MISSISSIPPIAN CONSTRUCTION, LABOR, AND SOCIAL ORGANIZATION
IN WESTERN KENTUCKY

A Thesis in
Anthropology

by

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Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Doctor of Philosophy

August 2005
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ABSTRACT

This dissertation examines the evidence for status differentiation between residents of the Annis Village, a single mound Mississippian site along the banks of the Green River in Butler County, Kentucky. Excavations conducted by the Works Progress Administration (1939-1940) and Penn State (2002-2004) exposed over 7,000 m² of the community, including the entire platform mound. A total of 34 structures, three palisades, and numerous other features were excavated, and over 20,000 artifacts were found.

Status differences are normally measured using elaborate burials, fancy artifacts, and monumental architecture. However, most of these studies have focused on larger Mississippian sites that make up a proportionally low number of sites. Smaller mound sites, such as Annis, are much more numerous and have great potential to contribute to a more full understanding of Mississippian sociopolitical complexity.

At Annis, comparison of mound (elite) and village (non-elite) materials do not reveal significant differences, leaving labor investment in monumental architecture as one of the few distinctions available. Using ethnographic and experimental data, I calculate the labor required to construct each stage of the platform mound, the structures on its summit, and the associated palisades, as well as the number of workers that would have been necessary to complete each task.

The results indicate that labor investment, while crucially important to Mississippian societies, was not overly taxing on the local population and could have been accomplished easily by a relatively small number of people in a reasonably short
period of time. Based on the lack of exotic items, I argue that the residents of Annis and other sites in the vicinity did not participate in a prestige-goods economy. Evidence of status is much more subtle and is reflected in the costs of monumental architecture.
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ACKNOWLEDGEMENTS

This project could not have been completed without the help of a number of people. I thank my committee members, George Milner, Dean Snow, Lee Newsom, and Barry Scheetz, for their helpful and constructive comments. George, in particular, has been a tremendous source of support, constructive criticism, and good cheer throughout the project. It was he who recommended the Annis site to me as a research project and did the thankless logistical work to allow our field schools there to happen. David Webster, Ken Hirth, and Steven Beckerman also gave me helpful feedback on aspects of this project. The late James Hatch gave me my first taste of Mississippian archaeology a decade ago. He is missed but would no doubt be satisfied that I made it this far.

George Crothers and Nancy O’Malley of the University of Kentucky’s William S. Webb Museum of Anthropology allowed me to borrow the Annis materials for analysis, looked up information for me when circumstances did not allow me to make it to Lexington myself, and gave permission to use WPA photos. David Pollack of the Kentucky Heritage Council answered many of my questions and looked at sherd photos to help me identify types.

Over the course of three field seasons, a great number of individuals participated in the project. I first want to thank Carroll and Doris Tichenor for giving us permission to work at the site and giving us the run of the place for weeks at a time. I became but the latest in a series of archaeologists to benefit from their hospitality. Their vigilance has kept the site well protected and I have no doubt that it will remain so. All archaeologists should be fortunate enough to deal with such fine people.
Members of the 2002 volunteer crew were Shelly Becker, Mina Chaker, Scott Hammerstedt, Steve Linthwaite, George Milner, and Joe Orkin. Erin and Cassidy Hammerstedt also visited the project. The 2003 field school consisted of Matt Boor, Matt Brungo, Rich Burnette, Adrian Eakes, Josh Fleming, Scott Hammerstedt, Ryan Hudson, George Milner, Brandon Pinzini, and Pete Wisniewski. Roy and Susan Hammerstedt made appearances as “overburden removal specialists” during the 2003 season. The 2004 crew members were Jen Amstutz, Afton Campbell, Scott Hammerstedt, Kim Holm, Tom Kutys, Julia Landis, Matt McMahon, George Milner, Emily Mitchell, Josh Renoe, and Amy Silverman. Jessica Burgett, Steve Linthwaite, and Pete Wisniewski also donated their time during the 2004 season. Thomas Nielsen served as a site supervisor in both 2003 and 2004 and also provided English translations of Danish articles. Your hard work made this research possible and I thank you all.

I also thank Rich Burnette, Afton Campbell, Mina Chaker, Lindsey Clark, Adrian Eakes, Josh Fleming, Traci Haimowitz, Ana Hernandez, Kat Hinkel, Erin Holland, Ryan Hudson, Tom Kutys, Julia Landis, Emily Parker, Sean Slane, Pete Wisniewski, and Jon Witcoski for their help with artifact analysis. Susan Hammerstedt did part of the data entry, and Rudy Slingerland of Penn State’s Department of Geosciences (and a fine hockey teammate) spent several hours identifying stone types. Jessica Burgett proofread the entire manuscript, Corey Sparks helped me with statistics, and Matt McKnight served as a sounding board for many of my ideas.

Victor Thompson has become a close friend over the course of this project. Not only did he volunteer his time in 2004 to an (ultimately fruitless) geophysical survey at
Annis but I was a frequent occupant of his couch in Lexington, sometimes for a week at a time, during trips to the Webb Museum.

I also thank Darlene Applegate for her hospitality. On several occasions she invited our entire field school to her home for barbeque and badminton, giving us a much-needed escape from our hotel and dorm rooms for a few hours.

Finally, I would be remiss if I did not mention the work of Ralph Brown and his crew of WPA laborers. Their work provided most of the data used here and the meticulous excavation notes that exist made my task much easier.

Funding for field and laboratory work came from Penn State’s Department of Anthropology’s Hill Fellowship, Research and Graduate Studies Office, and field schools run through Outreach and Continuing Education. Funding for chemical analysis of ceramics came from a Sigma Xi Grant-In-Aid of Research, and was further subsidized by National Science Foundation Grant No. BCS-0102325, awarded to the Archaeometry Laboratory at the University of Missouri Research Reactor. The conclusions drawn in this dissertation do not necessarily reflect the opinions of these institutions.
Chapter 1

Introduction

Late prehistoric Mississippian societies (A.D. 1000-1600) in the southeastern and midwestern United States (Figure 1) provide a rich dataset to explore the nature and extent of social distinctions in middle-range societies. We now know as much or more about Mississippian groups as we do about comparable societies elsewhere. This has led many scholars to use Mississippian examples in discussions of prehistoric chiefdoms (e.g., Chapman 2003; Earle 2002; Johnson and Earle 2000:265; Yoffee 2005). However, much of our knowledge comes from work done at large mound sites that make up only a small number of all known sites.

Figure 1: The Mississippian world (shaded). Outliers such as Aztalan in southern Wisconsin and Steed-Kisker in western Missouri are not included.
Excavation and analysis of smaller mound and non-mound sites, by far the most common type of Mississippian settlement, provide much needed data on the rest of the Mississippian world. By obtaining a more complete view of these small sites, we can gain important insights, both material and ideological, into the inner workings of Mississippian polities. This provides a picture of the full range of variation inherent in these societies.

The present study explores the nature of status differentiation at one of these smaller sites: Annis Village, a single-mound Mississippian site along the Green River in western Kentucky. Annis is an ideal case study because several seasons of excavations 60 years apart (first by the Works Progress Administration’s (WPA) archaeology program and then by Penn State) exposed nearly an entire community, something that is rarely possible today because of a lack of time and funds. The analysis of this settlement plan, selected artifacts, and a detailed reconstruction of labor requirements allows for an investigation of social differentiation and its manifestations at a small, isolated, Mississippian mound site.

In this dissertation, I describe the mound (Chapter 5) and the village (Chapter 6), the general characteristics of the artifact assemblage, and its relevance to studies of status differentiation. Using both experimental and published data (Chapter 3), I calculate the labor involved in constructing the mound, its summit architecture, and three separate palisades (Chapter 8). I examine the change in the community over time as it can be reconstructed from different phases of construction (Chapter 7), and I compare the labor and artifacts at Annis to other sites in the vicinity to come to general conclusions about Mississippian settlement in the Green River drainage (Chapter 9).
I argue that the residents of Annis were not a part of a prestige-goods economy, in which elites controlled fancy or nonlocal objects to further their own positions, nor were other sites in the region. This does not mean, however, that important people differentiated from everyone else did not live at the site. Changes in the overall layout of the community, the use of the mound summit, and significant changes in mound volume and building size indicate different forms of social organization over time. By this I mean that there was variation in the organization (structure) of the polity (e.g., occupational phases were not all uniform in terms of their organization, even within a single multigeneration site). As I demonstrate, status at Annis was not qualitatively different than what is seen at other sites in the region. Status can, however, be measured quantitatively through the evaluation of labor investment and can be seen in the presence of a handful of fancy artifacts in restricted contexts.

At Annis, labor and community layout are the key to understanding social differentiation in the absence of fancy artifacts. Labor costs were relatively low; however, this does not mean that residents of the site and its environs did not view them as important. The mound was a focal point for the community, even if not for the immediate benefit of all. Contributing labor for its construction was likely an important symbolic act.

The Problem

Nearly all archaeologists agree that Mississippian societies were socially ranked and had permanent offices of political and ritual importance. Differences between elite
and non-elite people can be detected, in part, by the residence of elites on platform mounds and the contents of these mounds. These distinctions have been of key importance in the description of Mississippian societies as chiefdoms. However, despite the recognition of these differences, the ways in which high and low-status individuals were economically distinct is the subject of considerable argument (e.g., Cobb 2003; Milner 1998, 2004; Muller 1997; Pauketat 1994, 2004; Schroeder 2002).

All would agree that chiefly power was kin-based and that chiefs controlled, to some extent, the labor and resources of their followers. Some people were set apart from others and were able to exert this control. Residence in a big house on a platform mound and rich burials are archaeological indicators of this privilege. This shows the social standing of elites and the central role of mounds in Mississippian life, although the importance of the volume of mounds is debated (Blitz and Livingood 2004; Knight 1986, 1989; Krause 1990; Lindauer and Blitz 1997).

The control that elites had over the basic needs for day-to-day life is subject to disagreement. Elites clearly had some preferential access to prestige items, but it is less clear that they had the same rights with respect to food and artifacts necessary for daily tasks. This is due, in part, to the fact we do not have a full appreciation of the range of Mississippian societies – and differences among individuals within them – because archaeological work has focused on larger sites. Elites have been clearly identified at these large sites, but we know little about the ways in which status was manifested at the much more numerous smaller sites. This bias has hindered our understanding of status-related prerogatives. Models that work for larger sites are not always applicable to these smaller sites, therefore research aimed at reconstructing status at small sites is imperative.
Addressing the Problem

The tremendous variation present within Mississippian requires us to look at similar variables (when possible) at large and small sites because they can be easily measured and compared. Models of prestige-good economies (control over exotic or nonlocal goods by a small subset of the residents of a site or polity) will not necessarily work at smaller sites because fancy artifacts are often rare or non-existent. In addition, the populations of these polities were often smaller and more isolated from one another than those packed into areas such as the Mississippi River floodplain from the American Bottom south to the lower valley. We can overcome this problem by looking at small sites using selected variables such as materials, community layouts, labor, foodstuffs, and changes in each over time. These variables are available at all sites (including Annis) and allow comparison to understand the nature, extent, and variation of status in Mississippian societies.

By materials, I refer to both raw materials and finished goods, including pottery, tools, beads, and food remains (both the amount of them and access to them). Preferential access to these items should be seen in their restriction to mound contexts or in only a small subset of burials. Community layout refers to both formal and informal space. Are some buildings larger or more specially placed than others? Is there change in the layout and size of communities over time? Labor can be measured in both the amount required and the kind of labor. Amount of labor simply refers to the time and people necessary to build monuments. The kind of labor can be divided into two spheres: private and public. Private labor is mustered to construct mounds and summit
architecture that was only meant for the benefit of a few individuals. By public, I refer to the construction of palisades and defensive enclosures that are of use to many people, not just the elite. There is obviously some overlap between the two since mounds were central to Mississippian ideology, but here I refer to physical benefit rather than mental well being.

Changes in materials, layout, and labor over time reflect changes in the social dynamics at a particular site. This could indicate the ascension of a new elite, changes in the authority wielded by the elite, the abandonment of a site, increases and decreases in population, and the willingness of people to contribute labor to major (supra-household) projects. Both a diachronic and a synchronic perspective aid in site interpretation. Synchronic snapshots of time of each construction phase tell us what was happening at a given time. A diachronic view, looking at differences between each phase, can tell us how social organization changed over time.
Chapter 2

What is Mississippian?

Chiefdoms

A distinguishing characteristic of chiefdoms is the establishment of both a permanent office of chief and a group of hereditary elites (Arnold 1996; Carneiro 1981; Sahlin 1972:139; Service 1962:150, 1975; Spencer 1987:371). Despite the influence of the chief and other elites, they do not necessarily have coercive power to force others to do what they command. Instead, their authority comes from their birth into a certain family, their position as ritual leaders, and established custom plus the ability to involve ritual, social sanctions, and occasionally violence (the threat is always there, if rarely used) (Fried 1960, 1967:718; Oberg 1955).

In a classic definition of the chiefdom, Service (1962:144) argued that communities were specialized. Chiefs served as managers, and chiefly redistribution of goods was key to a chief’s position and to the origin of chiefdoms (see also Fried 1967; Sahlin 1958). In his definition, goods flowed into the chiefly center from specialized communities and were redistributed by the chief. Labor was pooled and supervised by the chief for projects that were beneficial to the community (system-serving); that is, people were dependent on the smooth-functioning and complex intercommunity relations monitored and arranged by the chief. In this way, the chief managed the economy of the chiefdom and cemented his or her hold on power.
About a decade later, studies showed that the distribution of key economic resources or local goods (e.g., those needed for the daily operation of households) was not necessarily restricted or managed by the chief and there is more variability in this social system category than was assumed by Service (Earle 1977, 1987, 1997, 2002; Peebles and Kus 1977; Taylor 1975; Widmer 1994). The proponents of this model do not dispute that chiefs were central to the economy but argue that chiefs were more self-serving and depended on the acquisition of wealth and careful movement of it to selected supporters to maintain their position. Display goods, in fact, may have been restricted to the chief and principal supporters. Models for the acquisition of wealth and influence by elites in various parts of the world have been put forth by Frankenstein and Rowlands (1978), Brumfiel and Earle (1987), Blanton et al. (1996), and Helms (1979, 1993), among others. While there is some disagreement on certain points, it is possible to tease out some similarities in these models to come to a broad but workable definition of the chiefdom.

A chiefdom is a polity that:

- is centralized and encompasses multiple communities
- has a kin-based rank system
- has a permanent office of chief that must be filled through an orderly line of succession, as well as a group of hereditary elites and highly ranked lineages
- depends on the development and maintenance of a faction to preserve the position of the chief
- permits elites to mobilize the labor or goods of others
- is relatively unstable—lasting only a short time, perhaps generational

This definition encompasses much of the information presented above and is purposefully broad in order to accommodate a great deal of societal variation, such as Steponaitis’ (1978)
simple vs. complex chiefdoms, as well as a diverse lot of historically known societies worldwide.

The usage of the term *chiefdom* is not meant to pigeonhole Mississippian societies into a socio-evolutionary type. There is, in fact, considerable variation within so-called “middle-range societies,” as pointed out by Feinman and Neitzel (1984), Yoffee (1993, 2005), and others. My use of the term is simply due to the fact that these societies must be called something, if for no other reason than to have a convenient label to facilitate discussion among scholars (Muller 1997:38-39). Further, the category is useful because it groups together myriad societies of more-or-less similar scale (size) and structure (sociopolitical organization and economic system).

**Mississippian Chiefdoms**

Mississippian was originally used by William Henry Holmes (1886, 1903, 1914) in reference to the ceramic tradition of the Mississippi Valley. His “Middle Mississippi province” encompassed much of Missouri, Arkansas, Tennessee, Mississippi, Kentucky, Illinois, and parts of Iowa, Indiana, Alabama, Louisiana, and Texas. Pottery within this region was recognized as being tempered with crushed shell or clay.

The usage of Mississippian has changed in the past century as data have accumulated and research questions have changed (Cobb 2003; Griffin 1967, 1985; Schroeder 2004a; Smith 1986; Steponaitis 1986). The first attempts to compile trait lists to define Mississippian came from Cole and Deuel (1937; Deuel 1937) and McKern (1939) as part of the so-called Midwestern Taxonomic Method. At this time,
archaeologists were concerned with classification of societies in order to arrange them in proper chronological order. These authors recognized the importance of shell-tempered pottery, but included mounds, structure form, and burial practices, among other traits, in their definition of Mississippian. Mounds, wall-trench houses, and shell-tempered pottery became the most important, at least the most cited, characteristics, in large part because they were widely distributed and easily identified. At that time, Mississippian was a Midwestern (not Southeastern) endeavor stemming largely, but not exclusively, from University of Chicago work in the lower Illinois River valley and, later, in the Black Bottom of the lower Ohio River Valley.

With the improvement of methods and the acquisition of more data, scholars over the past sixty years have further expanded the concept. This was a move from classification to an interest in how people lived, organized themselves, ate, and what they believed in. In the 1960s, Mississippian cultures were defined as agricultural, based on maize (Griffin 1967). In the 1970s, scholars began to view Mississippian societies as socially complex classic “chieftdoms” (Brown 1971; Hatch 1975, 1976; Larson 1971; Peebles 1971; Peebles and Kus 1977) that had adapted to a riverine environment (Smith 1978b). By the 1980s, studies of Mississippian ideology became more common (Brown 1975, 1976, 1985, 1989; Knight 1981, 1985, 1986, 1989a, b) and it was recognized that these societies were more dynamic than previously believed (Anderson 1994b; Scarry 1996).

Today, Mississippian refers to societies that had a complex political and social organization, constructed platform mounds and wall-trench houses, relied on maize agriculture, practiced a religion based on a complex set of iconographic motifs, and
generally, but not always, made shell-tempered pottery and triangular projectile points. There is considerable variability in the archaeological record across the Southeast and southern Midwest, however, making an all-encompassing definition is difficult. Further, the term Mississippian has come to have two meanings. One refers to an archaeological category defined by certain traits, and the other refers to a sociopolitical type (Griffin 1985; Smith 1986), therefore not all Mississippian people were necessarily organized into chiefdoms.

It is important to remember that groups classified as Mississippian were not the only residents of the greater Southeast at this time. The Powhatan in Virginia (Barker 1992; Rountree 1993a, b; Rountree and Turner 1998, 2002) and the Calusa, Timucua, and Apalachee in Florida (Hann 1988; Widmer 1988; Worth 1998) were also chiefdoms, but are not considered to be Mississippian. They lie outside the Mississippian boundary in Figure 1. Nevertheless, the similarities in social structure between these groups and Mississippian groups encountered by European explorers has led researchers to use them in discussions of late prehistoric social organization in the Southeast and southern Midwest.

Architecture

Architecture, primarily mounds and wall-trench houses, is the most visible marker of Mississippian. Mound building was practiced in the Southeast at least 5,000 years ago (Saunders et al. 1997), and platform mounds first appear in the Midwest and Southeast during the Woodland period, ca. 100 B.C.-A.D. 700 (Jefferies 1994; Knight 2001; Milner
However, it was not until Mississippian times that platform mounds, usually topped by summit architecture (Figure 2), became common. The connection between platform mounds and earlier mound forms, if any, is unclear. Research by archaeologists and historians demonstrates that mounds marked the principal sites of chiefdoms (Anderson 1994b; Hudson et al. 1985; Smith 1978a), served as platforms for the houses of the elites (du Pratz 1972; Neitzel 1965), were locations for burials (including charnel houses), and were central to Mississippian ideology (Knight 1981, 1985, 1986, 1989b).

Figure 2: Mound B at Moundville, Alabama. Photo by the author.

Rectangular or square wall-trench houses (Figures 3 and 4) consisted of posts placed in a pre-excavated trench, with either a thatched or wattle-and-daub wigwam-like or gabled roof (Bennett 1944; McConaughy 1985; Reed n.d.), and are a classic marker of Mississippian societies (Deuel 1937; Lewis 1996; Lewis and Kneberg 1946; Milner 2004; Webb 1952; Wolforth 1987). Wall-trenches were common by the late 11th century in the American Bottom as well as the lower Ohio and central Mississippi valleys (Milner et al. 1984; Morse and Morse 1983; Muller 1986). There is some evidence for a date as early as A.D. 850 in the Mississippi-Ohio confluence region of western Kentucky.
(Edging 1995; Kreisa 1990, 1995; Stout 1989; Sussenbach and Lewis 1987). If this is accurately dated, it is a true outlier.

Figure 3: Wall-trench house (Structure 15) at Annis, Kentucky (WSWMA negative #4102). The wall trenches were pedestaled by the excavators.

Figure 4: Idealized floor plan of a Mississippian wall-trench house from Indiana. Redrawn from original drawing by Glenn Black (1944:489). Shape, size, and internal features of houses vary from place to place.
Agriculture

Mississippians depended heavily on maize-based agriculture. While maize had appeared by ca. A.D. 200 during the Middle Woodland period, it was not common until A.D. 800-900 or later in some areas (Bender et al. 1981; Johannessen 1993; Lynott et al. 1986; Smith 1989; Yarnell and Black 1985). Between A.D. 1000-1200, maize became the staple of the Mississippian diet in most places. In the lower Mississippi Valley, however, maize did not become important until the 13th century (Fritz and Kidder 1993; Kidder 1992).

Maize, since it is easily stored and produces high yields, is often viewed as the catalyst for the formation of chiefdoms (Griffin 1967; Peebles and Kus 1977; Smith 1986; Steponaitis 1986). The increase in available food spurred population growth and occurred at approximately the same time as the formation of chiefdoms, although it is unclear which was the prime mover. Early European explorers described large towns, rich agricultural fields, and large storehouses filled with maize, which they often received as tribute from local chiefs (Clayton et al. 1993; Hudson 1990). This tribute generally took the form of foodstuffs—deer, corn, beans, berries, etc.—which were often given to the Spaniards or taken by force.

Dependence on maize influenced the distribution of Mississippian sites on the landscape. Maize thrives in upland soils and well-drained, alluvial soils. Bottomlands, however, had abundant natural resources. This led to a settlement pattern centered increasingly on floodplains and oxbow lakes near the major rivers (Griffin 1967; Smith 1978b), with wild resources arguably more important than maize. The productivity and
diversity of these wild resources (within a few kilometers of rivers) was the principal reason for floodplain settlement and, of course, annual floods brought in nutrients to renew the soil.

The degree to which this settlement pattern holds true varies across space and time (Kowalewski and Hatch 1991; Smith 1978b), as does reliance on maize. In the lower Mississippi Valley, for example, local domesticates, not maize, made up much of the diet until after A.D. 1200, well after the rise of the first chiefdoms (Fritz and Kidder 1993; Kidder 1992; Kidder and Fritz 1993), and coastal groups, such as the Calusa in Florida, subsisted into the 16th century largely on marine resources that were readily available and less costly to harvest than maize (Marquardt 2001; Widmer 1988). In these areas, wetland and lagoon resources were available in sufficient quantity that the adoption of maize was not necessary.

Religion

The study of Mississippian religion has a long history. Early scholars recognized the similarity of motifs that occurred on pottery, shell, and copper across the Southeast, and noted that much of this material came from large sites (Griffin 1952:363). This corpus of motifs was referred to then as the “Southern Cult,” although it is today called the “Southeastern Ceremonial Complex,” or SECC. Antonio Waring (1968; Waring and Holder 1945) made an early attempt to compile a trait list for the SECC, believed that variation could be linked to specific tribes, and argued that the SECC was a short-lived phenomenon originating with Muskoghean speakers. The problem with this approach
was that trait lists were ever-expanding; eventually the SECC seemingly manifested itself everywhere.

More recently, careful study of SECC items and advances in $^{14}$C dating have given us a wider temporal distribution and a fuller picture of variation in the SECC over time and space. More focus has been placed on the production, consumption and distribution of SECC items than the mere compilation of trait lists.

Work by James A. Brown, Vernon J. Knight, Jr., and others has shown the SECC traits and designs to have deep time depth, although the coalescence of these traits was relatively short-lived (Brown 1976, 1985, 1997, 2004; Galloway 1989; Knight 1981, 1986; Knight et al. 2001). Variation occurs both over time and regionally; that is, local groups had their own interpretation of certain motifs. Greater emphasis has been placed on variation within themes to identify the place of origin of the material and relate it to known historic Southeastern belief systems. Knight (1986) has broken down the SECC into three separate, but interrelated, cult institutions, one associated with warfare and cosmogony, one focused on platform mounds, and one concerned with temple statuary, and Brown (1985) discussed ancestors and warriors.

The platform mound institution has the most relevance to this dissertation. Mounds were of central importance to Mississippian societies. Both segments\(^1\) of society, elites and commoners, were able to participate in ritual activity and the mound served as a visible reminder of religious beliefs. Knight (1981, 1986, 1989b) referred to mound building as a communal cult, involving entire communities or groups of

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\(^1\) This is a simplification that is not necessarily correct. Instead of two discrete groups, there may have been a status-related continuum between people rather than a gulf between them.
communities. Periodic recapping of the mound, he argued, was a symbolic rite of intensification that allowed the general population to participate in the altering of the mound, a public monument. This monument was something that benefited only a few elites, but the recapping was cast as a public ritual event. As the platform mound was a representation of the earth, recapping was seen as a burial and renewal of the earth (Knight 1981:46-48). Knight further divided this mound institution into the construction of the mound and the use of its summit. Construction was the communal act of Mississippian religion, while summit use was more private and restricted to only a few individuals. Mounds are most visibly a representation of the chief’s influence. While mounds may represent rites of community renewal and objects of display, only a select group of individuals were permitted to ascend to their summits. In fact, in a few instances, there are fences around mound summits and bases—historically for the Tunica and at several archaeological sites (including Annis) (Anderson 1994b:178-79; Black 1967:266; Brain 1988; DeJarnette and Wimberly 1941:61; Price and Fox 1990:24; Smith 1969:66; Swanton 1911:262-69).

Sociopolitical Structure

Settlement Patterns

Mississippian chiefdoms were multi-community polities with a prominent central site. Archaeologically, this is reflected in site hierarchies based on the number of or presence of mounds, with one site standing out from the rest by virtue of its size, internal
components, and arrangement. Henry Wright (1984) proposed that a distinction can be made between simple and complex chiefdoms based on the number of levels of decision making above local communities. Simple chiefdoms have only one level while complex chiefdoms have two (see also Anderson 1994b; Milner and Schroeder 1999; Steponaitis 1978). Chiefdoms can cycle between simple and complex over the course of their existence (Anderson 1994b, 1996a, b; Milner and Schroeder 1999).

Chiefdom size varies greatly, both in terms of population and geography. The de Soto accounts describe densely and sparsely populated areas as well as unpopulated buffer zones between neighboring chiefdoms (Anderson 1994b; Clayton et al. 1993; DePratter 1991; see also Milner et al. 2001). Chiefdoms were thought to be no more than 36-56 km in diameter, or a day’s travel, in parts of Georgia, but were sometimes more that 100 km long in the Mississippi Valley (Anderson 1994b; Brain 1988; Hally 1993; Milner 1990b, 1998:175; Morse 1990; Welch 2001:230). These differences can largely be ascribed to variation in the nature of river valleys (open floodplain or hilly piedmont areas) and the arrangements of people within them. The largest site in a region is generally believed to be the center of the chiefdom (Anderson 1994b; Muller 1978, 1993; Peebles and Kus 1977; Steponaitis 1978), although archaeological recognition of the entire spatial extent of historically described chiefdoms can be difficult. This is particularly true of “paramount chiefdoms” where pockets of population are separated by unoccupied zones (Hally et al. 1990). Often, this central site possesses the largest mounds, rich burials, and evidence for social differentiation that is lacking at outlying sites, although in many cases this is simply because we do not have the excavation data necessary from outlying sites for comparative purposes (Muller 1997). However, in
places where these data are available, such as Cahokia, there were status distinctions among people but these are more of a continuum between high and low than a gulf between them (Milner 1998, 2003).

Settlement patterns varied across time and space, but minimally there were three types of settlement (Figure 5): compact towns with no outlying sites, smaller sites clustered closely around mound centers, or an even distribution of outlying sites across the landscape with no clustering around mounds apparent (Hammerstedt 2000:7). Compact towns were found in the Dallas area of eastern Tennessee and Parkin and “St. Francis” sites in Arkansas (as well as in other areas) (Lewis et al. 1995; Morse 1990; Phillips et al. 1951; Polhemus 1987, 1990), although there are a few exceptions (Davis 1990). Clusters of smaller sites dispersed around mounds occurred near Moundville (Hammerstedt 2000; Hammerstedt and Myer 2001; Myer 2002; Welch 1998), Lubbub Creek (Blitz 1993; Jenkins 1982), Kincaid (Muller 1978, 1993), the American Bottom area (Milner et al. 1984), and historically in parts of the Caddo area (Wedel 1978), among others. Relatively even dispersal of sites occurred during late Lamar phase occupations of the upper Oconee area in Georgia (Kowalewski and Hatch 1991) and in the Florida Apalachee region (Payne and Scarry 1998). This wide variation in settlement patterns was influenced by the location and prominence of mound centers (Anderson 1994a, b, 1996a, b; Blitz 1999), the environment (Clay 1976; Larson 1970, 1972; Milner and Oliver 1999; Smith 1978b), demographic factors (Milner et al. 2001), and warfare (Smith 1978b).
Archaeologists think that Mississippian groups were organized along kinship lines, based on historical and comparative information. In general, reconstructions of Mississippian social systems are informed by either ethnographic “upstreaming,” in which ethnohistoric data are projected into the prehistoric past, and comparative analogy, in which ethnographically known cases from chiefdoms elsewhere in the world are compared to the archaeological record.
Knight (1990, 1997a) and Widmer (1994) agree on the existence of matrilineal, kin-based descent and ranking, but have different emphases. Knight, using data from the Timucua, Chickasaw, Natchez, Muskogee, and others, argued for the prominence of ranked matriclans headed by a paramount chief. These clans were corporate in nature, and lineages provided organization within the clans. Widmer, on the other hand, using Southeastern and African data, argued for the prominence of the individual lineage in the emergence of ranking. In his view, each individual is ranked within his or her lineage, which in turn is ranked according to other lineages. This comparative system gives each individual a unique rank and is therefore of more importance than the clan. Despite the differences in these two models, both provide evidence for the prominence of kinship-based systems in Mississippian societies.

**Political Structure**

There is abundant archaeological and historical evidence for the existence of ranked societies in the Southeast. Certain finely crafted goods seem to be concentrated at larger mound sites, although as mentioned above, part of this is because fewer smaller sites have been excavated. However, at Cahokia, where there is the best sample of small sites, fancy goods were in fact located in or near mounds, but there is a continuum of the relative amount of goods found in high- and low-status areas rather than a gulf between them (Milner 1998, 2003). Material could be concentrated at mound sites because of the dealings of important people who dwelled there or because of problems with
archaeological sampling (e.g., uneven sampling, bias towards mound sites, or simply a lack of knowledge about the society other than through material remains).

The writings of early European explorers, if used carefully, provide numerous examples of social differentiation. This evidence is often, but not always, backed up by archaeological research. Clear historic evidence exists for differences in dress, deferential behavior, houses, burial treatment, and labor mobilization. Chiefs often met the explorers at some distance outside a town and were usually carried on litters by lesser nobles:

“…the cacica came from the town in a carrying chair in which certain principal Indians carried her to the river” (Elvas 1993:82).

“The cacique came out to welcome him two crossbow flights from the town in a carrying chair borne on the shoulders of his principal men...(Elvas 1993:92).

“The cacique came forth to receive the Governor on a litter, covered with white blankets of the land. Sixty or seventy of his principal Indians carried the litter on their shoulders, and none was an Indian of the plebians or commoners, and those that carried him took turns from time to time, with great ceremony in their manner” (Rangel 1993:284).

Unfortunately, this cannot be backed up by archaeological evidence since we have no way of measuring deferential behavior, and clothing rarely survives the test of time.

Elite members of society were described as living in large residences atop mounds (Biedma 1993:239; du Pratz 1972; Elvas 1993:75,95). Archaeologically, the existence and size of mound summit architecture indicates that certain members of local groups enjoyed access to larger and more prominent houses (e.g., Anderson 1994b; Black 1967; Blitz 1983; Cole et al. 1951; DeJarnette and Wimberly 1941; Niquette 1991; Payne 1994,
Evidence for the differential treatment of elites at death is supported by both historic and archaeological sources. Historically, Le Page du Pratz (1972) provided a vivid depiction of the funeral rites carried out upon the death of Tattooed Serpent, the brother of the Great Sun of the Natchez, in which individuals were ritually killed in order to accompany his spirit in death. The body was carried on a litter and placed in a mound summit charnel house. Archaeological evidence shows that certain individuals were held in much higher regard than others and indicates social ranking through mounds, fancy artifacts, elaborate burials, and restricted-access cemeteries (Brown 1971, 1996; Fowler et al. 1999; Goldstein 1980; Jenkins and Krause 1986; King 2003; Knight and Steponaitis 1998b; Milner 1984; Moore 1996; Peebles 1971; Peebles and Kus 1977).

Chiefs may also have been exempt from labor (Barker 1992; Hann 1988:105; Worth 1998:166), although most of these descriptions come from well after European contact. It is clear that elites were able to command the labor of others. In the de Soto and Pardo accounts, this was primarily in the form of providing bearers for the Spaniards: “…they gave us eight hundred Indians to carry our food and clothes, and other Indians to guide us…” (Biedma 1993:229). This could have easily been simply a way to get rid of the Spaniards as quickly as possible, however, since the caciques were not always eager to supply these bearers (Bandera 1990:271). Regardless, their ability to provide labor, as well as to muster supplies of corn and other goods for the Spaniards, indicates that they

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2 This is a problem because these accounts describe societies that were changed considerably by contact.
had some capability to mobilize the labor of others, although decisions were often made by a council or at least in consultation with important individuals (du Pratz 1972:75; Galloway 1995:85). Archaeologically, we can measure labor mobilization through the presence of large earthworks and other projects.

The leaders of some of the larger polities, such as Coosa (Smith 2000), collected a regular tribute of foodstuffs—game, fruits, and nuts—from subsidiary centers, although it is not clear whether this tribute was solely for the use of the elite. However, as Coosa weakened, these smaller centers, such as Napochies, refused to pay. The chief of Coosa enlisted the help of Spanish soldiers of the de Luna expedition to collect payments (DePratter 1991:49, 134-135; Hudson 1990:102), indicating that power was not absolute and that factionalism within polities was common. In addition, the amount of tribute collected would not have been enough to feed large numbers of people; instead, it was more likely used by elites to bolster their own positions by giving gifts to key members of their factions.

Clearly certain individuals, both male and female, were accorded special treatment and were treated with respect, although, due to the nature of these accounts, it is impossible to glean information on how this respect translated into differential access to the essentials of daily life. It does seem that elites had special access to sumptuary items, such as the “white blankets of the land” in the above quote from Rodrigo Rangel. Nevertheless, the few skeletal analyses available do not indicate great variation in nutrition between elites and commoners (Milner 2004; Powell 1988, 1998; Schoeninger and Schurr 1998; Schurr and Schoeninger 1995), although the data are not as good as one would like.
Interpretations of Mississippian Status

While nearly all archaeologists agree that Mississippian groups had a system of social ranking, there is considerable disagreement over the degree of control wielded by elites. The debate over the nature of Mississippian complexity is most heated in the American Bottom region of Illinois, especially at Cahokia. Cahokia attracts the most attention because it is the largest and most impressive Mississippian site. These differing perspectives have largely occurred due to the nature of the data that are available and that have been analyzed thoroughly. Multi-mound sites, such as Cahokia, Moundville, Etowah, and Spiro, dominate discussions of social differentiation. These are the largest sites in the Southeast and have been the focus of attention for many years. However, past excavations at these sites targeted areas with a high probability of locating fancy artifacts, burials, or houses. Comparatively little work has been done in “non-elite” precincts of these larger sites (although some parts of Cahokia, Etowah, and Moundville have seen more excavation). As a result, these sites may look more hierarchical than they actually were since there is little data that enables direct comparison of a wide range of “elites” and “non-elites” in the same social system.

Beginning in the late 1980s and early 1990s, the term “minimalist” entered the literature (Stoltman 1991) as a contrast to what have become known as “maximalist” viewpoints. A third term, “idealistic,” entered the picture somewhat later (Schroeder 2002). As described by Stoltman, these categories reflected the active vs. passive roles of Cahokian elites in a regional interaction network. Maximalists argue that Cahokia was the capital of a populous polity, possibly a state rather than a chiefdom, with centralized
political and economic control, economic differentiation, full-time craft specialists, and contacts over a broad area (hundreds of kilometers) in other words, a “top-down” model for the structure and origin of the society (Dincauze and Hasenstab 1989; O'Brien 1972, 1989, 1991). Minimalists use a “bottom-up” model in which Mississippian chiefdoms were adaptations to local environments, were politically and economically autonomous, and that chiefs, while important, did not greatly interfere with the day-to-day lives of commoners (Cobb 2000; Milner 1990a, 1998, 2004; Muller 1997; Muller and Stephens 1991). Finally, idealists focus more on agency and view ideology as a more important way of gaining power than economics; that is, a distinction is made between an idealist and materialist perspective, and also cast as human agency versus a view based on environment, demography, and society (means of production) (Emerson 1997; Pauketat 1994, 2004a, b; Pauketat and Emerson 1997).

However, these are broad caricatures that conflate more nuanced arguments. Minimally, there are three separate dimensions to this debate that are not necessarily mutually exclusive. The first has to do with quantity, or the amount of outside connections, numbers of people, levels of hierarchy, and economic differentiation. The second is a matter of structure, or the organizing principles of Mississippian societies. In other words, are these societies fundamentally the same or are some fundamentally different than others? Further, are there differences between Cahokia and other Mississippian polities that are quantitative (sheer number of mounds and artifacts) but not qualitative? Third, there is a question of process, or the search for the mechanisms of cultural change.
Quantity

Quantity provides the strongest support for a state-level organization for Cahokia. Several different quantitative lines of evidence are available. The first of these is the number of outside connections. The rise of Cahokia undoubtedly affected the people living in the American Bottom and nearby. Items of Cahokian manufacture (or of raw material found in the American Bottom) have been found in a number of distant areas across the Southeast, from Oklahoma to Louisiana to Alabama, into Kentucky, and up to Wisconsin (Emerson et al. 2003; Milner 1990b; Steponaitis 1992, see also Chapter 5). Items from elsewhere also found their way to Cahokia; often turning up in elite burials (Fowler et al. 1999). The distribution of these goods is sometimes interpreted as a prestige-goods driven system in which Cahokia served as a core with a periphery stretching for hundreds of miles (Peregrine 1991a, b, 1992, 1995). But did it involve trading networks over vast space, including into parts of the Northeast (Dincauze and Hasenstāb 1989), or was it representative of limited interaction with down-the-line exchange responsible for the movement of selected artifacts (Griffin 1993; Milner 1998; Muller 1997)? Many of the marine shell beads found at Cahokia are of poor quality (Milner 1998:131); this is indicative of down-the-line exchange rather than trade, with the poorest material preferentially moving further into the continental interior. As has been pointed out by Muller (1995), however, models of exchange vs. trade have not been adequately tested, therefore this debate still rages, although he is an advocate of down-the-line exchange with his distance-decay models for prestige-denoting shell gorgets and utilitarian Mill Creek chert hoes (Muller 1997)
Quantity also includes the number of people. Estimates of the population of Cahokia range from as high as 40,000 to as low as 3-15,000 (Gregg 1975; Milner 1998; Pauketat and Lopinot 1997), with figures from 10-20,000 being widely accepted. The lowest estimate of 3-8,000 people (Milner 1998) is only several times larger than those calculated for other large Mississippian sites such as Moundville, which may have housed about 1,000 people at its height (Steponaitis 1998). It is about the size of the largest historically known towns in the Eastern Woodlands (Muller 1997:207-208; Snow 1994:81).

Levels of political hierarchy are also important when looking at quantity. Archaeologically, these are best studied by looking at settlement patterns. In the American Bottom, there are at least three locations of decision-making (local communities to more inclusive multi-community groups). Near Cahokia, there is a system with Cahokia itself on top, then nearby sites with mounds and dispersed communities or “nodal points” (Emerson and Milner 1981; Mehrer 1995; Milner 1998; Milner and Emerson 1981); residents of these sites were likely connected through kinship and economic ties. Several levels are also seen elsewhere in the Mississippian world, such as at Moundville and Etowah, although recent research has shown that they were not all occupied at the same time and the primacy of one site over others may have changed over time (Anderson 1994b; King 2003; Knight and Steponaitis 1998b; Welch 1998); this is true for Cahokia as well.

Finally, quantity is important in studies of economic differentiation. No one disputes that some people were of higher rank than others. This manifests itself in rich burials with exotic materials such as Mound 72 at Cahokia, as well as others at Spiro,
Etowah, and Moundville. While some of these burials were spectacular in their display of wealth, it is important to note that fancy goods were not restricted solely to one segment of the population. Rather, the elites had more goods than others but many people did have access to these items (although they were fewer and often of poorer quality).

Quantity, then, is one way to measure the complexity of Cahokia and other Mississippian sites, although it is not necessarily related to the other two processes. The number of external contacts, the size of the population, the levels of regional hierarchy, and differences in access to materials are one way to measure complexity.

Structure

The underlying structure of Mississippian polities is of equal importance to our understanding of these societies. Simply put, researchers know that there was significant variation and instability across time and space within the Mississippian world. But did they share fundamental organizational principles? Most researchers agree that Mississippian groups were politically complex but did not become states (Anderson 1994b, 1999; Beck 2003; Blitz 1999; Cobb 2003; Emerson 1997; Hally 1996; Hudson 1997; King 2003; Knight and Steponaitis 1998a; Milner 1998; Milner and Schroeder 1999; Muller 1997; Muller and Stephens 1991; Pauketat 1994; Pauketat and Emerson 1997; Schroeder 2004a, b; Smith 2000; Steponaitis 1991; Welch 1991, 2004), although a few disagree (Conrad 1989; Gibbon 1974; Kehoe 2002; O'Brien 1972, 1989, 1991).
States are multi-community units with a large population, a centralized government, social classes, and the alienation of the means of production, labor, and ideology from the primary producers (Carneiro 1970; Low 1996; Muller 1997). Many people, some archaeologists included, rightly or wrongly associate large buildings with cities (Webster and Sanders 2001). To some, the presence of monumental architecture and a few lavish burials is enough to make Cahokia a city and the capital of a state (e.g., Kehoe 2002). To others, Cahokia is the principal site of a large and impressive chiefdom, but not a state (Emerson 1997; Milner 1998; Muller 1997; Pauketat 1994; Welch 2004).

The difference between Cahokia and other Mississippian chiefdoms is one of scale. There are more and larger mounds and more people at Cahokia than at other sites. However, there is no evidence for social classes or the alienation of people from their source of subsistence. To be sure, Cahokia’s shadow loomed large over the midcontinent for two centuries, recognized in the form of Cahokian artifacts found over a great area. Cahokia may have also influenced the shaping of Mississippian societies elsewhere (Pauketat 2004a), although not as far as the Northeast as argued by Dincauze and Hasenstab (1989). The development of Cahokia is quite similar to what we see at other Mississippian sites such as Moundville (Knight 1997b), that is, there was a quick rise in prominence followed by a protracted decline. This suggests that the sequence of events that led to the rise of Cahokia were similar to those elsewhere in the Mississippian world.

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3 Contrast this with the definition of a chiefdom presented at the beginning of this chapter.
Process

The final dimension to consider when investigating Mississippian complexity is the question of process. Here we can contrast the approaches taken by materialists and idealists. Materialist models emphasize ecological, demographic, and economic (technological and social labor needs) issues as the principle determinants of social structure and change over time (Milner 1984, 1986, 1998; Muller 1997, 1999). These models begin with the simplest level of society, the individual household. To these researchers, daily decision-making by residents of households is central to the organization of Mississippian societies, and chiefs, while very important, had minimal impact on the day-to-day life of most people.

Idealist models emphasize identity, agency, and iconography as part of a “historical process” that is unique to each society (Emerson 1997; Pauketat 1994, 2001, 2004a, b). Environmental, demographic, social, and natural considerations are viewed as secondary. These models generally use a “top-down” approach (hegemony) in which ideology is utilized by elites to exert control over the rest of the population, even to the point of the resettlement of segments of the population to serve the needs of the elite, as argued for Cahokia. However, heterarchical processes are believed to be at work at the same time (Pauketat 2004a). This can be seen in the form of differing uses of space within central Cahokia and possibly indicative of competing groups within the polity.
Summary

Three dimensions of status exist when looking at Mississippian societies. First, there is the question of quantity; the amount of external connections, numbers of people, hierarchy, and economics. Next is structure, the underlying principles of Mississippian societies. Third, there is process, the mechanisms of cultural change.

These dimensions are not mutually exclusive. For example, it is quite possible for one researcher to utilize environmental explanations for Mississippian chiefdoms while recognizing the utility of agency and ideology in day-to-day decision making. Agency is arguably important in narrowly defined spatial and chronological contexts, and environmental change and demography are important in larger and longer contexts. In other words, these different modes of explanation can each work at different scales of analysis.

Quantity and structure need not be related. For example, quantitative differences in the amount of material (e.g., in amount but not kind) do not necessarily indicate structural differences within a society. Also, structure and process may be independent in that the mechanisms of cultural change need not be related to the quantity of material and outside contacts.

One possible resolution is to integrate agency and the environment. Schroeder (2004b) has proposed that ecology and agency can be successfully integrated into the same model. In her view, we must first understand local ecology, the distribution of sites on the landscape, and their local history. When this is known, we must look to explain variability by looking at material and managerial issues. Any remaining variability may
then be explained through agency. People may have initially chosen the location of their settlements based upon key environmental factors such as availability of key resources or simply because certain areas were able to escape constant flooding. Later, however, when the environment changed (either slightly or catastrophically), they may have stayed in these places for other reasons. These could be as simple as an emotional attachment to the area (since relatives may be buried there) or as complex as being forced to stay in that spot by one’s more powerful neighbors. This approach combines ecological and agency-centered approaches into a workable explanation of hierarchy.
Chapter 3
Community Organization and Labor

The study of the organization of past communities and the labor invested in them is an important step in the reconstruction of ancient societies. By community, I refer to a group of people who inhabit the same physical space, share social, economic, and political practices, common interests, and identify themselves as different from outsiders. These people need not occupy the same space at all times of the year, but part-time co-residence is essential to maintain social networks (Kolb and Snead 1997; Yaeger and Canuto 2000). It is difficult to separate the individual household socially and economically from the surrounding settlement since the settlement is crucial to the existence of the household (Rapaport 1969:69; Yaeger and Canuto 2000).

Communities can be defined on several levels. At the first, and most basic, level is the individual household in which directly related kin interact on a day-to-day basis and depend on one another for economic survival. At the second level are households grouped together at a particular site. Members of different households may or may not interact on a daily basis, but are bound to other households by kin ties, political interests, and/or economic bonds. Finally, there is the regional level that connects residents of different sites to some degree. Most people at the regional level do not interact on a day-to-day basis but may congregate periodically for important ceremonies and other purposes. Clan or other kin ties cross-cut site boundaries, as do shared language and belief systems. Economic ties, particularly those based on subsistence, can be less
important in the regional community, depending how risky the setting is—the more risk, the more pervasive the economic ties.

In Mississippian groups, a second-level community can be defined as simply the area circumscribed by the palisade at the major center. However, in all likelihood, residents of small sites nearby would have referred to themselves as being of the same community as the residents of the large site. In this dissertation, I focus primarily on the community at its second level, that is, interactions between households at Annis itself.

Community Planning and Layout

To archaeologists, physical layouts of sites are of the utmost importance. Community planning shows that someone, or a group of people, guided site construction, that is, it did not generally spring up at random without direction. Alternatively, plans can be organic or self-organizing; that is, they can conform to particular physical characteristics of the area without careful planning. Structure can arise through planning or organically through individuals (households) making separate decisions based on proximity or prior land use. That is, a top-down or bottom-up pattern of decision making can lead to apparent structure.

Layouts are readily observable and, in some cases, quantifiable. Quantifying site area and energy expenditure allows us to tease out different patterns of authority over time. By carefully reconstructing the sequence of construction at a site, we avoid the problem of assuming that its form and configuration were the same during the entire
occupation. Finally, looking at single phases of site construction allows meaningful intra-site comparisons and the tracking of change over time.

It is important to recognize the social division of space within a community to get at issues of status differentiation. Cross-culturally, there are many examples of larger, more elaborate, and sometimes physically elevated structures for a limited segment of the population, generally a chiefly household (Ames and Maschner 1999:151; Ferdon 1987:18, 24; Fraser 1968:37, 44-45; Le Moyne d'Iberville 1981:125; Malinowski 1965; Payne 1994). Greater height allows the chiefly structure to serve as a visual focal point for the community, fill one’s field of vision as one draws closer to it, and create an overall sense of awe (Higuchi 1983:46-47, 183; Moore 1996:92-120; Morgan 1999). At Mississippian sites, this focal point comes in the form of platform mounds, often topped by summit architecture (Knight 1989; Morgan 1999). This is a common human pattern precisely because we all respond similarly to such visual input.

There are numerous examples of carefully planned Mississippian sites, both large and small. This planning is evident in the construction of platform mounds and palisades and the presence of central plazas and cemeteries (Lewis et al. 1998). The most obvious examples of planned layouts are at principal mound sites such as Cahokia, Moundville, Etowah, Kincaid, Angel, Lake George, and Mound Bottom. These sites all possess multiple mounds arranged around one or more plazas and were enclosed by palisades or ditches (Black 1967; Cole et al. 1951; Fowler 1997; King 2003; Knight and Steponaitis 1998; O'Brien 1977; Williams and Brain 1983). Over time, however, the layout of sites was modified as circumstances demanded. This is clearly seen at Moundville, where a palisade was constructed over an earlier mound (Knight and Steponaitis 1998; Vogel and
Allan 1985), and at Cahokia, where a strong palisade was built around the central portion of the site through a previously occupied residential area (Anderson 1969; Fowler 1997; Iseminger et al. 1990).

Mississippian sites with one or only a few mounds, such as Towosaghy, Wickliffe, Bessemer, Lububb Creek, Powers Fort, Tinsley Hill, and Andalex (Blitz 1993; Clay 1963a, b, 1997; DeJarnette and Wimberly 1941; Healan 1972; Niquette 1991; O'Brien 2001; Peebles 1983; Price and Fox 1990; Wesler 2001) also generally possess a plaza fronted by mounds, but multiple mound and plaza groups within the same site are not present, or at least are not evident. Palisades are also common at these sites or in the rarer case of Wickliffe, sites are located on high, easily defensible bluffs, indicating that security was a concern when selecting site location. While excavations are not always sufficient to determine the internal layout of sites, their strategic placement and the arrangement of mounds suggests planning.

Finally, the much more numerous nonmound sites also appear to be planned to some degree. Larger villages such as Snodgrass and Turner in Missouri (O'Brien 2001; Price and Griffin 1979) exhibit a more or less orderly arrangement of structures, while sites such as Morris, Kentucky (Rolingson and Schwartz 1966) and Marshall and King in Georgia (Hally 1988; Hatch et al. 1997) possess one or more palisades that enclose multiple houses. Even farmstead-sized sites such as Gypsy Joint appear to have had areas designated for certain tasks, suggesting household-level planning and organization of tasks (Smith 1978, 1995).
Labor

Estimates of the costs associated with labor and the extent to which this labor was controlled by certain individuals is central to the study of sociopolitical organization. Public or community labor is most easily measured by looking at monumental architecture, such as pyramids, mounds and other earthworks, and palisades. In more complex societies, the control over the labor of others demonstrates the authority of the chief to mobilize resources and people, as well as evidence for community planning. If labor is directed by one or more people, then it shows that, on some level, these people have the ability to command others. At the same time, it shows that some level of planning has gone into the construction of the site and that laborers are guided according to this central plan.

It is often assumed that large earthworks required large populations of workers who may have been forcibly conscripted for labor (see discussions in Milner 2004; Muller 1997). However, detailed studies to confirm the amount of labor necessary to construct Mississippian earthworks have rarely been done, which is surprising given statements such as “value was reckoned through labor, not things” and “labor was everything” (Pauketat 2004b:35).

It is often implied, if not stated directly, that labor demands on the local population pulled people away from important subsistence tasks (Kehoe 2002; O'Brien 1972, 1989). However, since most Mississippian production was done at the household level, each family could likely afford to contribute one member to labor projects without significant ill effects, depending on the time of year and the duration of the project.
These labor contributions were not year-round, but were probably periodic and scheduled so they would not interfere with other activities. For example, an observer in Nigeria in 1955 witnessed the construction of an approximately 50 m long and 4 m high roadside embankment, nearly the same amount of earth needed to construct a small, but common-sized, Mississippian mound. Communal labor from nearby villages was used and an unspecified number of young males (perhaps 100) were called upon to work for a short time. Using only short-handled hoes (no baskets or other carrying tools), they completed the construction in less than one day (albeit an intense one), often taking turns digging and moving earth (Shaw 1970). This example illustrates that labor projects using simple tools can be done in short, intensive bursts of activity by only one or two members of each household. Even if these projects were scheduled during harvest season (an unlikely scenario), losing one worker per household for a day would not likely have caused undue hardship. Major ceremonies, such as funerals, are often scheduled far in advance to collect enough resources and build special structures. By scheduling projects during down-times in the production cycle (e.g., not during harvest or planting season) elites would further lessen the impact on local people.

**Earth Moving and Excavation**

Lekson 1984; Marinas-Feliner 1998; Renfrew 1973, 1983; Saitta 1997; Shimada 1978; Trigger 1990; Webster and Kirker 1995; Webster 1990, 1991), although detailed evaluations of labor investment are rare. More commonly, archaeologists often assume that large buildings/mounds/pyramids = high labor expenditures = complex social organization. While this is often a valid assumption, when detailed experimental studies are undertaken or when estimates are made, the labor required to build these large monuments in non-state societies is generally less than previously thought (Craig et al. 1998; Galaty 1996; Milner 1998; Muller 1997; Webster and Kirker 1995), particularly when differential effort put into individual construction phases is taken into account; that is, when construction took place over a lengthy period, perhaps spanning generations. This point is illustrated by summarizing experimental projects from different parts of the world.

**Mesoamerica and South America**

Probably the best-known (at least the most cited) study of labor investment was done by Charles Erasmus (1965) who observed the work done by Mexican villagers. These men excavated earth using digging sticks rather than metal tools. In one day, one person excavated 2.6 m³, and moved 3.17 m³ a distance of 50 m, and 1.76 m³ over 100 m. Workers quarrying and moving stone to construct masonry walls produced 1 m³ in 12.25 person-days. This would result in a relatively light labor cost per household given the estimated population density for the Yucatan in Maya times.
Elliot Abrams (1987, 1994, 1998; Abrams and Bolland 1999), working with data and workers from Copán, Honduras, calculated detailed earth-moving, quarrying, and transportation costs both for the structures and their superstructures and decorations. He concluded that costs were significantly higher for the decorative masonry and plaster (89% of the total) than the remainder of the construction process (Abrams 1998). Further, the detailed sculpture and superstructure work would have required the presence of specialists, making the final expense of certain structures beyond the reach of most individuals. However, the cost of the bulk of the structure, that is, the walls and fill, was minimal. It was only the decoration, presumably carried out by only a few select people, that resulted in a high cost. Since this would not have required many people, the effects on the population as a whole would have been minimal (Webster and Kirker 1995).

Data from complex state-level societies such as Teotihuacan (Aaberg and Bonsignore 1975) and the Chimú Empire in Peru (Moore 1988) indicate high labor costs for pyramids and raised agricultural fields, respectively. However, given the large population size available for construction in these state-level societies, it is not likely that construction, despite the multiple years necessary, would have severely impacted the families of workers. In ancient Egypt, for example, there is evidence that workers, while conscripted, were compensated for their labor on the pyramids (David 1986; Lesko 1994), and that construction was carried out when agriculture was impossible due to the Nile floods (David 1986:58). Estimates of the labor required to construct the Great Pyramid at Giza point to a task easily achievable by the residents of contemporary Egypt (Lehner 1997:224-225), likely during times when other work was next to impossible.
In Hawai`i, a complex chiefdom, the chief Kamehameha had a large stone structure measuring 2,083 m² built in about a year, even working on the project himself (Cordy 2000:336-339). Similarly, the recapping of burial mounds among the Mapuche, a relatively simple society, was carried out periodically by the kin of deceased chiefs, resulting in the construction of modestly-sized mounds with minimal labor costs over a period of years (Dillehay 1990, 1992).

**Europe**

In the late 1950s and early 1960s, the British Association for the Advancement of Science carried out projects to construct a mound, a replica of archaeologically known examples, to determine the labor necessary for construction and to determine the effect of burial on artifacts over time (Evans and Limbrey 1974; Jewell 1961a, b, 1963). Using volunteers unfamiliar with the use of ancient tools (deer antler picks, ox and horse scapulae, wooden mauls, and wicker baskets), 0.085 m³ of chalk from bedrock per person-hour was excavated and carried over an unspecified distance. Only a small part of the earthwork was constructed with these tools; however, with one person digging and one to two people filling and moving baskets, the work was completed in less than 200 person-hours (see also Startin 1982).

More recently, calculations using data from the Danish site of Sarup, assuming 2 m³ of earth excavated per person-day (number of hours unspecified), estimate 985 work days to excavate 1,970 m³ of soil for palisades, enclosures, fences, and ditches for one
part of the site and 384 days to excavate 685 m³ for another (Andersen 1988a, b). Thirty to 200 people could have constructed the entire area in just a few months.

North America

In North America, most anthropologists have relied upon the work of Erasmus (1965) or modern contractors (Muller 1997) for labor estimates. However, Bernardini (2004), using historic measurements, United Nations data (ECAFE 1957), and catchment analyses, calculated costs for Ohio Hopewell earthworks and concluded that 150-400 workers would have been necessary in a given year to construct one of these large, multi-part monuments. Many of these earthworks have ditches adjacent to them which served as borrow pits (Milner 2004). Earth in such areas could have easily been moved in a manner similar to the Nigerian example above (Shaw 1970).

Cahokia, collectively the largest earthworks in North America, has also been the subject of several labor estimates. The mounds at Cahokia could have been easily constructed by a relatively low population without undue hardship and without continuous construction (Galaty 1996; Milner 1998:146-147; Muller 1997:271-273). Most archaeologists simply look at the ultimate size and number of the mounds, and then assume that vast amounts of labor would have been necessary to build them, as if they were built in short order.

In the southwestern United States and northern Mexico, most labor estimates have been made at large sites such as Chaco Canyon and Paquimé, with statements emphasizing the grandeur of the construction and the vast amount of labor that must have
been necessary (much like the Mississippian literature). But Steven Lekson and Izumi Shimada (Lekson 1984; Shimada 1978), working with Chacoan data, and Silvia Marinas-Feliner (1998), discussing Paquimé, conclude that the labor required to build these large, impressive sites could have been done without overly high costs and in a relatively short period of time. They also say the work would have likely been directed by specialists because of the nature of the architecture.

Hard and colleagues (Hard et al. 1999), constructed an experimental Late Archaic (ca. 1150 B.C.) terrace near Cerro Juanaqueña, Chihuahua, in less than two days with three men using digging sticks and a metal pick. There are nearly 500 archaeological terraces at the site; these consist of prepared slopes reaching 60-150 cm above ground surface with a cleared surface of ca 52 m² at the top. The society living at Cerro Juanaqueña in the past was not socially complex, meaning that individual families constructed their own very simple terraces, and vast numbers of laborers were not necessary.
2004 Penn State Field Experiments

In order to obtain earth-moving data relevant to this study, members of the 2004 Penn State field school took part in a field experiment. Students excavated a 1 x 2 m test unit in root-penetrated compact silty loam using a Mill Creek hoe replica (Figure 6). Students worked in pairs, one digging and one scraping the excavated earth into a metal bucket. The hoe was used to first loosen the soil and then to sweep it towards the bucket. Earth was more easily moved by excavating into a vertical wall rather than from the top of the unit down (Figure 7).

Figure 6: Mill Creek hoe replica used in Penn State field experiments (PSU photo #04-49). The hoe was made by Larry Kinsella and George Milner’s hand is used for scale.
Over two days, students excavated 0.29 m³ in an hour, or a cubic meter in 3.4 hours. This works out to 2 m³ in just under 7 hours, a lower rate than Erasmus’ (1965) experiment in which his workers obtained 2.6 m³ in 5 hours (hourly rate of 0.52 m³), working in sandy soil with a digging stick. The Mexican worker was digging in looser soil than our students and was more accustomed to prolonged physical labor. This 7-hour workday is higher than the 5 hours usually used in calculations of earth moving; however, this number is for a pair of people, one mostly resting. An observation of modern Egyptian workers indicates that workdays greater than 5 hours are certainly feasible, if not routine (George Milner, personal communication, 2004). In addition, one “bucket-filler” could have kept up with two or three diggers by moving from person to person and removing earth systematically without forcing the diggers to stop working.
The figures generated by the Penn State field experiment should be viewed as extremely conservative. Certainly Mississippian laborers would have been able to excavate more quickly and for a longer period of time than our students, as do modern people inured to hard work. However, it is better to err on the side of caution and estimate a higher labor cost. Future studies using Mississippian tools can undoubtedly provide more accurate revisions to these figures.

We did not calculate the number or weight of bucket-loads that could be carried over a specific distance, but load sizes are available from a number of sources, both archaeological and otherwise (Table 1). Some of the loads in Table 1 were measured by archaeologists in the field, some are from historic records, and one is simply speculation. The speculative estimate of 50 lbs has found its way into mainstream citations (e.g., Aaberg and Bonsignore 1975) so is included here. Several of these loads are quite large but are certainly within the capacity of people used to this type of heavy labor. For example, Nepalese porters using tumplines routinely carry loads of goods weighing more than 70 kg, or nearly 150% of their body mass, over great distances and across rugged terrain, albeit slowly (Bastien et al. 2005a; Malville 1999, 2001; Malville et al. 2001), African women can carry up to 70% of their body mass either balanced on their heads or using a tumpline (Cavagna et al. 2002; Heglund et al. 1995; Maloiy et al. 1986), and modern Europeans can manage up to 75% of their body mass using backpacks (Bastien et al. 2005b).

United Nations (UN) data (ECAFE 1957), provide labor estimates for individuals digging in various types of soil (Table 2). As soil becomes more compact, labor costs
rise. As expected, the excavation rates are faster than those obtained by our experiments. This is unsurprising since the laborers in the UN study were using metal tools and, probably more importantly, were accustomed to prolonged physical activity.
Table 1: Load sizes. Conversion factors for translating weights to load sizes from Glover (2002).

<table>
<thead>
<tr>
<th>Location</th>
<th>Site</th>
<th>Load Size (original)</th>
<th>Load Size ($m^3$)</th>
<th>Material</th>
<th>Distance</th>
<th>Time</th>
<th>Method</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern US</td>
<td>multiple</td>
<td>0.5 bushel</td>
<td>0.02</td>
<td>earth</td>
<td>n/a</td>
<td>n/a</td>
<td>excavation</td>
<td>(Fowke 1893:37)</td>
</tr>
<tr>
<td>Eastern US</td>
<td>multiple</td>
<td>0.31-0.62 ft$^3$</td>
<td>0.01-0.02</td>
<td>earth</td>
<td>n/a</td>
<td>n/a</td>
<td>excavation</td>
<td>(Fowke 1902:319,335,337,363)</td>
</tr>
<tr>
<td>Eastern US</td>
<td>Mitchell</td>
<td>0.5 ft$^3$</td>
<td>0.01</td>
<td>earth</td>
<td>n/a</td>
<td>n/a</td>
<td>excavation</td>
<td>(Shetrone 2004:42)</td>
</tr>
<tr>
<td>Eastern US</td>
<td>Mitchell</td>
<td>5 lbs</td>
<td>0.0018</td>
<td>earth</td>
<td>n/a</td>
<td>n/a</td>
<td>excavation</td>
<td>(Porter 1974:335)</td>
</tr>
<tr>
<td>Eastern US</td>
<td>Mitchell</td>
<td>31.3 lbs</td>
<td>0.0114</td>
<td>earth</td>
<td>n/a</td>
<td>n/a</td>
<td>excavation</td>
<td>(Porter 1974:335)</td>
</tr>
<tr>
<td>Eastern US</td>
<td>Mitchell</td>
<td>26 lbs</td>
<td>0.0094</td>
<td>earth</td>
<td>n/a</td>
<td>n/a</td>
<td>excavation</td>
<td>(Porter 1974:335)</td>
</tr>
<tr>
<td>Eastern US</td>
<td>Mitchell</td>
<td>38 lbs</td>
<td>0.0138</td>
<td>earth</td>
<td>n/a</td>
<td>n/a</td>
<td>excavation</td>
<td>(Porter 1974:335)</td>
</tr>
<tr>
<td>Eastern US</td>
<td>Mitchell</td>
<td>19 lbs</td>
<td>0.0069</td>
<td>earth</td>
<td>n/a</td>
<td>n/a</td>
<td>excavation</td>
<td>(Porter 1974:335)</td>
</tr>
<tr>
<td>Poverty Point</td>
<td>Mitchell</td>
<td>16 lbs</td>
<td>0.0058</td>
<td>earth</td>
<td>n/a</td>
<td>n/a</td>
<td>excavation</td>
<td>(Porter 1974:335)</td>
</tr>
<tr>
<td>Poverty Point</td>
<td>Poverty Point</td>
<td>50 lbs</td>
<td>0.0182</td>
<td>earth</td>
<td>n/a</td>
<td>n/a</td>
<td>speculation</td>
<td>(Ford and Webb 1959:128)</td>
</tr>
<tr>
<td>Madeira</td>
<td>n/a</td>
<td>30-115 lbs</td>
<td>0.0109-0.0417</td>
<td>earth</td>
<td>n/a</td>
<td>n/a</td>
<td>excavation</td>
<td>(Gibson 2000:94)</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>n/a</td>
<td>50 lbs</td>
<td>0.0205</td>
<td>coal</td>
<td>n/a</td>
<td>1 day</td>
<td>dockhand labor</td>
<td>(Parsons 1853)</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>n/a</td>
<td>50-60 lbs</td>
<td>0.0205</td>
<td>coal</td>
<td>n/a</td>
<td>1 day</td>
<td>dockhand labor</td>
<td>(Parsons 1853)</td>
</tr>
<tr>
<td>Teneriffe</td>
<td>n/a</td>
<td>100 lbs</td>
<td>0.0411</td>
<td>coal</td>
<td>n/a</td>
<td>1 day</td>
<td>dockhand labor</td>
<td>(Parsons 1853)</td>
</tr>
<tr>
<td>England Overton</td>
<td>Down</td>
<td>30 lbs</td>
<td>0.0094</td>
<td>chalk</td>
<td>n/a</td>
<td>n/a</td>
<td>experiment</td>
<td>(Jewell 1963)</td>
</tr>
<tr>
<td>Mexico</td>
<td>n/a</td>
<td>44 lbs</td>
<td>0.02</td>
<td>earth</td>
<td>50 m</td>
<td>5 hrs</td>
<td>experiment</td>
<td>(Erasmus 1965)</td>
</tr>
<tr>
<td>Mexico</td>
<td>n/a</td>
<td>44 lbs</td>
<td>0.02</td>
<td>earth</td>
<td>100 m</td>
<td>5 hrs</td>
<td>experiment</td>
<td>(Erasmus 1965)</td>
</tr>
</tbody>
</table>
The effects of loading height for common soils were also examined (Table 3), although height refers to a dead lift where no ramp was used. These figures show that labor costs increase rapidly when loading height exceeds 1 m, and double when height is over 2 m. However, since no ramp was used in the UN study, it remains unclear how height would have affected Mississippian workers. It does suggest that labor costs may have risen as mounds grew in height and slopes became steeper.

<table>
<thead>
<tr>
<th>Loading Height (m)</th>
<th>Person-day of labor per m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.1</td>
</tr>
<tr>
<td>0.3</td>
<td>0.102</td>
</tr>
<tr>
<td>0.6</td>
<td>0.104</td>
</tr>
<tr>
<td>0.9</td>
<td>0.108</td>
</tr>
<tr>
<td>1.2</td>
<td>0.114</td>
</tr>
<tr>
<td>1.5</td>
<td>0.126</td>
</tr>
<tr>
<td>1.8</td>
<td>0.148</td>
</tr>
<tr>
<td>2.1</td>
<td>0.204</td>
</tr>
</tbody>
</table>

These data indicate that earth moving (lifting and carrying earth) and digging, while tiring and heavy work, were not outside the realm of ability for ancient workmen. Individuals, both in the past and today, were quite capable of excavating a significant amount of earth at a quick pace and moving heavy loads over short distances.
Tree-felling and Transportation

Of equal importance in the study of Mississippian labor costs is the time necessary to construct palisades and wooden structures. Many Mississippian sites, both those with and without mounds, were enclosed by palisades. Therefore, palisade construction provides an opportunity to measure labor in community welfare even when mounds are absent.

Tree-Felling

While some have compiled data regarding the length of palisades and the diameters of palisade posts (Milner 1999), few have attempted to quantify the labor involved in construction (but see Iseminger et al. 1990; Lafferty 1977; Milner 1998). It is commonly thought that 15-20 minutes per 20 cm diameter tree are required to cut down a tree and hew it into a post (Breasted 1944; Coles 1979; Custance 1968), but detailed experimental studies are rare. Most studies of stone axes are concerned with typology or use wear (e.g., Dickson 1981), and do not provide information on cutting times. In order to address this problem, I again turned to experimental and ethnographic data.

A number of published sources provide data on the time necessary to cut down trees with stone tools. I found 190 examples of cut trees from Europe, North America, South America, and New Guinea (Callahan 1993; Carneiro 1979a, b; Glennie 1983; Hansen 1959; Harding and Young 1979; Jorgensen 1953, 1985; Kunkel 1998; Morris 1939:136; Olausson 1983; Pond 1930; Townsend 1969). The trees range from 1-73 cm in diameter, with a median of 14 cm and mean of 17 cm, and included multiple species
felled by both native users and researchers using groundstone and chipped stone axes (Appendix A). The sample presented here is larger, exhibits greater species diversity, and has a wider range of axe types and observer skill than others in print.

Several published sources were not used in this sample since they were not comparable with the others. One tree from West Africa was felled by removing the bark from a 44 m tall tree and burning a fire at its base for six hours until it fell (Shaw 1969). While this was undoubtedly occasionally practiced by Mississippians, as it is elsewhere in the world, trees of that size would have rarely been used, certainly not for palisades. Other studies, such as the Pamunkey house building project (Callahan 1981), provide the number of axe strokes that were required, but not the time, so were likewise excluded.

In the reduced sample (n=184), the median cutting time is 14 minutes with a mean of 25 minutes (Figure 8). Several significant outliers exist and were removed for clarity in Figure 9. The hardness of the wood and the “neatness” of the cutting (e.g., how cleanly the chips come off), toughness of the wood (resistance to bending stress) as well as the diameter of the tree, affects the final cutting time, as does the thickness of the heartwood (Mathieu and Meyer 1997; USDA 1974). While hardness can be obtained if the tree species was recorded, neatness is more difficult to measure since there can be variation within species. Similarly, toughness, while it may be equally as important as hardness, is not consistently provided in the timber literature. Therefore, hardness will be considered here, but neatness and toughness will not be.

There is a fair amount of variation within the sample. Trees of similar hardness and diameter do not necessarily fall at the same rate. This can be due to a number of factors, including toughness, moisture, surrounding vegetation, temperature, and the
competence and physical state of the worker, among others (Mathieu and Meyer 1997). It is impossible to account for all of these factors with the data available.

Specific gravity, measurements of the density of the wood, can be used as a proxy for hardness. In general, denser woods have a higher specific gravities (Haygreen and Bower 1996; USDA 1974). Specific gravity averages for trees in the sample ranged from 0.3 (soft) to 0.989 (very hard) (Appendix A) (Carneiro 1979a; USDA 1974); the hardest trees in the sample are from South America.

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Figure 8: Tree cutting (n=184) by actual time and diameter with a power curve fitted ($R^2 = 0.54$). Hardness is not included.
I first subdivided the sample of 184 trees by hardness. It is important to note here that “hardwood” and “softwood” are general categories assigned to wood by the timber trade industry and do not necessarily describe the actual physical hardness or softness, but refer to deciduous and conifer trees. For example, cottonwood, a deciduous tree, is described as a hardwood but has a specific gravity of only 0.31, while juniper, a conifer, is a softwood with a specific gravity of 0.44 (USDA 1974). Therefore, I elected to drop these classifications in favor of dense (harder wood) and less dense (softer wood).

Since specific gravities can serve as a proxy for hardness, I divided the sample according to specific gravity with 0.5 being the cutoff point. Trees with a specific gravity of 0.5 and higher were classified as dense (n=96), and those of 0.49 or less were classified as less dense (n=88). For better or worse, this cut-off point divided the sample

Figure 9: Tree cutting by actual time and diameter with a power curve fitted ($R^2 = 0.52$). Hardness not included. Outliers from Figure 8 have been removed for a total of 179 trees.
roughly in half, which meant that there was a reasonably large sample of trees in both categories.

The first step was to see if the distinction between cutting times for dense and less dense was statistically significant. It is easier to work less dense wood with modern hand tools (USDA 1974:3-15), but it is not clear if this holds true with stone tools. If hardness makes a difference, better estimates for ancient labor can be derived if there is some prior knowledge of the trees used in construction. Comparing cutting time for dense vs. less dense wood revealed a noticeable difference (Figure 10), with lower density wood requiring much more time due to the presence of significant outliers.

Formulae for the power curves in Figure 10 are:

All trees (density unspecified): \( t = \exp(-1.422138) \times d^{1.471645} \)

Dense wood (specific gravity >0.5): \( t = \exp(-0.1525701) \times d^{1.029405} \)

Less dense wood (specific gravity<0.5): \( t = \exp(-2.648912) \times d^{1.924996} \)
Figure 10: Comparison of cutting time by diameter for dense wood (top) and less dense wood (bottom), with power curves fitted.
The preceding step included all trees in the sample, regardless of size. However, the majority of posts at Mississippian sites, with some exceptions (e.g., the woodhenges at Cahokia (Wittry 1969) and the large bald cypress post found at Mitchell (Porter 1974)), are less than 30 cm in diameter. Therefore, trees greater than 30 cm (n=12) were dropped (as were the four outliers noted above). After all, these larger trees were quite likely cut down with a combination of burning and chopping. Note the greater variability in time required to cut large trees (Figure 8); probably here is where the experience and stamina of individual loggers counts most.

Again, density makes a difference in cutting time and in the calibration of the power curve (Figure 11). Note that the R² value is considerably higher for less dense wood than for dense wood. While there are more outliers for less dense wood, overall, the predictive value of the power curve is much stronger. In general, less dense trees can be cut more quickly than dense trees (reversing the earlier pattern).
Figure 11: Comparison of cutting time by diameter (<30 cm) for dense wood (top) and less dense wood (bottom), with power curves fitted.
There is considerably less variation in cutting time for trees less than 30 cm than in the entire sample, leading me to believe that the power curve equations presented here can be of great use in calculating the time necessary to obtain posts of suitable size for most architectural needs at Mississippian sites.

In cases where the hardness of the wood are available and the diameter of the posts is less than 30 cm, predictive formulae are:

- Less dense wood (specific gravity <0.5): \( t = \exp(-2.643719) \cdot d^{1.922946} \)
- Dense wood (specific gravity >0.5): \( t = \exp(-0.487535) \cdot d^{1.17247} \)

\( t \) = time and \( d \) = diameter in cm

If, as happens in the majority of archaeological cases, the wood type is not known, the formula for the entire sample of trees less than 30 cm diameter can be substituted:

\( t = \exp(-1.766058) \cdot d^{1.622969} \)

As an example, a tree of unspecified species 20 cm in diameter would take 22 minutes to cut. A dense tree would take 23 minutes with 21 minutes required for a less dense tree. These are similar to the rough time of 20 minutes for a 20 cm tree presented by Coles (1979), among others. Differences in density have greater effect as the tree diameter increases. A 40 cm tree of dense wood requires a cutting time of 85 minutes while a less dense tree of the same diameter only takes about 45 minutes.

One post, Feature 93, in the inner palisade at Annis measured 49 cm in diameter, and was made of ash (\textit{Fraxinus} sp.). Ash has an average specific gravity of 0.71 and would be considered a hardwood according to the criteria presented above. Using the dense wood formula for all trees regardless of diameter, this post would have required 47 minutes to cut. Using the “unspecified” formula, it would have taken 74 minutes, since
density has an effect on cutting time. This post hole is abnormally large when compared to others from the site.

The average post at Annis is roughly 15 cm in diameter and would have required about 14 minutes to cut (using the formula for a tree of <30 cm diameter and unspecified hardness). If we knew that the trees were all dense, it would have taken 15 minutes; if they were all less dense, 13 minutes. The difference seems trivial for only one tree, but over 1000 posts, it would have added an extra 33 hours to cutting time. Therefore, at Annis, it really does matter if we know what kind of wood was used for estimating labor investments.

Others have made similar attempts to predict tree felling time. Carneiro (1979a), observing Yanomamo (South America) workers, developed two formulae to predict the cutting time required for trees given their hardness and diameter. This is important because it is one of the only attempts to quantify tree-cutting labor prior to this study. These formulae are:

1: \[ t = [(0.083d^3) * 1.3h] \]

and

2: \[ t = [(0.1683d^{2.7}) * 1.3h] \]

\( t \) = time
\( d \) = diameter (in)
\( h \) = specific gravity

The difference in the formulae reflect notches of different size and angles (one being narrow and one being wide) cut to take down the tree, and the varying amount of wood removed as a result. Carneiro (1979a), Kunkel (1998), Lekson (1984), and Mathieu and Meyer (1997), among others, have used these formulae in their calculation of labor.
Using a hypothetical example to illustrate how these formulae work, suppose we have an white oak tree 10 inches (25 cm) in diameter. White oaks have specific gravities ranging from 0.6 to 0.68 (USDA 1974:Table 4.2); I use the middle of this range, 0.64, in my calculations. The predicted cutting time is 69 minutes with Formula 1 and 84 minutes with Formula 2 (Table 4).

Table 4: Hypothetical calculations using Carneiro’s formulae.

<table>
<thead>
<tr>
<th>Formula</th>
<th>Species</th>
<th>Specific Gravity (h) (average)</th>
<th>Predicted Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1: 0.083d³</td>
<td>White Oak</td>
<td>0.64</td>
<td>69.1</td>
</tr>
<tr>
<td>F2: 0.1683d².7</td>
<td>White Oak</td>
<td>0.64</td>
<td>84.35</td>
</tr>
</tbody>
</table>

If this same tree is plugged into the formula for dense wood under 30 cm that I generated above, the time estimate is only 27 minutes. This is much more in line with experimental work presented by Coles (1979), Custance (1968), and others. Additionally, if Carneiro’s formulae are applied to the sample that I have presented above, they plot as a neat curvilinear pattern that bears no resemblance to the actual data (Figure 12; compare to Figure 9).
In general, differences between Carneiro’s formulae do not become apparent until the diameter of the tree is over 35 cm because of the greater volume of wood that must be removed to fell it.

It is clear that the formulae generated here have a better predictive value than do Carneiro’s. This is not unexpected since he was working with limited data. Because my sample is the most comprehensive available—utilizing a wide range of trees, conditions, and skill—it is more general and, therefore, more widely applicable. Further research in this direction and the addition of more trees to the sample will undoubtedly refine and strengthen the models presented above.

Figure 12: Carneiro’s Formula 1 (circles and solid line) and Formula 2 (triangles and dashed line) plotted with power curves.
Transportation of Logs

Few studies in eastern North America have addressed the problem of transporting trees. In part, this is likely because the heavily forested area did not require long-distance movement of lumber. In the Southwest, where wood is scarce, scholars have focused more attention on the matter. Roof-support poles at Grass Mesa Village, Colorado, and at some of the kivas at Chaco Canyon, respectively, were approximately 25 cm in diameter and 2-2.4 m long, while others were 40-60 cm in diameter and 3-3.65 m tall (Betancourt et al. 1986; Lightfoot 1988; Snygg and Windes 1998). The lower diameter figures match Eastern Woodlands palisade post diameter data provided by Milner (1999). It also fits Vogel and Allan’s (1985) and Ritchie’s (1980) estimates of palisade heights at Moundville and the Iroquoian Kelso site, both 3-4 m based on the depth of the post holes.

Snygg and Windes (1998), based on a photograph in Judd (1925), hypothesize that timbers were carried by teams of men, spaced at 90 cm intervals on each side of the log. The longer the log, the larger the teams needed. The timber was supported by holding a number of smaller poles cross-ways to the larger log, with the free ends of the small poles being held. In this way, the load was shared among numerous individuals and the log could be moved a significant distance.

While this method may be feasible for the very large poles found at Chaco, especially given the presence of a road system, it is not likely that this technique was used in the east. Logs 25 cm in diameter and 3 to 4 m in length could have been carried by teams of 4-6 men hoisting the timber onto their shoulders, especially when transport distances were not very long. Iseminger and colleagues (Iseminger et al. 1990) suggest
that teams of both four and six people carried each log for 0.5 km and 1 km at an estimated speed of 2.4 km per hour (1.5 mph) to construct the Cahokia East Palisade. If wood was properly seasoned and dried, perhaps only 2 people would have carried each log. One man, working by himself in the 1960s, cut and moved large spruce logs nearly 300 m, allowed them to dry over the winter, and used them to build a small Alaskan cabin (Keith and Proenneke 1973).

If logs needed to be carried more than 1 km, water transport was always a possibility. Most rivers were navigable by canoe (Little 1987), and logs that were not very dense (most eastern species) could have easily been floated downstream. Historic logging records from northern Pennsylvania in the late 1800s and early 1900s indicate that log rafts floated at about 5 miles per hour on the Clarion River (French 1922; King 2001), slower than canoe travel but faster than walking, with much less overall labor cost.

Concluding Remarks

So, despite claims to the contrary, labor required for earthworks was not always overly taxing and do not seem to have pulled people away from crucial subsistence tasks. Certainly construction projects were labor-intensive and were viewed as important by the people who built them, but demands on households were tolerable. Contributing labor to these projects was likely considered a civic duty, and individual families may have been pleased to do so. Coercion was not likely a factor in the mobilization of workers, rather it was likely a festive event in which the majority of the local population took part at one level or another, be it actually moving earth or by preparing food. This may be
particularly true at smaller sites where most of the residents were likely from more closely related kin groups and construction took place at more regular intervals (Livingood and Blitz 2004). Detailed calculations of labor can help us understand the amount of work that went into construction of the mound and palisades, the different amounts of labor required during different phases of occupation, and the social dynamics that accompanied these labor projects.
Chapter 4

Previous Investigations

Annis is located on the banks of the Green River, near present-day Morgantown, Kentucky (Figure 13). It has been owned by members of the Annis family since 1904 and was placed on the National Register of Historic Places (NRHP) in 1985. Much of the site is currently under cultivation, but the area nearest the river lies in woods and is well protected.

Figure 13: Location of Annis (site not drawn to scale). USGS aerial photo, 1993.

Annis’ most visible feature is an earthen platform mound (15BT2) that once measured approximately 3.7 m high and 33.5 m on a side before damage from erosion occurred early in the 20th century (Figure 14). The mound was built in three major
construction stages, each topped by summit architecture, including structures and, at one point, a fence.

![Figure 14: Annis Mound in 1939 (WSWMA negative #3250). The steeply sloping river bank is immediately behind the back edge of the mound.](image)

Adjacent to the mound is a village (15BT20) encompassing between 1.3-1.8 ha. Three concentric palisades, seventeen structures, and numerous pits and isolated postmolds were excavated in 1939-40 and 2002-04 (Figure 15). The palisades were built sequentially. That is, they were not all in use at the same time, as shown by feature superpositioning. Similarly, it is clear that not all structures in the village were occupied contemporaneously since some structures overlap each other and, in a few cases, either overlap or underlie palisades.

---

4 The exact area is unclear due to erosion of the river bank, although the lower end is more likely.
The village can be treated as a distinct entity; that is, the site is not merely a construct of archaeologists. Surface surveys show that the density of artifacts drops off considerably outside the area circumscribed by the palisades, indicating that significant habitation did not occur outside this area.

The final part of the Annis complex is the Annis Sand Mound (15BT21). This low mound, built largely of sand, is directly grid south of the outermost palisade (Figure 15). It was 1 m high and approximately 35 by 30 m in diameter. Five burials, several features, and numerous artifacts, primarily flaked stone, were found by the WPA excavators. It appears to be Archaic in origin; therefore, it predates the primary occupation of Annis by several thousand years and it is not considered further here. A description of the features and artifacts is in Appendix B.

Figure 15: Annis Village site map.
Previous Investigations

C.B. Moore (1916)

Clarence B. Moore made the first professional visit to Annis during his 1915-16 expedition. Moore, a wealthy businessman and antiquarian from Philadelphia, traveled the Southeast in the late 19th and early 20th centuries aboard his ship, the *Gopher of Philadelphia*. These travels were undertaken for the express purpose of excavating Native American mounds along the South’s major rivers (Knight 1996).

Moore visited the Green River in 1916 and stopped briefly at Annis (Moore 1916; Polhemus 2002). It was “the largest mound seen or heard of by us on Green river. This mound, of sandy loam, approximately square with corners rounded by time, has a flat summit plateau, is 11 feet in height and about 110 feet in diameter of base. It stands immediately on the river bank” (Moore 1916:480). Moore excavated a “trial hole” 17.5 m² in area and ca. 3.7 m deep in the center of the platform mound (Figure 16), and a second in the sand mound. He reported one hearth in the platform mound and a single poorly preserved skull in the sand mound (Moore 1916). They were of little interest, so he did not excavate further.
The most extensive excavations at Annis took place under the auspices of the WPA state-wide archaeology program headed by William S. Webb of the University of Kentucky. WPA archaeology (as well as archaeology facilitated by the Tennessee Valley Authority, Civilian Conservation Corps, and other agencies) was initiated as a part of Franklin D. Roosevelt’s New Deal, a set of programs intended to combat the crushing poverty and high unemployment that gripped much of the nation during the Great Depression (Lyon 1996; Milner and Smith 1986). Archaeological projects, especially in the Southeast, were considered important because they could employ many people for extended periods due to relatively mild winters (Haag 1961, 1985). This was especially
attractive in particularly hard-hit rural states and counties where there were fewer competing demands on the work-relief labor (such as bridges, post offices, etc.).

New Deal archaeologists were pressed into service to salvage archaeological resources scheduled to be flooded by the construction of large dams along the Tennessee River, including the Guntersville, Norris, Pickwick and Wheeler basins of Tennessee, Alabama, and northeast Mississippi, as well as Kentucky Lake in Kentucky (Webb 1938, 1939; Webb and DeJarnette 1942; Webb and Wilder 1951). These projects salvaged numerous archaeological sites from destruction, many of which still feature prominently in current literature. In addition, New Deal archaeologists played a major role in the professionalization of the discipline (Lyon 1996): the training of supervisors, the establishment of field and laboratory manuals to standardize field techniques in several states (e.g., Lewis and Kneberg n.d.), and the expansion of departments and museums at universities.

William S. Webb was the driving force behind the WPA program in the state of Kentucky and early TVA work elsewhere. A physics professor at the University of Kentucky, he directed some of the largest TVA projects and, along with William D. Funkhouser, founded the Department of Anthropology at the University of Kentucky in 1927 (Schwartz 1967). Projects directed by Webb covered much of the state, but were focused on Adena sites in the Bluegrass region, rockshelters in the Knobs, and shell mounds and villages along the Tennessee, Cumberland and Green Rivers. Webb’s work focused on stratigraphic work to flesh out cultural sequences, exposure of village and house plans, and recovery of skeletal remains (Lyon 1996; Milner and Smith 1986). In keeping with the goals of the federal WPA program, rural counties with high
unemployment were especially targeted (Milner and Smith 1986). Butler was one of these counties.

Webb employed a number of supervisors who directed the day-to-day aspects of field projects while he coordinated the program from Lexington (Milner and Smith 1986). These supervisors were generally college graduates with training in archaeology, museum work, and mapping. Many had received experience with WPA or TVA projects in other states, and several had attended the University of Chicago’s field school at Kincaid in Illinois. Above all, however, supervisors were to be familiar with local prehistory and be able to follow orders. Crews ranged from 10-50 men, accompanied by one to two supervisors, a timekeeper, a tool checker, and occasionally a foreman and clerk. Laborers served as “shovel men” or “trowel men,” depending on their level of expertise, and were paid accordingly. Shovel men removed overburden and pushed wheelbarrows while trowel men excavated features and burials. In this manner, large groups of men could be trained and put to work despite high turnover.

The WPA program in Kentucky ran from 1937 to 1941. Shortly before and after the United States’ entry into World War II, federal funding for archaeological projects (only CCC labor was still in use at the time of the Pearl Harbor attacks) dried up and most of the laborers found themselves in military service or in expanding war industries. As a result, many of the sites excavated during this period were not studied and, in some cases, the artifacts remained unwashed and uncatalogued.

WPA excavations at Annis ran from February 11, 1939, to April 10, 1940, with a crew of twenty-four laborers under the supervision of Ralph D. Brown (Figure 17). It is not clear whether any other supervisors were present full-time, although the field notes
mention periodic visits by others, such as John Cotter, although not Webb himself (Brown n.d.).

A grid was placed over the site, with an arbitrary 0’ stake placed just south of the sand mound. A north-south baseline was laid out beginning at this stake and extending to the nearby river, thus placing half the site on each side of the line. Grid north roughly corresponds with magnetic south, not magnetic north. All directions in this dissertation refer to grid north rather than magnetic north, unless stated otherwise. This was done to facilitate the reconciliation of the WPA and Penn State grids.

The baseline and each intersecting east-west line was staked out in 5 ft intervals. These were labeled L1, L2, L3, etc., and R1, R2, R3, etc., respectively, depending on the direction they extended. So, L1 is 5 ft to the west of the baseline (Figure 18). North-

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Figure 17: The WPA crew at Annis, 1939. Ralph Brown is in the front row, 6th from right, holding his hat. (WSWMA negative #4093).

5 Brown’s field report states that the east-west lines were staked off in 10 ft intervals, but this is an error. The distance between L1 and L2, for example, is 5 ft, but the distance between L2 and L4 is 10 ft.
southern divisions between the sand mound, village, and platform mound were arbitrarily drawn. The sand mound (15BT21) extended from the 20 to 180 ft line, the village (15BT20) from 180 to 450 ft, and the mound from 450 to a maximum of 530 ft, depending on the extent of erosion by the river.

Excavation began at the 0 ft line and progressed toward the river (grid north, magnetic south). Soil was removed by 6 inch arbitrary levels within each 10 ft x 10 ft or 5 ft x 5 ft block (Figure 19), although in the first few days 9 inch levels were used. The exception to this came in the excavation of the mound. Brown began by removing mound fill in vertical slices, a common practice at that time, moving from grid south to north (toward the river). In one early profile, however, he noted several post molds and switched to a horizontal clearing strategy to expose summit structures. Excavation still

Figure 18: Schematic of a portion of the WPA grid. Baseline is bold.
proceeded according to grid squares, although each individual mound summit was fully exposed and structures were mapped before excavation proceeded to a greater depth.

There is no evidence that soil was screened and, given the field methods at the time, it is unlikely to have been. Features were numbered consecutively as they were encountered, with new lists compiled for each site number. In other words, there are separate Feature 1s for Annis Mound (15BT2), Annis Village (15BT20), and Annis Sand Mound (15BT21). Sixteen structure areas, three palisades, and numerous pits and postmolds were excavated in the village, and three additional structures with associated pits, hearths, and posts were identified in the mound.

Figure 19: Example of WPA excavation technique—removal of soil in 5 ft and 10 ft strips (WSWMA negative #4365). Excavated soil was thrown into the previously excavated strip as the WPA crew worked its way methodically across the site.

Over 25,000 artifacts, primarily pottery and stone, were placed in bags by square and depth, and labeled with specific catalogue numbers. Fancy artifacts, or those found in unique contexts, were given specific field specimen numbers compiled in a separate
list. What little organic material recovered was coated with a sealant and sent to the laboratory, but was not analyzed.

Brown had some problems identifying features in the wet soil of Annis, sometimes described as a “veritable quicksand” in the field notes. Features, especially wall trenches, were often very faint in the sandy subsoil and were difficult to identify. This problem also affected the 2002-2004 Penn State work.

Brown was an above-average excavator who took high-quality field notes. Features were carefully mapped, described, and photographed before excavation. Maps were clearly and carefully plotted, often at night when excavation was done for the day. Doris Tichenor—Brown boarded with her family during the excavations—recalls him working late at night on notes and piecing together broken pottery by the light of kerosene lamps.

Despite Brown’s skill, there are some problems with the collection. First, one of Brown’s field notebooks is missing, so there is a gap from February 11 to May 29, 1939 in the notes that summarize daily progress and Brown’s thoughts on the excavation. This encompasses the entire sand mound excavation and the early part of the village excavation. Nevertheless, individual feature forms, photographs, and maps for this time period exist.

Second, due to the excavation techniques of the time, there are biases in the artifact assemblage, both in the sizes and types of artifacts collected. Since soil was not screened, the vast majority of the artifacts recovered are \( \frac{1}{2} \)” or larger. Pottery and stone projectile points are abundant, but few to no flakes were collected from the mound and the village. Recent surface collections and excavations indicate that many flakes are
present at the site, therefore the WPA collection techniques must be the source of the bias. The exception to this is in the sand mound collection where flakes are abundant, although again nearly all are large (> ½”). It is possible that a different collection strategy was employed early in the excavation but, without the missing field notes, this remains a mystery.

Third, most, but not all, of the organic material was soaked in paraffin and sealed in order to preserve it. This indeed has preserved it well, but it has also made radiocarbon dating impossible.

Despite these biases, the collection is useful to modern archaeologists. The strengths of the WPA excavation lie in the large-scale exposure of features. Few excavations today have the time and money available to excavate an entire platform mound and much of the associated village. The availability of large-scale exposures with selective sampling of artifacts complements focused excavations with the collection of diverse cultural and biological materials, such as those conducted by the Penn State field school.

**Modern Work (1962-1995)**

More recent work at Annis was carried out by researchers associated with the University of Kentucky and the Kentucky Heritage Council. In the 1960s, graduate students Jon Young and Frank Fryman both worked with the Annis materials. Young (1962) focused almost exclusively on the material from the platform mound. He produced a detailed description of the artifacts and the results of the WPA excavation,
and attempted to place Annis within a regional perspective. However, he made a critical error. In several cases, features were labeled by the photograph number and not by the feature number assigned by Brown. Young inadvertently assigned some features within the mound to the wrong construction stage. As a result, his maps are often seriously wrong.

Fryman (1967), wrote a seminar paper using the village maps. He did not analyze the material, but he did sort all the pottery by catalog numbers. Prior to his paper (and afterwards\(^6\)), many artifacts, especially the diagnostic ones, were loose in shallow drawers and not sorted by provenience. I am indebted to him for saving me a considerable amount of work.

Jimmy Railey of the Kentucky Heritage Council visited Annis in 1985 to judge its qualification for inclusion on the NRHP. The nomination form includes photographs of the mound and village areas, mentioned the likelihood of intact deposits, and commented on sparse surface materials in the plowed field where much of the WPA work took place. Railey did not conduct excavations, and the nomination was approved.

A decade later, B. Jo Stokes, a graduate student at the University of Kentucky, analyzed a sample of the Annis ceramics as part of a seminar paper (Stokes 1995). She went through much of the collection and used a sample of 300 sherds for extensive attribute analysis. Her analysis suggested a date of A.D. 1300-1450 for Annis, fitting nicely with more recent work (see Chapters 5 and 6).

\(^6\) The sherds from the mound were in boxes but not sorted when I began work with the collection in 2002. George Milner (personal communication, 2005) recalls that quite a few diagnostic sherds were boxed in the early 1980s in preparation for a move by the Webb Museum from the old Vine Street warehouse to a new facility.
There were also other visits to the site by collectors and looters, even though the Annis and Tichenor families have protected the site extremely well. Evidence for this can be seen in this early 1900s photo (Figure 20). The fact that the threat of a fine was necessary to keep people off the site suggests that the visits were not uncommon. Also, Ralph Brown reports:

How much material has been picked up from the surface it is impossible to say. Several men who had worked on the place as laborers at various times reported carrying away ‘flint rocks’ and tomahawks and eventually losing them. Rumor has it that thirty or forty years ago a stone statue was found here, which for a time served as a door stop. It, too, has become lost without leaving a clue to its whereabouts. The owners of the property have preserved a modest collection of typical surface material (Brown 1940).

Figure 20: Annis Mound summit, early 1900s. Photo courtesy of Doris Tichenor.

This statue (figurine) would have been found before Moore’s arrival, but he did not mention one being recently found in his report (Moore 1916). This is the sort of story that often springs up at sites that attract local attention.
No looting occurred at Annis during Penn State excavations in 2002-2004, but a visit to the nearby Martin Mound (15BT1) in 2004 revealed an approximately 1 x 2 m and relatively recent pit, indicating that looting still takes place in the area. It is quite possible that the steepness of the river bank and, especially, the vigilance of the Annis and Tichenor families has kept the site safe, although hogs kept at the site in the past have done some damage by churning the ground thoroughly, in some places up to 40 cm.

**Penn State Research, 2001-2004**

**Background Work**

Penn State began research at Annis in the summer of 2001. That summer, while working on a project with Richard Jefferies and George Milner in neighboring counties, I drove to the site and received permission from Carroll and Doris Tichenor, the current landowners, to conduct fieldwork. Doris is a member of the Annis family who, as mentioned earlier, knew Ralph Brown when she was a girl.

Once permission was granted, I traveled to the William S. Webb Museum of Anthropology (WSWMA) at the University of Kentucky. There I obtained copies of all WPA field notes, maps, artifact cards, feature cards, and photographs. The entire artifact collection was loaned to Penn State for analysis.

Although Brown drew a master map of the site, more detailed computerized maps of the village and mound stages were needed. Individual field forms were used to digitize individual features directly into AutoCAD 2000. Two things became apparent
during this process. First, several features, including the outermost palisade, had not been completely mapped on Brown’s site plan. The trajectory of this palisade had been mapped on a separate sheet that had not been integrated with the master plan. Second, when mound summit structures were mapped, the significant discrepancies between Young’s and Brown’s maps were noted. These problems were rectified during the mapping process and all features are now on the master map.

To make the mapping process easier, the WPA coordinate system was converted to a metric grid. Since the original 0’0’ stake used by the WPA was removed or destroyed, a new arbitrary 0’0’ point was created. This new point was moved 5,000 ft to magnetic north and 5,000 ft to magnetic east (or south and west of the site according to grid directions). This made the original 0’0’ map point 5000’ 5000’ and eliminated the “L and R” distinction. Upon conversion to metric units, the 5000’ 5000’ point became N1524 E1524. Hereafter, even when referring to WPA excavations, the new grid coordinates will be used (see the conversion chart to translate the WPA to the Penn State grid in Appendix C).

2002 Excavations

In May 2002, a Penn State volunteer crew carried out a three-week field project designed to locate the edge of the WPA excavation units at the Annis Village and to reestablish the site grid. Two important lines of evidence were used to guide this early work. First, the WPA did not extend their excavation past a wire fence recorded on all their maps. Several remnants of this fence still exist today (Figure 21), although they
deviate from the original fence line since wire was tacked to trees when the posts rotted away. Second, one pit, Feature 67, extended beneath the fence and was only partially excavated by the WPA workers (Figure 22). The remainder of the feature was left in situ. Thus, the main focus of the 2002 season was to locate Feature 67.

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**Figure 21**: a. Digitized section of WPA map showing fence. Grid north is to the bottom of the map. b. Fence embedded in tree (PSU photo #02-05).
Using the fence as a guide, sixteen test units were excavated, exposing a total of 38 m² (Figure 23). Nearly all of these proved to be in WPA backfill, although several prehistoric postmolds were found in undisturbed soils. Feature numbers were assigned according to the WPA system, e.g., we began our numbers where theirs left off. In Unit 7 the previously unexcavated portion of Feature 67 (Figure 24) was located, thereby allowing one grid point to be fixed firmly in place. This point marks the grid northern end of the feature where the feature boundary intersected with the WPA profile that bisected the feature.
Additional excavations nearby identified wall trenches forming the eastern wall of Structure 16 and a portion of the innermost palisade (Feature 65). They had been exposed by the WPA, but were pedestaled to facilitate photography and were not excavated (Figure 25). These pedestaled trenches were identifiable in 2002 as intersecting bands of light soil surrounded by dark WPA backfill (Figure 26). The remnants of Feature 46, the central hearth of Structure 16, were also found. Finally, Unit 16, placed near the foot of the western slope of the reconstructed platform mound,
revealed an additional remnant of the palisade and one corner of Structure 15. The identification of these points allowed us to lock down the old grid system. Four fixed points were shot in as permanent grid points, and a permanent elevation spike of 100 m was established. This elevation point was arbitrary and bore no relationship to the WPA elevations—all signs of their fixed points were long gone. We could, however, link the two vertical elevation systems by comparing our elevations (fixed for the entire site) with the elevations taken at the top of features exposed by the WPA crew.

Figure 24: Plan view of Feature 67, 2002. The dark area at the top is the unexcavated portion of the feature (PSU photo #02-30). Grid north is to the right.
Figure 25: Structures 15 and 16. Note pedestaled wall trenches to the back right (WSWMA negative #4099).

Figure 26: Wall trenches (lighter brown soil) re-exposed in 2002 (PSU photo #02-46).
2003 Excavations

In the summer of 2003, a crew of Penn State field school students under the direction of George R. Milner returned to Annis. I served as lead supervisor. This field season had two goals: to relocate the inner palisade (Feature 65) on the east side of the mound, and to excavate a house. By finding the palisade, an additional known point from the WPA map could be established and the two grid systems would be more firmly linked. Excavation of a house using modern techniques would allow us to compare the recovery of artifacts using old and new methods, and compare the assemblage from the house with that from summit and village houses.

A total of 34 units were excavated, exposing 121 m² (Figure 27). These units were named using the coordinates of the southwest corner. Despite mixing of the soils by hogs to approximately 40 cm below the ground surface, a number of features were located, including two walls of a structure, sections of two palisades, and several isolated post molds and small pits.
Figure 27: Location of 2003 excavation units. Features 64, 92, 93, 103 are parts of palisades. Grid north is to the top.
Because of the thorough soil disturbance, only a portion of each unit was screened. This was generally the southwest corner of 2 x 2 m units, the west half of 1 x 2 m units, and all of 1 x 1 units, although exceptions occurred. The unscreened portion was simply tossed out of the units onto a tarp and any artifacts seen were placed in a grab bag for that unit. This practice took place in both the 2003 and 2004 seasons.

The only structure excavated in 2003, Structure 17, consists of two shallow wall trenches set at a right angle to one another (Figure 28). Like the features, we added structures to the end of the WPA number list; structures 1-16 were excavated by Brown’s crew. Upon excavation, the trench remnants proved to be only a few centimeters deep. Hogs kept at the site, as well as an abundance of large roots from a large oak tree in the center of the structure, have mixed the soils to a considerable depth, destroying most of the features. Finally, heavy rains flooded the area of the structure multiple times during excavation, and re-trowelling of unit floors scraped away some of the trenches.

Figure 28: Structure 17 area. Grid north is to the top.
Parts of two palisades were excavated during the 2003 season. The innermost palisade (see Figure 15), Features 92, 93, and 103, was superimposed on the south wall of Structure 17 (Figure 29). This superpositioning was checked by re-trowelling on several occasions after rains, and we are confident that it is correct. The segment excavated measured approximately 12 m long and 30 cm wide, and consisted of numerous post molds set into a deep trench (Figure 30). This palisade extended south from the riverbank and curved slightly west toward the mound where it likely connected with Feature 65, forming a D-shaped enclosure with the river bank on one side.

Figure 29: Feature 92 palisade wall (running left to right) superimposed on the south wall of Structure 17 (running top to bottom). Facing west (PSU photo #03-77).
The second palisade, Feature 64, is the middle of the three palisades mapped at Annis (Figure 15). Approximately 14 m of this palisade was exposed. Like the inner palisade, it was also a deep trench with posts set into it, but was not continuous. Rather, segments of the trench were exposed in a line (Figure 31). This is likely because the

Figure 30: Feature 92 profile. The trench is light gray and postmolds are black.

Figure 31: Feature 64 palisade segments, facing south. The ridge is visible at the top of the photograph (PSU photo #03-60).
inhabitants of Annis did not dig a trench with a uniform bottom. Since the bottom of the trench varied in depth, not all of it was preserved, and the palisade would have been built in segments. Each segment of the trench was given a letter designation to distinguish it from the others, e.g., Feature 64A, 64B, etc., and was excavated separately.

This second palisade was built atop a low ridge (see Figure 31), although whether the ridge was constructed for this purpose or was simply a natural feature utilized by the inhabitants of the site is not clear. Several other linear features of similar size and orientation were present elsewhere along this stretch of the river bank. One was excavated and found sterile in 2004. Regardless, this feature rises roughly 20 cm above the surrounding area and the palisade runs down the approximate center of it, meaning that the palisade was purposefully placed there.

In and around unit N1581 E1663, at the southern end of the exposed second palisade, a clear trace of the WPA excavation was found. In this area, there was a large patch of grayish-brown fill containing iron oxide above the palisade (Figure 32). Part of an eyeglass lens, metal objects, and a large piece of sandstone7 were recovered from this fill. This disturbed area stretched for over two meters and followed the same path as the underlying, unexcavated, palisade, but was approximately double the width.

7 Large (>10 cm) fragments of sandstone are rare on the Annis Farm (Carroll and Doris Tichenor, personal communication 2003).
The WPA excavation of this area occurred in February 1940 during several days of rain (Brown n.d.:66). The palisade was not excavated at that time but was exposed and mapped then reburied. Although it does not show up well in the 2003 photographs, the appearance of the soil was consistent with dirt churned and packed by many pairs of boots. That is, it looked just like compacted backdirt. Matching up the end of the WPA-excavated palisade with the 2003 segments gave another fixed point to reconcile the two grids.

The relocation of the palisade in 2003 and the wall trenches in 2002 resulted in a reasonably secure reconstruction of the WPA grid system. However, one final piece of evidence cleared up any remaining doubts. Unit N1665 E1571, just south of the inner palisade, bore clear evidence of historic disturbance--a deep trench in the northern half of

Figure 32: WPA disturbance above Feature 64 segment. Iron oxide is most visible at the bottom of the photograph (PSU photo #03-48).
the unit (Figure 33). Careful examination of Brown’s maps showed that this was the edge of an area dug in 1940. By overlaying these points on the WPA grid and rotating them in AutoCAD 2000 around the fixed Feature 67 point, it was determined that the Penn State grid is 3°24’ off the WPA grid. That is, in order to reconcile the WPA and Penn State grids, points needed to be rotated 3°24’ west around the Feature 67 point (placed in 2002) for a proper alignment.

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**Figure 33**: WPA disturbance on right side of profile, N1665 E1571 (PSU photo #03-156).

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**2004 Excavations**

A second Penn State field school, also directed by George R. Milner, returned to Annis in 2004. I again served as lead supervisor. Four major tasks were attempted this
season. First, we targeted areas where the outermost palisade mapped by the WPA was likely to be. Second, we sought to locate the unexcavated east half of Structure 17 and any associated pits. Third, we hoped to locate another structure to the west of the mound, outside the WPA excavation. Fourth, cultivated fields nearby were surveyed to locate small sites related to the major occupation at Annis. Thirty-two units were excavated, exposing a total of 92 m² (Figure 34).

Figure 34: Location of 2004 excavation units. All three palisades are shown curving across the site as is the old fence line to the left.

**Palisade Investigation**

Since portions of the two inner palisades had already been excavated, the major goal of the 2004 season was to locate a segment of Feature 63, the outermost palisade. A
large part of this palisade had been exposed and mapped by the WPA. Since we had located the middle palisade in 2003, we assumed that this would be an easy task. We could not have been more wrong.

Four trenches were dug for this purpose. Three were on the eastern part of the site, near the 2003 work. The fourth was on the western side of the mound, further into the village area. All three trenches on the east proved to be sterile. No features were noted, and few artifacts were recovered. Interestingly, the trenches were placed well outside the hog-disturbed areas and sterile soil was found at only 10-15 cm, as opposed to nearby trenches that extended to nearly 50 cm. Perhaps this palisade trench was shallower than the others and was eroded away. Because it was in a lower area, it might have been scoured by floodwater which, on occasion, flows across this area. Water is retained here for long periods of time after a rain, as it drains in from the nearby agricultural fields. This made it difficult to excavate even on a dry day, and these trenches sat for weeks without being worked on because of standing water. The soil never fully dried out—it would quake as we walked on it.

The fourth trench, extending from N1582 E1486 to N1594 E1486, was completely different. This trench, running roughly north-south, was situated to intersect the palisade at the edge of the WPA excavation on the western side of the site (Figure 34). This was only done because of our earlier lack of success. No prehistoric features were noted in this trench, though a historic drainage trench was uncovered in unit N1588 E1486. It was well over 2 m deep, nearly 1 m wide, and contained pieces of terra cotta tile. This drainage trench was, unfortunately, exactly where we had hoped to
find the palisade, based on the WPA maps. The fields have been tiled (with terra cotta and plastic tiles) several times in the 20th century.

A final attempt was made to locate the palisade by using geophysical methods, specifically electromagnetic conductivity. Victor Thompson of the University of Kentucky visited the site on two occasions with an EM38 Earth Conductivity Meter. A total of 3,600 m² was surveyed in three different areas (Figure 35). Readings were taken every 1 m but no trace of the palisade was noted. This can be attributed in part to calibration problems with the machine, bits of metal in the ground from old fences, and possibly to the fact that the palisade has been destroyed by modern land use, specifically tiling the field. Finally, Clay (2001) correctly notes that multiple methods of geophysical survey should always be used to complement one another. Unfortunately, the cost of the equipment precluded this approach in 2004, but it remains possible that other techniques may be more suitable at this site.

Figure 35: Locations of blocks surveyed using electromagnetic conductivity. Palisades are shown.
**Structure 17 Area**

A 19 m² block was opened east of Structure 17 (Figures 34 and 36). No trace of wall trenches were noted, though several large pits (Features 105, 106, 107, 108) and post molds were excavated. Presumably, they were located just outside of Structure 17 but, since no evidence of the house walls were identified, that only remains a possibility.

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Figure 36: 2004 excavation block near Structure 17.

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**Excavations West of the Mound**

To the west of the mound is a high spot of ground separated from the WPA excavation area by a large erosion gully. Soil probes in this area indicated that no major ground disturbance had occurred, other than ubiquitous tree roots. Still, this seemed to be
a promising location for a possible structure, or so we had believed since our first visit to
the site in 2001. Therefore, a 2 x 6 m trench was dug in this area, with the southwest
corner at N1680 E1483. No cultural features and only a handful of artifacts were found.

An additional 1 x 6 m trench was excavated from N1665 E1456 to N1665 E1460
(Figure 34). This was a last ditch effort to intersect the outer palisade—a gamble that
also failed. The trench was laid out across a low rise that was similar to the one noted
beneath the middle palisade on the east side of the mound (see above). The trench was
dug to a depth of approximately 85 cm, but no features were noted and only two artifacts
were found, despite all soil being screened. It is the best evidence that low rises running
roughly perpendicular to the river bank are natural features.

**Surface Survey**

Parts of three cultivated fields totaling 71 ha (708,991 m²) were surface collected
in 2003 and 2004 to locate small sites near Annis (Figure 37). Thirteen small scatters of
artifacts were recorded. The majority of these consisted of only a few flakes and were
quite close to the main village. Three other sites, however, are more significant:
15BT119, 15BT120, and 15BT121 (Figure 37). Sites 15BT121 and 15BT119 are lithic
scatters. The collections consist mostly of debitage, but several Archaic projectile points
were recovered. Site 15BT120, however, appears to be a Mississippian farmstead. The
collection consists of a high-density scatter of shell-tempered pottery and debitage
approximately 20 m in diameter (Figure 38). The density of surface material at this site
is equal to that at the Annis site itself.
The soil was well puddled so artifacts were easily visible. Crops were also rather low, no more than 40 cm high. Visibility was good and we made a thorough collection of surface materials from all three sites.

Figure 37: Location of surveyed areas (tan) near Annis covered in 2003 and 2004. Sites not drawn to scale.
Grid Markers Left in Place

Before leaving the site, permanent datums and elevation markers were placed to aid future investigators in relocating the Penn State grid. Pieces of rebar were pounded flush with the ground to mark three of our four original points from 2002, and marked with a cinder block (Figure 23). The fourth point, N1650 E1518, could not be relocated in 2004, but a cinder block was placed in the vicinity of where it should be. Rebar was also left in the ground in three other places. One piece was placed on the grid north edge of Feature 67, at coordinates N1668.49 E1504.83—on the west side of the mound. The other two were left in Feature 92 at N1676.74 E 1577.6 and Feature 93 at N1673.29
E1575.85. The top of the spikes are at an elevation of 97.8 m for Feature 92 and 98.045 m for Feature 93.

The arbitrary 100 m elevation point used for all three seasons of work was left in a large oak tree on the grid west of the site. This tree still has parts of the old fence stuck into it and should be easy to find (see Figure 21b).
Chapter 5
Annis Mound

The platform mound was excavated by the WPA crew from August, 1939, to February, 1940. When first visited by Moore, the mound measured 33.5 m on a side and was 3.5-3.7 m high (Moore 1916) (Figure 14). However, because of considerable erosion from the Green River, the mound measured only 30.5 by 25.9 m at the time of excavation (Brown 1940:2; Young 1962:37).

Excavation began at the 450-foot line, an arbitrary division between the village and mound. The early stages proceeded according to the slicing method described in Chapter 4, and was generally done in 6 in levels, although occasionally levels of a foot or more were used. However, rows of post molds were soon noted in several profiles, so Brown abandoned slicing in favor of horizontal clearing (Brown n.d.:30). As a result, only a handful of poorly labeled profiles were drawn.

Three construction stages were noted during excavation, each topped by summit architecture and other features, mostly pits and hearths. These were referred to as the Sub-Primary, Primary, and Secondary mounds, and were underlain by an Old Humus layer—the original ground surface (Figure 39). This description is used here to reduce confusion with the notes. Stages were recognized by the presence of features and undulating seepage lines, not solely by fill color. The fill of each stage was a “…sandy clay, such as would be produced by a mixture of soils in the neighborhood, chiefly to the
west and northwest, from whence the soil from the mound was probably got…” (Brown n.d.:21). Brown’s notes only occasionally mentioned the presence of basket-loaded soil, but individual loads are evident in many photographs (Figure 40).

Features were numbered sequentially by the WPA crew as they were encountered. In general, lower feature numbers are associated with the upper mound stages since excavation began at the top of the mound. The main exception to this is Feature 4, a
flank midden associated with the Sub-Primary mound. This midden was encountered early in the excavation before the different stages were revealed, and Brown later assigned to the Sub-Primary mound.

Artifact bags for the Old Humus, Sub-Primary, and Primary mounds were labeled by mound stage as well as by square and depth. Bags from features did not always have the stage recorded on them, but the features themselves were mapped by mound stage, and the feature forms were labeled by mound stage. Artifacts from the Secondary mound were not labeled by stage because it was excavated before the existence of multiple stages was recognized. Therefore, all proveniences without labeled mound stages were assigned to the Secondary mound, a decision also made by Young (1962) who, despite problems with his mapping, was a competent artifact analyst.

Mound volume by stage was inferred using a combination of summit structure maps, feature forms, field notes, photographs, and Moore’s mound measurements. Moore’s measurements for the Secondary mound were used rather than Brown’s because he visited the site before the most serious erosion had occurred.

The major problem with calculating mound volume using the WPA notes from Annis lies in reconstructing elevations from local datums. Each mound stage had a local 0’ marker from which measurements were taken. When a stage was completely excavated, a new 0’ datum was set for the stage below it. Unfortunately, if the differences in elevation between each 0’ datum were ever recorded, they have been lost in the intervening sixty years. I was able to obtain elevations from some parts of the mound but not from others. As a result, the volume estimates presented here err on the high side since I slightly overestimated the size of each stage when there were questions
about total size. However, these estimates are the best possible given the existing
documentation.

Estimates of mound volume use a formula for a pyramidal frustum (Baumeister et
al. 1978):

\[ V = \frac{1}{3}h \left[ (B + \sqrt{BB'}) + B' \right] \]

\[ V = \text{total volume}, \]
\[ h = \text{mound height}, \]
\[ B = \text{basal area}, \]
\[ B' = \text{area of the stage surface}. \]

Volumes for each mound stage are presented in Table 5. The “volume added”
column reflects the amount of earth added as a result of each construction stage. The
total volume of the mound was nearly 1,700 m³, as estimated from Brown’s and Moore’s
measurements.

<table>
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<th>Stage</th>
<th>Length (m)</th>
<th>Width (m)</th>
<th>Total Height (m)</th>
<th>Volume added (m³)</th>
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<td>24.38</td>
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<td>18.29</td>
<td>30.48</td>
<td>1.6</td>
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<td>33.5</td>
<td>3.7</td>
<td>918.6</td>
</tr>
</tbody>
</table>

**Mound Stages**

**Old Humus**

The Premound stage, referred to as Old Humus by Brown, is the earliest
Mississippian stage recorded. Twenty-seven post molds were recorded, although no clear
pattern is evident (Figure 41). One isolated post to the west appears to have been part of a palisade, and it is discussed further in Chapter 6.

![Diagram of Old Humus plan]

Figure 41: Old Humus plan.

Both sherds (n=148) and chipped stone artifacts (n=23), along with a handful of deer bones, were found in the Old Humus level. The majority of sherds (n=94) were shell-tempered (Table 6). Nearly all were plain or eroded, although one Ramey Incised sherd was found (Figure 43b), indicating that the mound was built on an early Mississippian occupation surface. Only one handle was present, a loop form, also pointing to an early Mississippian occupation (Table 7). One shell-tempered animal effigy fragment was likely an attachment on a pot (Figure 42a). Identifiable vessel fragments were exclusively jars (Table 8). Most of the stone artifacts were debitage made from locally available Curlew chert, although a drill, a possible scraper, and a Madison/Hamilton cluster projectile point (Justice 1987) were also found (Table 9).
Table 6: Distribution of Temper and Surface Treatment, Annis Mound.

<table>
<thead>
<tr>
<th>Temper/Surface Treatment</th>
<th>Mound Stage</th>
<th></th>
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</tr>
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<td>Secondary</td>
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</tr>
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</tr>
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<tr>
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<td>40</td>
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*39 sherds have an unknown provenience and are not included in this table.
Table 7: Distribution of handle types, Annis Mound. Types determined following Hilgeman (2000).

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<thead>
<tr>
<th>Handle Type</th>
<th>Mound Stage</th>
<th>Old Humus</th>
<th>Sub-primary</th>
<th>Primary</th>
<th>Secondary</th>
<th>Total</th>
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<td>1</td>
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<td>Shell/Grog</td>
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<td>31</td>
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Table 8: Distribution of Vessel Type by mound stage.

<table>
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<tr>
<th>Temper/ Vessel Form</th>
<th>Mound Stage</th>
<th>Old Humus</th>
<th>Sub-primary</th>
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<th>Secondary</th>
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<tr>
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<td></td>
<td>11</td>
<td>226</td>
<td>3</td>
<td>132</td>
<td>372</td>
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</tbody>
</table>

**Bowl**
- burned clay: 1
- grog: 14
- shell: 7
- shell/grog: 4

**Bowl/Pan**
- grog: 1
- shell: 1

**Jar**
- grog: 51
- shell: 9
- shell/grog: 11

**Pinch Pot**
- burned clay: 1

**Pinch Pot Jar**
- shell: 1

**Pan**
- grog: 11
- shell: 11
- shell/grog: 5

**Plate**
- shell: 2

**Unknown**
- grog: 45
- shell: 1
- shell/grog: 3

<table>
<thead>
<tr>
<th></th>
<th>Old Humus</th>
<th>Sub-primary</th>
<th>Primary</th>
<th>Secondary</th>
<th>Total</th>
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<tr>
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<td>11</td>
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<td>2</td>
<td>13</td>
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<td>1</td>
<td>4</td>
<td></td>
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</tbody>
</table>

Total

- Old Humus: 11
- Sub-primary: 226
- Primary: 3
- Secondary: 132
- Total: 372
Table 9: Old Humus stone artifacts.

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<th>Object</th>
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<tr>
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</tr>
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</tr>
<tr>
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</tr>
<tr>
<td>blue gray chert debitage, 1&quot;</td>
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</tr>
<tr>
<td>drill</td>
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</tr>
<tr>
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</tr>
<tr>
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<td>1</td>
</tr>
<tr>
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</tr>
<tr>
<td>hematite</td>
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<tr>
<td>hematitic sandstone</td>
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<tr>
<td>light gray chert debitage, 0.5&quot;</td>
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</tr>
<tr>
<td>gray chert projectile point, Madison/Hamilton</td>
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</tr>
<tr>
<td>quartz cobble</td>
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</tr>
<tr>
<td>scraper tip?</td>
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</tr>
<tr>
<td>tan fossiliferous chert debitage w/cortex, 1&quot;</td>
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</tr>
<tr>
<td>white chert debitage, 0.5&quot;</td>
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</tbody>
</table>

Figure 42: Animal effigy decorations (a-b) and handles (c-d).  a). Old Humus level (BT2-C210); b). Sub-Primary mound, Feature 47 (BT2-43); c). Secondary mound fill (BT2-C464); d). Sub-Primary mound fill (BT2-C457).
Sub-Primary Mound

The Sub-Primary mound measured 15 x 24 m and was raised to a height of 70 cm with a total volume of 225 m$^3$ (Table 5). Unlike the Old Humus, the Sub-Primary mound was clearly topped by a structure (Figure 44). The exact area encompassed by the structure is unclear due to erosion on the northern edge, but it was at least 88.49 m$^2$. This structure consisted of several lines of post molds, perhaps evidence of rebuilding, as well as numerous hearths (n=9) and trash-filled pits (n=4) (Figure 45).
Figure 44: Sub-Primary mound structure, facing northwest (WSWMA negative #3323). The frozen-over Green River is in the background, and Moore’s test pit (outlined in white) is in the left center of the photograph.

Figure 45: Sub-Primary summit structure. Red areas are hearths, blue areas are trash-filled pits. Features 4 and 52 lie on and beyond the west and southwest flanks of the mound.
Two large middens, Features 4 and 52, lay on the western flank of the mound. These contained over 3,000 bone specimens (primarily deer, but a few possible fox and drum were identified), turtle and mussel shell fragments, as well as pottery and stone artifacts. Much of the bone had been smashed to extract marrow and gnawed by animals. Several pieces are pot polished (White 1992) and exhibit chop marks. Thus the bones were smashed and boiled to extract the maximum nutritional value. Based on tooth wear, both young and old deer are represented in the sample, indicating that the local herd was not under considerable stress, since herds under stress are dominated by young animals. Also, both meaty and non-meaty parts are represented, meaning that the animals were probably processed on the mound itself rather than being processed elsewhere with the meatiest portions delivered to the residents of the mound summit. This is a pattern that is clearly distinct from elite flank middens found at larger Mississippian sites (Knight 2004).

A 2-sigma radiocarbon date of 420 - 170 B.C. (Beta 186154) was obtained from a piece of mussel shell from Feature 52 (Appendix E). I consider this date to be erroneous because of the presence of Mississippian debris in association with the shell and because of the reservoir effect caused by the limestone in the area. Limestone does not contain radioactive carbon and dilutes the radioactivity of things in surrounding waters compared to elsewhere, thus making shellfish seem older than they are (Higham 1999), plus the shell may have been debris from an earlier occupation that was mixed in.

Both shell- and grog-tempered pottery were present in the Sub-Primary mound (Table 6). Much of this material was mixed with mound fill, which was likely scraped up
from the surrounding village (Brown n.d.:21). Jars and bowls were most common, although a number of pans were also present (Table 8).

A Matthews Incised, var. Manly sherd (Figure 43a) was found in Feature 46, a series of overlapping fire basins, and a Powell Plain rim sherd was found in the fill of Feature 44, a trash-filled fire pit. These were the only diagnostics from features. A second Ramey Incised sherd (Figure 43c) came from the mound fill. Neutron activation analysis (NAA) indicates that the Ramey Incised sherds (from the Old Humus and Sub-Primary mound) as well as the Matthews Incised were imports. The Powell Plain sherd plots as a locally made piece but, due to a small sample from Annis and a poor sample of American Bottom materials, this may not be accurate. Visually, this sherd is indistinguishable from sherds that originate near Cahokia (George Milner, personal communication 2002), and the small temper size is not typical of local wares. There is a considerable amount of variation evident within local ceramics that could perhaps be masking true imports (Speakman and Glascock 2005). Despite this variation, the Ramey sherds consistently plot as clear imports. Additional testing may shed more light on this problem.

Most of the handles in the fill were shell-tempered loops with one wide intermediate (strap-like) type (Table 7). These artifacts point to a early to middle Mississippian date (A.D. 1100-1300) for the construction of the Sub-Primary mound. Unlike the Ramey material from nearby sites such as Andalex (Niquette 1991) and Angel (Hilgeman 2000), these sherds do not appear to be local copies since they are morphologically and chemically consistent with those made in the American Bottom (George Milner, personal communication, 2003).
Two small figurines came from feature fill and one other was recovered from mound fill. The first is a small human head from Feature 45 (Figure 46), with eyes, nose, mouth, and ears clearly evident. The other two depict animals (Figure 42b, d). One seems to be a part of a larger creation (Figure 42b) while the other appears to be a loop handle fashioned into an animal (Figure 42d).

![Human figurine](image)

Figure 46: Human figurine, Sub-Primary mound, Feature 45 (BT2-41).

Bone and shell artifacts, primarily domestic in nature, were found in both features and mound fill. These included bone awls or needles, flakers, mussel shell hoes, and a bone projectile point.

**Primary Mound**

The Primary mound measured 30.5 x 18.3 m at its base. A layer of 0.9 m of soil (556 m³) was added to the mound, bringing its height to 1.6 m and volume to 781 m³ (Table 5). A structure was again built on the summit (Figure 47). This structure was built using both wall trenches and single-set posts (Figure 48). The total area
encompassed by these posts was 250 m², although the northern edge was eroded away
before excavation, meaning the original building was somewhat larger.

Figure 47: Primary Mound structure, facing west. Note postmolds from fence in the
vertical profile (cross-section) to left of photograph (WSWMA negative #3300).
It is unlikely that this entire enclosure was roofed given its size and the absence of interior roof support posts. Rather, the deeply set outer line of posts (Figure 49) probably formed a fence that enclosed an interior wall-trench building and screened it from public view, similar to structures at Angel, Bessemer, Cahokia, Etowah, and Towosaghy, as well as sites in the Savannah and lower Mississippi valleys (Anderson 1994:178-79; Black 1967:266; DeJarnette and Wimberly 1941:61; Price and Fox 1990:24; Smith 1969:66; Swanton 1911:262-69).

Figure 48: Primary Mound structure plan. Red areas are hearths and surface fires. Only one small part of Moore’s pit was noted in this level.
All non-architectural features within this structure were fire-related. These included puddled clay fire basins (n=6), fire basins (n=6), and patches of burned earth interpreted as surface fires or bonfires (n=12). The majority of these surface fires (Features 24, 25, 27, 28, 29, 30, 32, 33, 34, 35, 36, 49) lie between the presumed inner building and fence.

Forty-nine artifacts were recovered from the Primary mound. The lone artifact from a feature was a Bell Plain jar rim from Feature 26, a puddled clay fire basin. The remainder came from mound fill. There were 40 sherds found, with a nearly even split between shell- and grog-temper (Table 6). The only handle found was of the narrow
intermediate form (loop-like) (Table 7), and two sherds from jars were noted (Table 8). The remaining nine artifacts were one piece of fired clay, five pieces of debitage, two tool fragments, and one bone needle. All stone pieces were made from locally available Curlew chert (Table 10).

<table>
<thead>
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<th>Association</th>
<th>Material</th>
<th>Count</th>
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</thead>
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<td>primary mound</td>
<td>brown and gray chert debitage, 0.5&quot;</td>
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<tr>
<td>primary mound</td>
<td>gray chert debitage w/cortex, 0.5&quot;</td>
<td>1</td>
</tr>
<tr>
<td>primary mound</td>
<td>gray chert debitage w/cortex, 1&quot;</td>
<td>1</td>
</tr>
<tr>
<td>primary mound</td>
<td>tool fragment (drill?)</td>
<td>1</td>
</tr>
<tr>
<td>primary mound</td>
<td>light gray chert debitage, 1&quot;</td>
<td>1</td>
</tr>
<tr>
<td>primary mound top</td>
<td>gray chert debitage w/cortex, 1&quot;</td>
<td>1</td>
</tr>
<tr>
<td>primary mound top</td>
<td>projectile stem</td>
<td>1</td>
</tr>
</tbody>
</table>

Secondary Mound

The final stage of the mound measured 33.5 m on a side. A total of 919 m³ of soil was added, raising the mound to its final height of between 3.65 and 3.73 m, and volume of 1,699 m³ (Table 5). Again, the mound was topped by a structure (Figure 50), encompassing 104.79 m², although erosion is a problem in determining its overall size. The structure was built solely using wall trenches, with evidence of rebuilding along the eastern wall. Several wall trench sections may have been internal partitions (Figure 51). This building is also the only one with a clear, but narrow, entrance. Although recorded and plotted as pits, Features 6 and 21 appear in profile to be deep, narrow posts, probably for roof support. Features 7, 15, and 16 were internal pits, perhaps for storage.
Figure 50: Secondary Mound summit structure, facing east (WSWMA negative #3264).
Only one prepared hearth, Feature 19, was recorded. Features 1, 2, and 5 are patches of surface burning, perhaps bonfires, and Feature 8 is a pit filled with burned earth and charcoal. Features 11 and 12/19 are areas of burned earth, charcoal, and charred cane and roof pole fragments that likely resulted from the burning of the structure (Figure 52).
With the exception of Feature 6, in which a turtle shell bearing traces of red paint was found, and Feature 7, which contained a handful of flakes and one small sherd, no artifacts were collected from summit features. However, artifacts from Feature 12 were lumped together with those from the surrounding mound fill, making it impossible to sort out feature from fill artifacts. Features may have been cleaned out before the structure burned.

The paint-bearing turtle shell was likely of ritual significance. Traces of red pigment have been found on certain artifacts at other sites (e.g., Milner 1984:95), and they probably had a special function as well.
Feature 56 was a cache of 25 “crude chunks” of unworked chert located near the bottom of the Secondary mound fill, almost on the Primary mound surface. They were not found within a pit, but, according to the feature form, were “packed together, however, as though crammed into a hole”. These items, unfortunately, have not been relocated in storage and no photograph was taken. It is possible that these items were placed as an offering immediately upon decommission of the Primary mound and the beginning of construction of the Secondary mound. A similar scenario has been reported at other Mississippian sites, notably Cemochechobee (Knight 1981:74; Schnell et al. 1981:133-134) where “killed” pots were placed within features before a new mantle of earth was added. There are also reports of caches of cores in domestic buildings at Robert Schneider and Turner in the American Bottom (Finney and Fortier 1985; Milner 1983), and elsewhere.

Shell-tempered pottery dominates the Secondary mound collection (Table 6), although all artifacts are seemingly from mound fill. Jar and bowl sherds were most common, although pans were again a sizeable minority and, for the first time, two plate fragments were found (Table 8). Handles were nearly all shell-tempered, and consist of both open and closed types, with lugs being the most common (Table 7).

Chipped stone artifacts were all made from Curlew chert. Several projectile points were recovered as were a celt and fragments of a mortar and pestle (Table 11). One triangular and two corner-notched projectile points were present in the fill.

Bone and shell artifacts from mound fill include awls/needles, a fish hook, flakers, and a shell hoe, as well as unworked bone, primarily deer. As with the material from the Sub-Primary mound, these are all domestic items.
Table 11: Secondary mound stone artifacts.

<table>
<thead>
<tr>
<th>Object</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>blue gray chert cobble</td>
<td>1</td>
</tr>
<tr>
<td>blue gray chert core</td>
<td>1</td>
</tr>
<tr>
<td>blue gray chert core fragment</td>
<td>1</td>
</tr>
<tr>
<td>blue gray chert debitage w/cortex, 0.5&quot;</td>
<td>2</td>
</tr>
<tr>
<td>blue gray chert debitage w/cortex, 1&quot;</td>
<td>2</td>
</tr>
<tr>
<td>blue gray chert debitage, 0.5&quot;</td>
<td>3</td>
</tr>
<tr>
<td>blue gray chert debitage, 1/2&quot;</td>
<td>1</td>
</tr>
<tr>
<td>blue gray chert debitage, w/cortex, 0.5&quot;</td>
<td>2</td>
</tr>
<tr>
<td>brown and gray chert debitage, 0.5&quot;</td>
<td>1</td>
</tr>
<tr>
<td>cannel coal</td>
<td>2</td>
</tr>
<tr>
<td>celt, limestone</td>
<td>1</td>
</tr>
<tr>
<td>core</td>
<td>1</td>
</tr>
<tr>
<td>crinoid stem bead</td>
<td>1</td>
</tr>
<tr>
<td>daub</td>
<td>9</td>
</tr>
<tr>
<td>fossiliferous chert, 1&quot;</td>
<td>1</td>
</tr>
<tr>
<td>gray and tan chert debitage w/cortex, 0.5&quot;</td>
<td>1</td>
</tr>
<tr>
<td>gray chert cobble fragments</td>
<td>4</td>
</tr>
<tr>
<td>gray chert debitage w/cortex</td>
<td>1</td>
</tr>
<tr>
<td>gray chert debitage w/cortex, 0.5&quot;</td>
<td>3</td>
</tr>
<tr>
<td>gray chert debitage w/cortex, 1&quot;</td>
<td>5</td>
</tr>
<tr>
<td>gray chert debitage, 0.5&quot;</td>
<td>8</td>
</tr>
<tr>
<td>gray chert debitage, 1&quot;</td>
<td>6</td>
</tr>
<tr>
<td>hematitic sandstone</td>
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<tr>
<td>jasper-like debitage, heat treated, 1&quot;</td>
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<td>light gray chert debitage w/cortex, 0.5&quot;</td>
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<tr>
<td>light gray chert debitage w/cortex, 1&quot;</td>
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<td>light gray chert debitage, 0.125&quot;</td>
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<td>light gray chert debitage, 0.5&quot;</td>
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<td>limestone</td>
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<tr>
<td>projectile point</td>
<td>7</td>
</tr>
<tr>
<td>projectile tip</td>
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<td>sandstone</td>
<td>4</td>
</tr>
<tr>
<td>scraper</td>
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</tr>
<tr>
<td>tan chert cobble, 0.5&quot;</td>
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</tr>
<tr>
<td>tan chert debitage w/cortex, 1&quot;</td>
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</tr>
<tr>
<td>tool fragment-possible adze</td>
<td>1</td>
</tr>
<tr>
<td>tool fragment-possible scraper</td>
<td>1</td>
</tr>
<tr>
<td>utilized blue gray chert debitage, 1&quot;</td>
<td>1</td>
</tr>
<tr>
<td>utilized core</td>
<td>1</td>
</tr>
<tr>
<td>utilized flake</td>
<td>7</td>
</tr>
<tr>
<td>white chert debitage, 1&quot;</td>
<td>2</td>
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</tbody>
</table>
Summary

The mound went through several stages of occupation during its use. The Old Humus layer was an early Mississippian occupation surface, based on the presence of several post molds, household debris, and diagnostic pottery. The Sub-Primary mound was a low mound topped by a domestic building, with both pits and hearths as well as large flank middens filled with domestic refuse. The Primary mound was somewhat larger than the Sub-Primary, but was not likely used as a dwelling platform due to the lack of debris and features other than hearths and bonfires. It presumably had some ceremonial function. The Secondary mound was significantly larger and the summit structure was domestic, based on the reappearance of pits and a large number of artifacts, some clearly processing tools.

As a final note, at the request of the Annis family, the mound was rebuilt in 1940 62.5 ft grid south of its original location. This was done so the mound could still be viewed and to protect it from further river erosion. Backdirt was piled using wheelbarrows (Figures 53 and 54), the mound was kept as close to its original measurements as possible, and a mulberry tree was planted on the summit to replace the original, larger tree removed when excavation began (Figure 55)
Figure 53: WPA workers rebuilding the mound (WSWMA negative #3277).

Figure 54: WPA workers rebuilding the mound, facing north (WSWMA negative #3291).
Figure 55: Final Annis Mound reconstruction, facing grid north (WSWMA negative #3329). Today, this part of the site is in woods.
Chapter 6

Annis Village

Excavation took place at the village from February 1939 until April 1940\(^8\) by the WPA, and in the summers of 2002-2004 by Penn State crews. Parts of the WPA village work ran concurrently with mound excavation, although the bulk of the village was excavated before work at the mound began. This is because the excavators generally worked from grid south (village) to grid north (mound). The major features found during the combined field efforts were 3 concentric palisades and 17 structure areas and their associated pits (Figure 56). One burial, numerous isolated postmolds, and several natural features (likely tree falls) were also excavated (Table 12). The structures and palisades and their associated artifacts are described in this chapter, as are the general characteristics of artifact assemblages.

Palisades

Three palisades, referred to as inner, middle, and outer, were built at Annis (Figure 56). These appear to be nested within one another and were not contemporaneous, since in several places structures and palisades are superimposed. It seems that these palisades represent successive enlargements of the village. The WPA

\(^8\) As mentioned in Chapter 4, one of the field notebooks is missing so the exact start date of the WPA excavation is unclear. However, Milner and Smith (1986), using field notes and WPA monthly and quarterly reports, note that excavation of Annis Village probably began in February, 1939.
exposed portions of all three palisades. Penn State crews excavated parts of the inner and middle palisades, but could not relocate the outer palisade (see Chapter 4). The number of posts was determined by first averaging the spacing of known posts and the dividing the estimated length of each palisade by the distance between posts.

Figure 56: Annis Village site plan with palisades in red. The mound outline shows the approximate shape of the Secondary mound at the time of the WPA excavation—erosion has taken some toll. Downstream is to the left.

The area encompassed by each palisade was estimated using the current riverbank. We compared the location of the riverbank in 2003 to its location in 1940, using the WPA maps as a guide. We discovered that about 2 m of bank had eroded away
over the last 60 years. Assuming a constant erosion rate, the bank was likely 20 m
further north at the time of occupation. A constant rate is questionable because erosion
likely quickened once the river was dammed and river boats made waves that lapped
against the banks. However, little can be said at this time other than the village probably
extended no more than 20 m toward the river, and probably somewhat less.
Table 12: Total number of features at Annis.

<table>
<thead>
<tr>
<th>Structure</th>
<th>Building Episodes</th>
<th>Hearths</th>
<th>Pits</th>
<th>Caches</th>
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<tr>
<td>16</td>
<td>3</td>
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<td>1</td>
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</tr>
<tr>
<td>17</td>
<td>1</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
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<td>17</td>
<td>26</td>
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<table>
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<th>Other Features*</th>
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</thead>
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<td>Burial</td>
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<tr>
<td>Burned earth</td>
<td>2</td>
</tr>
<tr>
<td>Cache, chert</td>
<td>2</td>
</tr>
<tr>
<td>Cache, shell</td>
<td>1</td>
</tr>
<tr>
<td>Fire-cracked Rock concentration</td>
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</tr>
<tr>
<td>Hearths</td>
<td>19</td>
</tr>
<tr>
<td>Isolated Posts</td>
<td>100+</td>
</tr>
<tr>
<td>Midden, no pit</td>
<td>1</td>
</tr>
<tr>
<td>Natural features**</td>
<td>1</td>
</tr>
<tr>
<td>Palisades</td>
<td>3</td>
</tr>
<tr>
<td>Pits</td>
<td>35</td>
</tr>
<tr>
<td>Pits, unnumbered</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>170+</td>
</tr>
</tbody>
</table>

*includes features from structures
**does not include tree falls as they were generally not mapped or numbered by the WPA (e.g., Feature 67 is not included here).
Inner Palisade

The inner palisade was the first to be constructed (Figure 57). It was built by setting roughly 20 cm diameter posts into a deep trench (Figure 30), visible on the surface as a dark stain (Figures 29 and 58). Posts were set approximately 20 cm apart and the trench was 30 cm wide and extended 1 m below ground surface. The palisade was 114 m long, enclosed approximately 0.32 ha, and contained an estimated 570 posts (Table 13), one of which was the stray post seen to the west of the Old Humus mound map (Figure 41). Three wood specimens were identified, all were ash (*Fraxinus* sp., Lee Newsom, personal communication, 2003). Two radiocarbon dates were obtained from wood charcoal found in Feature 93, a charred post. The result was 2-sigma date ranges of cal A.D. 1278-1398 (Beta 181396, 181398) (Appendix E).

---

Figure 57: Simplified site map showing palisades and the estimated location of the riverbank at the time of occupation. Solid lines show excavated parts of palisades, dashed lines are estimates of their course.
The middle palisade was 205 m in length, encompassed 0.82 ha, and required 1025 posts (Table 13; Figure 57). It was built by placing posts in a deep trench, the same as the first palisade. This palisade was uneven in depth and did not leave a continuous signature (Figure 59), meaning that shallow posts were truncated by the time we reached...
a level where it could be identified or it was built discontinuously (or perhaps both). No tree species were identified from this palisade, but a 2-sigma radiocarbon date of cal A.D. 1256-1385 (Beta 181397; Appendix E) was obtained from a fragment of charred nutshell, probably black walnut (*Juglans nigra*; Lee Newsom, personal communication, 2003).

---

**Outer Palisade**

The outermost palisade measured 277 m, covered 1.3-1.8 ha, and required 1,385 posts (Table 13; Figure 57). As mentioned above, no trace of this palisade was found during Penn State excavation, so it is unclear how it was constructed, nor could
radiocarbon dates be obtained. However, WPA photographs show that it was similar to the inner palisade in plan (Figure 60); posts were placed in a ditch (Figure 61). Note that the excavation trench was shallow (Figures 60 and 62) and there is a possibility that the palisade was eroded away in the low ground where Penn State excavated in 2004, as our trenches exposed little in the way of soil (15 cm) above sterile yellow subsoil.

Figure 60: Plan of outer palisade (WSWMA negative #4073). Southernmost extension, facing west.
This palisade is the only one with evidence of a bastion (Figure 62). However, one bastion alone would not provide sufficient protection against an attacking group, certainly not the same level of defense that would have been possible at other western Kentucky sites, such as Jonathan Creek (Webb 1952) and Morris (Rolingson and Schwartz 1966), that possessed palisades with regularly spaced bastions. On average, Mississippian bastions, when several are present, are placed at about 30 m intervals, well within overlapping arrow distance (Milner 1999). The Annis Village bastion faces out
into a wide, flat area (Figure 61) and may have served as a watchtower to provide an early warning system to people working in the nearby fields. In this sense, it was part of the defensive works, but did not make the wall a more effective barrier. Watchtowers to guard fields are common among groups that are involved in a near-constant state of raiding, such as in highland New Guinea (Gardner 1964; Heider 1997:43).

---

*Figure 62*: Bastion on east side of outer palisade (WSWMA negative #4111). The trench was sectioned and the post molds were scooped out, but are still visible around the edge of the excavation.

---

**Structures**

Sixteen structure areas were excavated by the WPA crew and one by Penn State students. Their locations with respect to one another can be seen in Figure 63. In this section, I rely heavily on short summaries of each structure prepared by Brown following
the completion of excavation in 1940. Structures were of both single-set post and wall-trench forms, and ranged from 19 to 45 m² in floor area with a mean of 29 m² (Table 14). Measurements were taken from the inside edge of each wall since prepared floors were not identified. A total of 31 construction episodes were noted, including stray wall trenches and rows of posts. There were no stray wall trenches other than in the vicinity of recognized houses.

---

**Figure 63**: Locations of structure areas 1-17. Features 63, 64, 65, and 92/93 (in red) are palisades. Mound outline is the final extent of the Secondary mound.
Artifacts clearly associated with structures were given field specimen (FS) numbers and recorded separately. Occupation floors within structures were not always recorded, but Brown distinguished artifacts associated with each structure based on their

<table>
<thead>
<tr>
<th>Structure Area</th>
<th>Area (sq m)</th>
<th>Single-set Posts</th>
<th>Wall Trench</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>21.00 x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>30.00 x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>27.60 x</td>
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<td></td>
</tr>
<tr>
<td>2</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>33.00 x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>23.85 x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>20.98 x</td>
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<tr>
<td>3</td>
<td>n/a x</td>
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</tr>
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<td>4</td>
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<td></td>
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</tr>
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<td>39.36 x</td>
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<td>7</td>
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<td>n/a x</td>
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</tr>
<tr>
<td>Mean</td>
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<td>19</td>
<td></td>
</tr>
</tbody>
</table>

Table 14: Structure sizes. Those without areas are stray wall trenches that are counted as separate building episodes. All measurements are from the inside edge of each wall line.
relative depth with respect to wall trenches, post molds, and other features. Artifacts from overburden were bagged by square and level, and are discussed separately since it cannot be shown conclusively that they came from any specific structure. Features within each structure were generally recorded and excavated separately, although in some instances that was not the case.

**Structure 1**

Structure 1 consisted of wall trenches with a line of post molds running along the interior and occasionally superimposing them, probably indicating a rebuilding episode. The single-set post structure measured 21 m² and the wall trench structure measured 30 m² (Table 14). Several additional posts may have been for roof support (Figure 64). It had two hearths, Features 1 and 14, neither of which contained artifacts. Large patches of burned soil, charcoal, and cane fragments were found along the east and west walls, indicating that the structure likely burned.
Shell-tempered ceramics and stone artifacts were found (Table 15). Vessel forms were two fragments of a noded jar, three jar sherds with round-to-oval lugs, three undecorated jar rims, and one pan sherd. At least three jars and one pan were present. One notable stone object was a cannel coal ear plug (Figure 65).
Structure 2

Structure 2 was difficult to distinguish due to water-saturated soil during excavation, although wall trenches and several post molds were recognized. The south wall was not found in the field but its location was projected by Brown based on the

Table 15: Artifacts from Structure 1.

<table>
<thead>
<tr>
<th>Material</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pottery</td>
<td></td>
</tr>
<tr>
<td>shell, eroded</td>
<td>3</td>
</tr>
<tr>
<td>shell, plain</td>
<td>42</td>
</tr>
<tr>
<td>Stone</td>
<td></td>
</tr>
<tr>
<td>celt</td>
<td>1</td>
</tr>
<tr>
<td>hammerstone</td>
<td>1</td>
</tr>
<tr>
<td>grooved</td>
<td></td>
</tr>
<tr>
<td>hammer</td>
<td>1</td>
</tr>
<tr>
<td>ear plug</td>
<td>1</td>
</tr>
<tr>
<td>polished stone</td>
<td>1</td>
</tr>
</tbody>
</table>

Figure 65: Cannel coal ear plugs from Structure 1 (left; Bt20-129) and Structure 3 (right; Bt20-14).
locations of the other three (Figure 66), making the floor area 27.6 m² (Table 14). The middle palisade (Feature 64) superimposes the north wall of the structure, so the building must belong to the original (smallest) village. Two other trench segments to the north are out of alignment with the others. In addition, the longer of the two superimposes a wall clearly associated with the others, and they are shallower. It is possible that these walls are part of rebuilding episodes that was not fully documented because of the digging conditions.

One central hearth, Feature 2, was recorded. The fill was described as “dirt in which was mixed the usual debris of burned dirt, ash, charcoal, bone scrap,” although only a handful of shell-tempered sherds were retained.

More artifacts were clearly associated with Structure 2 than any village structure. A total of 25 FS numbers were assigned. Nine were dendrochronological specimens discarded in the intervening 60 years, and the remainder were pottery (n=168) and stone (n=12) (Table 16).
Figure 66: Structure 2. Feature 64 is the middle palisade. The small red area is burned earth.
Most of the pottery came from several nearly complete vessels. These were a strap-handled jar with lugs and a bowl. Fragments of several other vessels were also found, including two strap-handled jars, one jar with a bifurcated lug, two jars with no handles, three bowls with either lugs or nodes, and one pan. A pottery trowel, a human figurine head (Figure 67) and a curiously shaped pottery item that looks much like a deer astragalus (Figure 68) were also found. Figurines such as the one depicted at the right of Figure 67 have a relatively limited midcontinental distribution mostly around the Ohio-Mississippi Confluence region.

Table 16: Artifacts from Structure 2.

<table>
<thead>
<tr>
<th>Material</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pottery</strong></td>
<td></td>
</tr>
<tr>
<td>shell, eroded</td>
<td>1</td>
</tr>
<tr>
<td>shell, plain</td>
<td>166</td>
</tr>
<tr>
<td>shell, fabric-impressed</td>
<td>1</td>
</tr>
<tr>
<td><strong>Stone</strong></td>
<td></td>
</tr>
<tr>
<td>nutting stone, limestone</td>
<td>1</td>
</tr>
<tr>
<td>nutting stone, sandstone</td>
<td>1</td>
</tr>
<tr>
<td>saw, sandstone</td>
<td>2</td>
</tr>
<tr>
<td>triangular cannel coal</td>
<td>1</td>
</tr>
<tr>
<td>celt, Dover chert</td>
<td>1</td>
</tr>
<tr>
<td>pestle, limestone</td>
<td>1</td>
</tr>
<tr>
<td>figurine head, human</td>
<td>1</td>
</tr>
<tr>
<td>Projectile point, triangular</td>
<td>1</td>
</tr>
<tr>
<td>trowel, pottery</td>
<td>1</td>
</tr>
<tr>
<td>astragalus effigy</td>
<td>1</td>
</tr>
<tr>
<td>whetstone? (missing)</td>
<td>1</td>
</tr>
</tbody>
</table>
Figure 67: Human figurines.

Figure 68: Pottery object from Structure 2 shaped like a deer astragalus (left). An actual deer astragalus is on the right for comparison.
Stone artifacts were primarily domestic in nature, including sandstone saws, nutting stones, and a pestle (Table 16). An unidentified triangular cannel coal object and a Dover chert woodworking implement (Figure 69) were also present.

Structure 3

Structure 3 consisted of multiple, but faint, wall trenches and internal roof support post molds (Figure 70). The structure was not completely recorded, in part because of poor visibility due to a high water table (a “veritable quicksand” according to Brown). It is not clear if it predates the middle palisade or not. The palisade likely intersected parts of the structure, but superposition either way is unknown (Figures 63 and 70).
Because of the multiple wall lines, Structure 3 was likely rebuilt on four occasions (including stray trenches), with floor areas ranging from 21-33 m² (Table 14). No central hearth was found but two non-fire related features were noted. Feature 7 was a small pit packed full of small charred corncobs (Figure 71). A number of these were shellacked for preservation purposes and were glued to a piece of newspaper, a common practice at the time, but one that made later radiocarbon dating impossible.

Figure 70: Structure 3 and the middle palisade (F64).
The second feature, Feature 8, was a pit with rocky fill and no artifacts. It lay partially under two segments of wall trench and was later determined to be a natural disturbance (Table 12).

A number of artifacts were found in association with this structure. Several of these could not be relocated in storage but are listed in Table 17. One bowl and a large jar with three bifurcated lugs (Figure 72) were the identifiable vessels. Both clay and stone pipes were also found, as was a cannel coal ear plug (Figure 65).

Figure 71: Corncob from Feature 7.
Table 17: Artifacts from Structure 3.

<table>
<thead>
<tr>
<th>Material</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pottery</td>
<td></td>
</tr>
<tr>
<td>shell, plain</td>
<td>65</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Pipe, clay</td>
<td>1</td>
</tr>
<tr>
<td>Pipe, sandstone</td>
<td>1</td>
</tr>
<tr>
<td>projectile point, corner-notched</td>
<td>1</td>
</tr>
<tr>
<td>nutting stone, sandstone</td>
<td>1</td>
</tr>
<tr>
<td>grinding stone, sandstone</td>
<td>1</td>
</tr>
<tr>
<td>drilled chert pebble</td>
<td>1</td>
</tr>
<tr>
<td>ear plug, cannel coal</td>
<td>1</td>
</tr>
</tbody>
</table>

FS 1 (pot), FS 51 (mica), FS 60 (celt), FS 76 (celt) not found in storage.

Figure 72: Jar from Structure 3 (BT20-C455).
Structure 4

Structure 4 was a wall-trench building with several roof support posts, a central hearth, and a floor area of 18 m² (Table 14). Only one wall was rebuilt (Figure 73); the rebuilt structure measured 19 m² (Table 14). A large amount of charcoal, burned earth, charred roof pole and cane fragments, and burned daub covered the floor, indicating that the structure had burned. It is possible that the middle palisade intersected the structure, but it is again unclear which was built first. Feature 3, a hearth located near the center of the structure, apparently contained burned bone, stone, and sherds, although nothing was retained.

A second feature, Feature 5, was recorded just to the north of the structure. It was a small pit packed full of sherds “as tightly as can be,” as well as bone and charcoal. Eighty-one sherds were recovered, including one pan fragment, four jar sherds (one with a bifurcated lug), and one “helmet bowl” (Figure 74). Similar bowls have been reported in other parts of the South (e.g., Griffin 1952:Figure 128e).

An additional 14 artifacts were recovered from within the structure itself (Table 18). These were mostly domestic refuse: pottery, a few pipes, and a large antler fragment. Unfired (but tempered) clay, whetstones, red paint, and a pottery disk were also found by the excavators, but not all of these artifacts were located in storage. One green, very fine-grained, sandstone celt was also found (Figure 75).
Figure 73: Structure 4. Brown represents cane fragments, red is burned earth, and green is a large antler fragment. Feature 64 is the middle palisade.
Figure 74: “Helmet” bowl from Feature 5 (BT20-C1065-3).

Table 18: Artifacts from Structure 4.

<table>
<thead>
<tr>
<th>Material</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pottery</td>
<td></td>
</tr>
<tr>
<td>shell, plain</td>
<td>6</td>
</tr>
<tr>
<td>fired clay pinch pot rim</td>
<td>1</td>
</tr>
<tr>
<td>unfired shell-tempered clay</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>pipe</td>
<td>2</td>
</tr>
<tr>
<td>trowel</td>
<td>2</td>
</tr>
<tr>
<td>clay disk, fired clay</td>
<td>1</td>
</tr>
<tr>
<td>celt</td>
<td>1</td>
</tr>
<tr>
<td>whetstone, sandstone</td>
<td>2</td>
</tr>
<tr>
<td>antler</td>
<td>1</td>
</tr>
</tbody>
</table>

FS 44, 46, 49 (sherds), 48, 64 (unfired shell-tempered clay), 41 (red paint) not found in storage.
Structure 5 measured 31 m² (Table 14) and was a wall-trench construction with no evidence of rebuilding (Figure 76). No roof support posts were found. The presence of burned cane and daub fragments indicate that this structure likely burned.

Three features were excavated within the structure; one other was nearby. Feature 13 was a hearth, located slightly off-center, with fill containing ash, burned bone, and a few sherds, although none were retained. The other two features, Features 11 and 12, were small pits packed with sherds. The material from Feature 12 was not found in
storage, but Feature 11 contained 10 shell-tempered sherds, likely from the same pot; three were rims of unknown vessel form.

Figure 76: Structure 5. Cane fragments are brown, red is burned soil.

Feature 10 lay approximately 4 m east of the structure (Figure 76), although it is unclear if it was directly related to the building. It was a large shallow pit filled with dark soil. The southern section contained the majority of the artifacts, mostly sherds (Table 19). Sherds from multiple vessels, primarily jars, were found (Table 20).
Additional artifacts were recovered from within the structure itself, but were not associated with any feature (Table 21). Vessel types included four jar sherds (one with a strap handle) and a pan.
Structure 6

Structure 6 was a wall-trench building with internal support posts and a clear entrance on the west wall consisting of two short parallel trench segments set at right angles to the wall (Figure 77). The structure was rebuilt at least once, with floor areas of 23 and 39 m² for the two episodes (Table 14). A number of posts were set along the outer walls and may have originally been set in a trench that was not noticed during excavation.

Two hearths, Features 21 and 22, were found. Feature 21 is located central to the inner wall lines and Feature 22 is central to the outer enclosure. Most likely, each was associated with different construction episodes. No artifacts were found in Feature 21, and only a clay disk was found in Feature 22.

A third feature, Feature 18, was a cache of Curlew chert cores and possible knives (Figure 78) located in the southeast corner of the structure (Figure 77). No pit was evident and Brown was not convinced that this feature was associated with the structure.

Table 21: Artifacts from Structure 5.

<table>
<thead>
<tr>
<th>Material</th>
<th>Count</th>
</tr>
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<tbody>
<tr>
<td>Pottery</td>
<td></td>
</tr>
<tr>
<td>shell, plain</td>
<td>39</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>anvilstone</td>
<td>1</td>
</tr>
<tr>
<td>human figurine</td>
<td>1</td>
</tr>
<tr>
<td>pipe</td>
<td>1</td>
</tr>
<tr>
<td>pottery trowel</td>
<td>2</td>
</tr>
</tbody>
</table>

FS 83 (grooved stone) and FS 90 (burned earth) could not be relocated.
“in any other way than by chance.” Similar caches of lithic artifacts along structure walls have been found elsewhere (Milner 1983c:157-158, 1984:170-172).

Both stone and pottery were found on the floor of Structure 6 (Table 22), including celts, pipes, and other household debris. Pottery was primarily shell-tempered and included sherds from four jars, one pan, one bowl, and an unknown type.

Figure 77: Structure 6.
Figure 78: Feature 18, chert cache.

Table 22: Artifacts from Structure 6.

<table>
<thead>
<tr>
<th>Material</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pottery</td>
<td></td>
</tr>
<tr>
<td>shell, plain</td>
<td>11</td>
</tr>
<tr>
<td>shell, fabric-impressed</td>
<td>1</td>
</tr>
<tr>
<td>grog, plain</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>antler</td>
<td>1</td>
</tr>
<tr>
<td>anvilstone, sandstone</td>
<td>2</td>
</tr>
<tr>
<td>cannel coal disk</td>
<td>1</td>
</tr>
<tr>
<td>cannel coal object</td>
<td>1</td>
</tr>
<tr>
<td>celt</td>
<td>3</td>
</tr>
<tr>
<td>grinding stone, sandstone</td>
<td>1</td>
</tr>
<tr>
<td>pipe bowl</td>
<td>2</td>
</tr>
<tr>
<td>projectile point, corner-notched</td>
<td>1</td>
</tr>
<tr>
<td>saw, sandstone</td>
<td>1</td>
</tr>
<tr>
<td>whetstone, sandstone</td>
<td>2</td>
</tr>
</tbody>
</table>

FS 117 (chisel-like implement), FS 127 (grinding stone) were not found in storage.
FS 112 (dendrochronology sample) was discarded in the 1950s or 1960s.
FS 129 (antler) disintegrated in storage but is included in this table.
**Structures 7 and 8**

Structures 7 and 8 must be discussed together because they were directly superimposed, but aligned slightly differently (Figure 79). Structure 7 was a single-set post structure, with a clear entrance, and floor measuring 36 m². Structure 8 was a wall-trench structure with a 32 m² floor (Table 14). Interestingly, Structure 7 is the later structure, since several posts superimpose the Structure 8 wall trenches. As discussed in Chapter 2, wall trenches are believed to have replaced single-set posts as a preferred means of construction by the late 11th century or possibly earlier, so the presence of a reversed order at a later date at Annis is curious. It does indicate, however, that both construction techniques were employed at about the same time.

Only one hearth, Feature 23, was found, suggesting that both structures may have had it as a central point. No artifacts were recovered from this feature. Three additional pits can be seen in Figure 79, but no notes exist for them.

Two additional features were recorded. Feature 17, located along the south wall of Structure 7, was a small, irregular, bell-shaped pit filled with mussel shells. A 2.27 kg (5 lb) sample of shell was retained and was found in storage. Feature 24 was a series of post molds in the southern half of the structure complex (Figure 79). This feature may have been an internal wall from one of the structures, but this remains unclear.

Artifacts, primarily stone and pottery (Table 23), were not bagged separately by structure. Sherds from a number of different vessels, primarily jars, were found (Table 24).
Figure 79: Structures 7 and 8. Feature 24 is outlined by a dashed line.
Structure 9

Structure 9 was an incompletely defined single-set post structure (Figure 80) with a floor area of approximately 17 m² (Table 14). No internal support posts were found. A shallow central hearth, Feature 19, was recorded, as was a large pit to the north of the hearth. This pit was not given a separate number, but “contained a moderate amount of the usual refuse.” No artifacts were recovered from the structure floor or Feature 19 and none were found in storage from the pit.

Table 23: Artifacts from Structures 7 and 8.

<table>
<thead>
<tr>
<th>Material</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pottery</td>
<td></td>
</tr>
<tr>
<td>shell, eroded</td>
<td>2</td>
</tr>
<tr>
<td>shell, plain</td>
<td>104</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>pottery trowel</td>
<td>2</td>
</tr>
<tr>
<td>knife, Curlew chert</td>
<td>1</td>
</tr>
<tr>
<td>anvilstone, sandstone</td>
<td>1</td>
</tr>
<tr>
<td>cannel coal disc</td>
<td>1</td>
</tr>
<tr>
<td>hoe, limestone</td>
<td>1</td>
</tr>
</tbody>
</table>

FS 102-105 (dendrochronological samples) were discarded in the 1950s or 1960s. FS 110 ("slate point") was not found in storage.

Table 24: Vessel forms from Structures 7 and 8.

<table>
<thead>
<tr>
<th>Material</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>jar</td>
<td>9</td>
</tr>
<tr>
<td>jar, strap handle, notched rim</td>
<td>2</td>
</tr>
<tr>
<td>bowl/pan</td>
<td>1</td>
</tr>
<tr>
<td>jar, bifurcated lug</td>
<td>1</td>
</tr>
<tr>
<td>jar, round-to-oval lug</td>
<td>1</td>
</tr>
<tr>
<td>jar, strap handle</td>
<td>1</td>
</tr>
<tr>
<td>unknown</td>
<td>1</td>
</tr>
</tbody>
</table>
Structure 10 was constructed using single-set posts (Figure 81), had a floor area of nearly 25 m² (Table 14), and was located near the edge of the Secondary mound (Figure 63). A number of interior posts were present, likely for roof support. A central hearth, Feature 35, contained six shell-tempered sherds and one fragment of fired clay, as well as some flakes and bone (the latter were not retained).
A second feature, Feature 34, was found near the east wall of the structure (Figure 81). It was a small pit filled with whelk shell beads and blanks (Figure 82), and covered with a layer of sherds (Figure 83). Similar caches of shell beads have been found at Cahokia (Collins 1990) and in Arkansas (Morse 1972).

Other artifacts from Structure 10 included 9 shell-tempered sherds, one elbow pipe, and a corner-notched projectile point made from Curlew chert. Brown’s notes report a hematite celt, a polished piece of cannel coal, and an ear plug of unknown material, but these were not found in storage.

One large pit, Feature 28, was found just outside the structure enclosure (Figure 81). This pit was notable “principally for its size, which is rather greater than for most such features, and by the comparatively large number of bone fragments in fairly good condition.” These bone fragments include dog skulls (Figure 84) and deer antler fragments. Sherds were found, but no stone (Table 25).
Structure 10

Figure 81: Structure 10. Brown areas are burned daub and cane.
Figure 82: Sample of unfinished whelk shell beads (top) and blanks (bottom) from Feature 34.

Figure 83: Feature 34 in situ. Sherds are overlying the pit, whelk shells are underneath (WSWMA negative # 4064).
Figure 84: Dog skull fragments from Feature 28 (WSWMA negative #4057). At least two skulls were present.

Table 25: Artifacts from Feature 28.

<table>
<thead>
<tr>
<th>Material</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pottery</td>
<td></td>
</tr>
<tr>
<td>shell, plain</td>
<td>150</td>
</tr>
<tr>
<td>shell, fabric-impressed</td>
<td>5</td>
</tr>
<tr>
<td>grog, plain</td>
<td>2</td>
</tr>
<tr>
<td>fired clay</td>
<td>1</td>
</tr>
<tr>
<td>shell, eroded</td>
<td>1</td>
</tr>
<tr>
<td>shell, plain, fine</td>
<td>1</td>
</tr>
<tr>
<td>shell/grog, eroded</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vessel Type</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>jar</td>
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<tr>
<td>unknown</td>
<td>4</td>
</tr>
<tr>
<td>pan</td>
<td>3</td>
</tr>
<tr>
<td>jar, rectanguloid lug</td>
<td>2</td>
</tr>
<tr>
<td>bowl</td>
<td>1</td>
</tr>
<tr>
<td>jar, bifurcated lug</td>
<td>1</td>
</tr>
<tr>
<td>jar, notched rim</td>
<td>1</td>
</tr>
<tr>
<td>jar, round-to-oval lug</td>
<td>1</td>
</tr>
<tr>
<td>jar, trianguloid lug</td>
<td>1</td>
</tr>
</tbody>
</table>
Structures 11 and 14

Structures 11 and 14 were separated by only about 15 cm (Figure 85), therefore they will be discussed together. However, they are still separate buildings that may (or may not) have been in contemporaneous use. Structure 11 was larger than Structure 14 (Table 14), although both were constructed using single-set posts and show no clear signs of rebuilding. Numerous posts were scattered throughout the interior of both structures and appear to be roof support posts. There may have been a third structure here, based on post molds extending to the east from the north wall of Structure 14. Large patches of burned earth, charcoal, burned clay, cane, and charred poles (some nearly 0.5 m long) were evident on the floors of both structures, indicating that they likely burned. It is not clear if these structures were occupied at the same time, but since the structures do not overlap it is a possibility. They have a similar orientation and construction technique. Paired structures have been found at other Mississippian sites including Turner (Milner 1983c).

Structure 11 contained two internal features: the central hearth (Feature 36), and an unnumbered pit along the south wall (Figure 85) labeled as “cane lined” on the original map. No further information exists for this pit. The field form states that sherds and burned daub were found within Feature 36, but were not found in storage.

Other artifacts from Structure 11 were numerous sherds, including four strap-handled jars (Figure 86), one jar with a round-to-oval lug, a pinch pot or rattle full of clay beads (Figure 87) two celts, one of Dover chert and one of a green stone that may be a very fine-grained sandstone (Rudy Slingerland, Penn State Department of Geosciences,
personal communication, 2003; Figure 88) (Table 26). Clay rattles such as these presumably had some special or ritual significance. Many have been found along with effigy vessels in other parts of the Mississippian world (the hollow heads of effigies are filled with pellets that rattle), although no effigy vessels were found in this structure.

Figure 85: Structures 11 and 14. Red areas are burned earth, cane fragments are brown.
Figure 86: Strap-handled and noded jar from Structure 11 (Bt20-C982-2). Drawing by Rich Burnette.

Figure 87: Pinch pot/rattle from Structure 11 (WSWMA negative #4058).
Figure 88: Celt from Structure 11 (Bt20-104).

Table 26: Artifacts from Structure 11.

<table>
<thead>
<tr>
<th>Material</th>
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</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>shell, eroded</td>
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</tr>
<tr>
<td>shell, plain, fine</td>
<td>32</td>
</tr>
<tr>
<td>sherdlets</td>
<td>22</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
</tr>
<tr>
<td>celt, sandstone?</td>
<td>1</td>
</tr>
<tr>
<td>celt, Dover chert</td>
<td>1</td>
</tr>
<tr>
<td>nutting stone</td>
<td>1</td>
</tr>
</tbody>
</table>

FS 141 and 143 (both nearly intact pots) were not found in storage.
Structure 14 contained four internal features, Features 41-44 (Figure 85). Feature 41 was a hearth, while Features 42-44 were small, ash or charcoal-filled pits. The only artifacts found were two plain shell-tempered sherds from Feature 42 and one from Feature 44.

**Structure 12**

Structure 12 was a wall-trench building with clear evidence of rebuilding on three walls and interior roof support posts (Figure 89). The two structures measured 36 and 45 m² respectively (Table 14). A row of post molds on the interior of the west wall may be an internal partition or parts of a third structure, although it is not clear which. Four internal pits were recorded. Feature 37 was the central hearth. Feature 38 was a pit that appears to be associated with the second phase of house construction. This is supported by the superposition of Feature 38 over a wall trench on the west wall. Features 39 and 40 were likely in use during the first episode based interior posts that intrude into their fill. The superposition of Features 38 and 39 can be seen in Figure 90. Feature 37 was probably used during both occupations of this spot since a second hearth was not found.

The only artifacts found in Structure 12 were two fragments of the same limestone pipe, one sandstone nutting stone, and a broken celt (FS 154). The celt was not found in storage, nor were sherds and daub reported from Feature 37.
Figure 89: Structure 12. Brown areas are cane fragments.
Structure 13 consisted of one solid line of single-set posts and a scatter of other posts that may represent two other walls (Figure 91). The floor area of the structure is estimated at 37 m² (Table 14). No pits were found in this structure. The only feature inside the structure was the central hearth, Feature 26. Fifteen shell-tempered sherds were found in its fill.

A second feature, Feature 20, was found just outside the south wall. This feature was a concentration of fire-cracked rock containing bone fragments, and a bear skull (Figure 92). The bear skull was severely damaged in the intervening decades. Shell-tempered pottery was also found: 36 plain, 2 fabric-impressed, and 2 eroded. No pit was noted, therefore this may simply be a trash dump.
Figure 91: Structure 13.
Structure 15

Structure 15 was a wall-trench building located just to the south of Feature 65, the inner palisade (Figures 63 and 93). According to Brown, the Secondary mound partially covered the northwest portion of this structure, but this does not show clearly on Figure 63. It is evident in Figure 94, however, by observing the changing height of the shadow cast by the profile.

The structure was clearly rebuilt, possibly on two occasions, and is the only structure at the site where posts were clearly evident within wall trenches. The structures
measured 30 and 34 m$^2$, respectively (Table 14). A number of additional posts lay outside the west wall but it remains unclear exactly how they related to the main part of the structure. Internal roof-support posts were present, as were a number of features.

Figure 93: Structure 15. The red area inside the structure is a patch of burned earth. The inner palisade, Feature 65, runs along the north wall.
Three features were clearly associated with the structure (Figure 93). The Feature 47 designation was assigned to two central hearths. These contained sherds, burned earth, daub, and charcoal, although nothing was kept. Feature 27 was a “large pit, perhaps used for storage purposes” (Brown 1940). A sample of sherds were taken from this feature but were not relocated in storage.

Three pits of similar size and shape were recorded as a single feature, Feature 66. Brown believed that these were also used for storage. Eight plain shell-tempered sherds (including a bowl/pan and a rim from an unidentified vessel), a grog-tempered cord-marked sherd, and 7 pieces of daub were recovered.

Figure 94: Structure 15 area, facing grid west. Note the changing height of the shadow to the right of the photo. The shadow shows the extension of the Secondary mound slope. From this, it is clear that it partly covered the structure (WSWMA negative #4100).
Feature 69 was a large, irregular pit in the north half of the structure. The fill contained charcoal, burned earth, burned daub, chert debitage, and sherds “in meager number.” No artifacts were retained.

Two additional features, Features 45 and 68, were located outside the north wall of the structure and were likely related to it (Figure 93). Feature 45 was a large refuse pit containing bone, sherds, burned clay, and charcoal. The bone and sherds were found only in the upper half of the pit while the charcoal was pervasive throughout. Thirty shell-tempered plain (including one jar rim), three shell-tempered cord-marked, and one grog plain sherds were found, as was one sandstone anvilstone.

Feature 68 was a small cache of chert about 1 m north of the northern wall. Eight Fort Payne chert performs, one Curlew chert scraper, and one triangular projectile point (also made of Curlew chert) were found. These were packed together in a row (Figure 95), although there was no indication that they were placed in a pit.

Figure 95: Feature 68, chert cache outside the north wall of Structure 15 (WSWMA negative #4104).
Artifacts associated with the structure included the usual assortment of ceramic and stone. Fifty plain shell-tempered sherds were found, including a bowl, several small jar fragments, a large bottle (Figures 96 and 97), and a loop-handled jar with two round-to-oval lugs (Figure 98). FS 164, the contents of one pot, were kept as well, however they could not be relocated and remain unidentified.

Figure 96: Large bottle in situ, Structure 15 (Bt20-C793; WSWMA negative #4097).

Figure 97: Large bottle (Bt20-C793).
Stone artifacts from Structure 15 included a hammerstone (possibly made of granite), an anvilstone of cortex-covered Curlew chert, a sandstone whetstone, a hematite pestle, a Dover chert celt distal (likely a woodworking tool), and a pottery trowel. A considerable number of charred hickory nuts were also found. These nuts were likely
lying on the floor of the structure when it was destroyed. Their location can be seen as black lines in the pillars in Figure 99.

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**Figure 99:** Location of hickory nuts within Structure 15 (dark lines on pillars) (WSWMA negative #4102).

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**Structure 16**

Structure 16 was located a few meters west of Structure 15 (Figure 63). It had multiple wall lines and both post molds and wall trenches were used (Figure 100), although the line of posts along the innermost east wall was probably originally in a trench. The west wall was not found, probably because this area was heavily eroded.
This area includes three possible rebuilding episodes. One is represented solely by a stray wall trench; the other two measured 20 and 35 m² (Table 14). Several roof support posts were present. Artifacts assigned to the structure by Brown include a sandstone nutting stone and 47 sherds from one plain shell-tempered jar.

The inner palisade, Feature 65, ran along the north wall of the structure. The wall trenches cut through the palisade, that is, the structure was built after the palisade. Parts of this structure were identified by the 2002 Penn State crew during attempts to locate our excavation grid with respect to the WPA’s. The wall trenches in the northeast corner of the structure and the palisade line were re-exposed. A short segment of the southern wall was also found (see Chapter 4).

Figure 100: Structure 16. Feature 65 is the inner palisade.
Two features, Features 46 and 67, were identified. Feature 46 was a hearth that did not produce any artifacts. Feature 67 was described by Brown as a large storage pit. The fill contained some potsherds, flakes, and charred corn kernels, which, according to the feature form, were retained. However, they were never catalogued and, except for the corn kernels, could not be located in storage.

Only half of Feature 67 was excavated by the WPA because it was bisected by a fence (Figures 21 and 22). As described in Chapter 4, we located this feature in 2002 and excavated the other half. Our investigation showed that Feature 67 was the remnant of a tree fall and not a human-made feature. Our 2002 work also found several features missed by the WPA crew. Features 79 and 80 were very shallow pits or possible postmolds. Several flakes and sherdlets⁹ were retained from feature fill.

**Structure 17**

The Structure 17 area was excavated by Penn State during the 2003 and 2004 seasons. It was extremely hard to identify features in this area until thoroughly churned soil was removed to 40-50 cm below ground surface. The base of this churned area was irregular and diffuse. Two partial wall trenches, measuring approximately 7 m and 4 m long, and several posts and pits were recorded (Figure 101). These trenches, Features 94 and 104, were extremely shallow when excavated; however, they were found over 50 cm below the current ground surface and the area was shovel-scraped and trowelled numerous times because of heavy rains. Feature 104 was traced to the nearby riverbank

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⁹ Sherdlets are pottery fragments that are <1/4” long. These were counted but not analyzed further.
where it was lost due to erosion. The area encompassed by the structure is minimally 24 m² (Table 14), but this is a low estimate based solely on the known length of wall trenches. The inner palisade, Feature 92, clearly was built after the structure (Figure 29).

Feature 102 was a post mold and Feature 101 was a small patch of burned earth located approximately 15 cm above the level at which the trenches were mapped. No artifacts were recovered from any of these features.

Figure 101: Structure 17 area. Features 64 and 92 are the middle and inner palisades, respectively.

A cluster of pits and several post molds were found several meters to the east of the wall trenches. These are not clearly related to the structure itself since the southern wall trench, Feature 94, was not found in this area. Features 107, 110, and 111 were post
molds that may have formed part of the eastern wall of the structure. If so, this was the largest non-mound structure at the site.

Features 105, 106, and 108 were large pits. Half of the soil from each was screened and a sample was kept for flotation. A number of artifacts were recovered from Features 105 and 106 (Table 27). Artifacts from one flotation sample were analyzed, but no botanical studies have been done.

Table 27: Artifacts from Features 105 and 106

<table>
<thead>
<tr>
<th>Feature</th>
<th>Type</th>
<th>Count</th>
<th>Vessels</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>105</td>
<td>shell, plain</td>
<td>11</td>
<td>1</td>
<td>jar sherd</td>
</tr>
<tr>
<td>105</td>
<td>shell, eroded</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>105</td>
<td>grog, plain</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>105</td>
<td>sherdlets</td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>105</td>
<td>daub</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>105</td>
<td>debitage</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>106</td>
<td>shell, plain</td>
<td>18</td>
<td>2</td>
<td>jar sherds</td>
</tr>
<tr>
<td>106</td>
<td>shell, plain</td>
<td>43</td>
<td></td>
<td>from flotation</td>
</tr>
<tr>
<td>106</td>
<td>shell, eroded</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>106</td>
<td>sherdlets</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>106</td>
<td>sherdlets</td>
<td>408</td>
<td></td>
<td>from flotation</td>
</tr>
<tr>
<td>106</td>
<td>daub</td>
<td>52</td>
<td></td>
<td>from flotation</td>
</tr>
<tr>
<td>106</td>
<td>drill</td>
<td>1</td>
<td></td>
<td>from flotation</td>
</tr>
<tr>
<td>106</td>
<td>debitage</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>106</td>
<td>debitage</td>
<td>111</td>
<td></td>
<td>from flotation</td>
</tr>
</tbody>
</table>

Other Features

Feature 4 was a patch of burned earth located approximately 6 m northeast of Structure 2. No artifacts were found and one sample of burned earth (FS 69) was taken and has since been discarded. It was not in a pit. In this respect, it is similar to Feature 101 in the Structure 17 area.
Feature 6 was a “small bed of burned rocks” about 5 m northeast of Structure 4. They were not in a pit and no burned earth was found around them; therefore, it is unlikely that this was the location of a hearth.

Feature 9 was a small pit 3.5 m south of Structure 1 containing sherds, charred corn cobs, small stones, and charcoal. One fabric-impressed and 25 plain shell-tempered sherds were found, including rim sherds from a bowl with 3 nodes and three jar sherds. A utilized flake and a scraper, both of Curlew chert, were also found.

Feature 15 was a small pit located 4 m south of the outer palisade. It contained fire-cracked rock, burned soil, and ash. It was probably a hearth, although it was not associated with a structure.

Feature 16 was two small pits 2.5 m east of Structure 1. It was likely associated with the structure. The feature contained bone fragments, including a bear jaw, as well as sherds (primarily shell-tempered plain) and ash.

Features 29-33 were all located about halfway between Structures 10 and 11 (Figure 63). Features 29-32 were all trash-filled pits containing shell-tempered pottery, ash, charcoal, and burned soil. Feature 31 also produced a fragment of a human femur. No other bones were found within this pit, and it was far too small to hold an entire skeleton (ca 20 cm in diameter), therefore it is unlikely that this was a burial. Feature 33 was a cache of two chert points that had no necessary connection with the Mississippian occupation. One was a Copena Cluster point (Justice 1987) made of Curlew chert. The other point could not be found in storage.

Feature 70 was a small pit, located just inside the middle palisade (Feature 64), that was re-exposed during Penn State excavations in 2003. It was a small trash-filled pit
that had been severely impacted by tree roots. Ten shell-tempered, eight plain, and one each of eroded and fabric-impressed sherds were recovered.

Feature 71 lay on an undisturbed surface and had been buried by the construction of the Secondary mound. The fill contained charcoal, ash, fire-cracked rock, burned earth, and a number of sherds (Table 28). Recognizable vessel forms included two grog-tempered jars, two shell-tempered bowls, two shell-tempered jars, and one of indeterminate form.

<table>
<thead>
<tr>
<th>Material</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>shell, plain</td>
<td>52</td>
</tr>
<tr>
<td>daub</td>
<td>17</td>
</tr>
<tr>
<td>grog, plain</td>
<td>13</td>
</tr>
<tr>
<td>clay</td>
<td>2</td>
</tr>
<tr>
<td>shell, fabric-impressed</td>
<td>2</td>
</tr>
<tr>
<td>fired clay</td>
<td>1</td>
</tr>
<tr>
<td>grog, fabric-impressed</td>
<td>1</td>
</tr>
<tr>
<td>shell, net-impressed</td>
<td>1</td>
</tr>
</tbody>
</table>

Feature 72 was located 23 m east of Structures 7/8 and 12 m west of the middle palisade. It was a trash-filled pit that contained a number of sherds (Table 29). Identifiable vessel forms included seven jar sherds (two with strap handles), two bowls, and one indeterminate form with a bifurcated lug, likely a jar.
Feature 73 was a small pit, located about 3 m south of Burial 1, filled with stone (Figure 102). No charcoal, burned earth, or artifacts were found within it.

Table 29: Pottery from Feature 72.

<table>
<thead>
<tr>
<th>Material</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>shell, plain</td>
<td>85</td>
</tr>
<tr>
<td>shell, cord-marked</td>
<td>1</td>
</tr>
<tr>
<td>grog, plain</td>
<td>1</td>
</tr>
<tr>
<td>shell, eroded</td>
<td>3</td>
</tr>
<tr>
<td>shell, fabric-impressed</td>
<td>1</td>
</tr>
</tbody>
</table>

Features 90 and 96 were small pits excavated by Penn State in 2003. No artifacts were found in Feature 90; 11 shell-tempered sherds, including three jar rims, were found in Feature 96.
The remainder of the features, 83, 86, 87, 100, and 112, as well as over 100 roughly mapped by the WPA but not given numbers, were isolated post holes. These were scattered all over the site and did not form any recognizable patterns when excavated.

### Burial 1

Burial 1, located near 280L14 (PSU coordinates E1502 N1606), was extended and consisted only of a poorly preserved skull, right humerus, femora, and lower leg bones, likely tibiae (Figure 103). Brown tentatively identified the remains as male, based solely on the size of the bones, although such field assignments based on fragmentary material are often incorrect. The burial pit was faint and was similar in color to the surrounding fill. No grave goods were present, and only a few teeth and skull fragments were saved. These could not be located in storage.

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**Figure 103:** Burial 1. Photo facing grid south (WSWMA negative #4106).
Natural Features

Brown’s notes also mention the presence of many large, irregular pits, several of which can be seen in Figure 104:

One of the puzzling developments in the excavation of this site was the appearance of numerous irregular pits 5 to 10 feet long and 1 ½ to 3 feet or more in depth, lying in the clear undisturbed sand below the archeological deposit. There was a total absence of refuse material in them except occasionally in their top few inches, which actually seem to be within the limit of archeological deposit, vertically, or only very slightly below it. The fill of these pits was brownish sand with some clay and a quantity of coarse angular rock of small size. Invariably, there was adjacent to each of these pits a pile of sand, of undisturbed appearance, or sufficient size usually to very nearly fill the pit. At times these piles seemed actually to overlay, to a slight degree, the pit fill beneath. This seems to be a problem for the geologist (Brown, WSWMA negative #4029 description).

Figure 104: Natural features, likely the remains of tree falls (WSWMA negative #4029).
From this description it seems that these features were created by tree falls (Stephens 1956). The pits themselves were the location of the root system, while the piles of sand next to them were deposited as the roots were exposed and decayed. This explains the superposition and size of the piles and the relative lack of artifacts. Feature 67 was also the remnant of a tree, as were a number of soil stains excavated by Penn State crews in 2002-04.

**Artifacts**

**Pottery**

Over 20,000 sherds were recovered by the combined Penn State and WPA excavations in the village area. Table 30 totals all sherds, including those from features. The vast majority of the sherds are shell-tempered, but there is a substantial minority of grog-tempered sherds, pointing to a Late Woodland occupation of the riverbank.

Nearly 2,000 of these sherds were rims and could be classified by vessel type (Table 31) (Hally 1986; Hilgeman 2000; Milner 1990; Steponaitis 1983). Jars were by far the most common type, although bowls and pans were also common. Pans were numerous in both the mound and the village. There are no salines located near Annis, so they could not have been used for salt production. Rather, they were likely used for parching or as griddles, as noted by several authors (Milner 1984; Thruston 1890:159).

A Late Woodland component exists at Annis, based on the presence of grog-tempered pottery in both the Sub-Primary mound and the village. No concentration of
this pottery was noticed; it was instead dispersed throughout the site. Most of the grog-
tempered pottery appears Baytown-like, but several pieces of Yankeetown pottery were
found (Figure 105). Yankeetown is a terminal Late Woodland or Emergent
Mississippian type (Kreisa 1991; Redmond 1990), and is likely related to an earlier
occupation of the riverbank.

Nearly 300 handles were recorded. Lugs are by far the most common handle type
(Table 32), with a round-to-oval type the most common type. Strap handles, some
particularly wide and notched (Figure 106), greatly outnumber loop handles, pointing to a
later Mississippian date (post AD 1300) for the site and corroborating the radiocarbon
dates from the palisades.
Table 30: Sherds by temper and surface treatment. 4215 sherds and an uncounted number of sherdllets without secure provenience are not included.

<table>
<thead>
<tr>
<th>Temper/Surface Treatment</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shell</strong></td>
<td></td>
</tr>
<tr>
<td>plain</td>
<td>13533</td>
</tr>
<tr>
<td>eroded</td>
<td>776</td>
</tr>
<tr>
<td>fabric-impressed</td>
<td>459</td>
</tr>
<tr>
<td>fine, plain</td>
<td>272</td>
</tr>
<tr>
<td>sherdlet</td>
<td>68</td>
</tr>
<tr>
<td>cord-marked</td>
<td>27</td>
</tr>
<tr>
<td>fine, sherdlet</td>
<td>20</td>
</tr>
<tr>
<td>trowel fragments</td>
<td>9</td>
</tr>
<tr>
<td>clay disk</td>
<td>6</td>
</tr>
<tr>
<td>fine, burnished</td>
<td>6</td>
</tr>
<tr>
<td>net-impressed</td>
<td>3</td>
</tr>
<tr>
<td>unfired clay lump</td>
<td>3</td>
</tr>
<tr>
<td>astragalus effigy?</td>
<td>2</td>
</tr>
<tr>
<td>red-filmed</td>
<td>2</td>
</tr>
<tr>
<td>burnished</td>
<td>1</td>
</tr>
<tr>
<td>figurine</td>
<td>1</td>
</tr>
<tr>
<td>fillet</td>
<td>1</td>
</tr>
<tr>
<td>incised</td>
<td>1</td>
</tr>
<tr>
<td>trailed</td>
<td>1</td>
</tr>
<tr>
<td>trowel</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total shell</strong></td>
<td>15192</td>
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<table>
<thead>
<tr>
<th>Grog</th>
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</tr>
</thead>
<tbody>
<tr>
<td>plain</td>
<td>609</td>
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<tr>
<td>cord-marked</td>
<td>25</td>
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<tr>
<td>eroded</td>
<td>11</td>
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<td>fabric-impressed</td>
<td>6</td>
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<tr>
<td>incised</td>
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<td>trailed</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total gog</strong></td>
<td>655</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shell/grog</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>plain</td>
<td>31</td>
</tr>
<tr>
<td>cord-marked</td>
<td>1</td>
</tr>
<tr>
<td>eroded</td>
<td>1</td>
</tr>
<tr>
<td>fabric-impressed</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total shell/grog</strong></td>
<td>34</td>
</tr>
</tbody>
</table>

| Grog/chert, plain       | 1     |
| Grog/limestone, plain   | 1     |

| Fired clay             | 189   |
| No Temper, plain       | 5     |
| sherdlet               | 1     |
| **Total**              | 16078 |
Figure 105: Yankeetown pottery (Bt20-C150-8).
Table 31: Vessel forms by temper.

<table>
<thead>
<tr>
<th>Temper/Vessel Form</th>
<th>Total Rim Sherds</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bottle</strong></td>
<td></td>
</tr>
<tr>
<td>shell</td>
<td>2</td>
</tr>
<tr>
<td><strong>Bowl</strong></td>
<td></td>
</tr>
<tr>
<td>shell</td>
<td>254</td>
</tr>
<tr>
<td>shell, fine</td>
<td>26</td>
</tr>
<tr>
<td>fired clay</td>
<td>4</td>
</tr>
<tr>
<td>grog</td>
<td>2</td>
</tr>
<tr>
<td>shell/grog</td>
<td>1</td>
</tr>
<tr>
<td><strong>Bowl, &quot;Helmet&quot;-style, shell</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>Bowl, effigy</strong></td>
<td></td>
</tr>
<tr>
<td>shell</td>
<td>1</td>
</tr>
<tr>
<td>shell, fine</td>
<td>1</td>
</tr>
<tr>
<td><strong>Bowl/Pan</strong></td>
<td></td>
</tr>
<tr>
<td>shell</td>
<td>78</td>
</tr>
<tr>
<td>shell, fine</td>
<td>1</td>
</tr>
<tr>
<td>grog/limestone</td>
<td>1</td>
</tr>
<tr>
<td><strong>Jar</strong></td>
<td></td>
</tr>
<tr>
<td>shell</td>
<td>930</td>
</tr>
<tr>
<td>shell, fine</td>
<td>47</td>
</tr>
<tr>
<td>grog</td>
<td>19</td>
</tr>
<tr>
<td>fired clay</td>
<td>2</td>
</tr>
<tr>
<td>shell/grog</td>
<td>2</td>
</tr>
<tr>
<td><strong>Pinch Pot</strong></td>
<td></td>
</tr>
<tr>
<td>fired clay</td>
<td>11</td>
</tr>
<tr>
<td>shell</td>
<td>1</td>
</tr>
<tr>
<td><strong>Pinch Pot Jar, fired clay</strong></td>
<td>5</td>
</tr>
<tr>
<td><strong>Pinch Pot/Rattle, shell</strong></td>
<td>2</td>
</tr>
<tr>
<td><strong>Pan</strong></td>
<td></td>
</tr>
<tr>
<td>shell</td>
<td>215</td>
</tr>
<tr>
<td>shell/grog</td>
<td>2</td>
</tr>
<tr>
<td><strong>Plate</strong></td>
<td></td>
</tr>
<tr>
<td>shell</td>
<td>9</td>
</tr>
<tr>
<td>shell, fine</td>
<td>4</td>
</tr>
<tr>
<td><strong>Plate/Deep rim bowl</strong></td>
<td></td>
</tr>
<tr>
<td>shell</td>
<td>1</td>
</tr>
<tr>
<td><strong>Unknown</strong></td>
<td></td>
</tr>
<tr>
<td>shell</td>
<td>354</td>
</tr>
<tr>
<td>shell, fine</td>
<td>22</td>
</tr>
<tr>
<td>grog</td>
<td>4</td>
</tr>
<tr>
<td>fired clay</td>
<td>3</td>
</tr>
<tr>
<td>shell/grog</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2006</td>
</tr>
</tbody>
</table>
Table 32: Handle types and frequencies.

<table>
<thead>
<tr>
<th>Handle Type</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shell</strong></td>
<td></td>
</tr>
<tr>
<td>loop</td>
<td>5</td>
</tr>
<tr>
<td>strap</td>
<td>58</td>
</tr>
<tr>
<td>Unknown (closed handle fragment)</td>
<td>3</td>
</tr>
<tr>
<td>lug, round to oval</td>
<td>123</td>
</tr>
<tr>
<td>lug, bifurcated</td>
<td>49</td>
</tr>
<tr>
<td>lug, indeterminate</td>
<td>3</td>
</tr>
<tr>
<td>lug, trianguloid</td>
<td>3</td>
</tr>
<tr>
<td>lug, &quot;trifurcated&quot;</td>
<td>2</td>
</tr>
<tr>
<td>node, 3</td>
<td>11</td>
</tr>
<tr>
<td>node, 2</td>
<td>10</td>
</tr>
<tr>
<td>node, 1</td>
<td>6</td>
</tr>
<tr>
<td>node, 4</td>
<td>2</td>
</tr>
<tr>
<td>node, 6</td>
<td>1</td>
</tr>
<tr>
<td>tab</td>
<td>3</td>
</tr>
<tr>
<td><strong>Shell, fine</strong></td>
<td></td>
</tr>
<tr>
<td>strap</td>
<td>1</td>
</tr>
<tr>
<td>wide intermediate</td>
<td>1</td>
</tr>
<tr>
<td>beaker/bean pot</td>
<td>1</td>
</tr>
<tr>
<td>lug, round-to-oval</td>
<td>1</td>
</tr>
<tr>
<td>lug, trianguloid</td>
<td>1</td>
</tr>
<tr>
<td>node, 3</td>
<td>1</td>
</tr>
<tr>
<td><strong>Grog</strong></td>
<td></td>
</tr>
<tr>
<td>loop</td>
<td>2</td>
</tr>
<tr>
<td><strong>Fired Clay</strong></td>
<td></td>
</tr>
<tr>
<td>node, 2</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>288</td>
</tr>
</tbody>
</table>
While the vast majority of sherds were undecorated, there are some interesting artifacts that warrant further discussion. In Chapter 5, I discussed the Ramey Incised, Matthews Incised, and Powell Plain sherds that were found in the Old Humus and Sub-Primary mounds, and are imports from the American Bottom. There are a number of vessels from the village that appear to be Lohmann (11th century) and Stirling phase (12th century) Cahokian material. These are undecorated jars, but one (from a refuse area in 340L8) has a sharp shoulder break (Figure 107a) and the other (found in backfill) has an American Bottom rim form (Figure 107b). Samples from these sherds were sent to the University of Missouri Research Reactor (MURR) for neutron activation analysis. The

Figure 106: Wide, notched strap handles.
results indicate that the jar depicted in Figure 107b is also a likely import, but variation within the sample makes this less clear than one would like. The sherd in Figure 107a is of a local clay body and appears to be a locally made copy of Cahokian material (Speakman and Glascock 2005).

Several vessels appear to be effigy bowls. Two are likely zoomorphic, with limbs molded onto the side of the vessel (Figures 108 and 109), but since only a fragment of the side of each is present it is difficult to tell what is being depicted. These vessels usually are squat with incurving rims, and date to no earlier than the 13th century, probably the 14th century. A third vessel appears to be a whelk shell effigy bowl (Figure 110). Similar items have been found throughout the Mississippi Valley, including at sites such as Florence Street that date to the late 13th to 14th century (Milner 1983b).
Figure 107: American Bottom-like pottery resembling Lohmann phase (top) and Stirling phase (bottom) materials. Sherd A is a local copy and sherd B is likely an import.
Figure 108: Effigy bowl (Bt20-C756). Drawing by Rich Burnette.

Figure 109: Effigy bowl (Bt20-C316). Drawing by Rich Burnette.
Two small jars with drilled holes near the rims were also found (Figure 111). These have been reported in mortuary contexts in the American Bottom (Milner 1983a) where they were placed (probably hung) in graves, although they were not with burials at Annis.
A number of pipes were found throughout the site, some in structures. These were typical of those found in other parts of Kentucky and nearby states, and included both clay and stone examples (Figure 112).

![Image of pipes](image)

Figure 112: Pipes.

**Stone**

Stone artifacts were primarily made of local Curlew and Fort Payne cherts, limestone, or sandstone. Most projectile points were Archaic in age, not surprising given the heavy occupation of the Green River area during that time, but a number of triangular Mississippian types were also found. Again, no distinctive distribution patterns were noted; points were distributed across the entire site.
There were a few Dover chert celts and wood working tools (Figure 69). One celt fragment was made of syenite (Figure 113), which only occurs naturally in Arkansas and parts of Europe. No other exotic stone was noted.

Figure 113: Syenite celt fragment (Bt20-373).

**Summary**

In summary, the assemblage at Annis is very similar to that reported at other sites in western Kentucky and Tennessee. The vast majority of material is locally made and undecorated, although there are some decorated effigy bowls and stone that were clearly important but not restricted to elite contexts. Rim forms, handle types, and the presence of effigy bowls point to a later Mississippian date, which fits nicely with the radiocarbon
range of the mid-13th to 15th centuries. Perhaps the most interesting aspect of the
collection is the high numbers of pans. As noted above, there are no salines near the site,
and they may have been used for parching or baking rather than salt production. I now
turn to a reconstruction of the occupational history of Annis, drawing on the mound and
village material presented in Chapters 5 and 6.
Chapter 7

Occupational History

As outlined in previous chapters, there are four, distinct Mississippian construction episodes at Annis, referred to here as Pre-palisade and Phases 1, 2, and 3. These were identified by the recapping of the platform mound and the building of new palisades (Figure 114).

Since there are no radiocarbon dates available from individual village structures, it was not possible to assign most of them to a specific phase. Only Structures 2, 10, 15, 16, and 17 can be ruled out of at least one phase, and only three of these, Structures 2, 15, and 17, can be placed in a single phase. In addition, the common approach of assigning single-set post structures to an earlier Mississippian occupation than wall-trench structures does not work at Annis, since in several cases single-set post enclosures are definitely superimposed on wall-trench buildings.

---

10 These are not true archaeological phases, but are simply meant to refer to different construction episodes at the site.
The earliest identifiable Mississippian occupation at Annis is the pre-palisade phase, consisting of the Old Humus mound and possibly the Structure 17 area. These have not been given a phase number since their relationship is unclear. The Old Humus mound consists of two scatters of post molds that do not form an obvious pattern (Figure 41). It can tentatively be dated to the 12th to 13th century based on the presence of one Ramey Incised sherd (Fowler and Hall 1972; Milner et al. 1984).

The Structure 17 area may be associated with the Old Humus. The main evidence for this is that the inner palisade (Phase 1) was constructed over it. No radiocarbon dates are currently available, therefore the association between Structure 17 and the Old Humus posts, if any, cannot be determined for certain. However, as shown by this structure and the Ramey pottery, there was a prolonged occupation of the riverbank but
the palisaded village was only in place for a portion of that time (beginning in the late 13th century A.D.).

Phase 1

The first evidence for a bounded community at Annis is referred to here as Phase 1 (Figure 115). The Sub-Primary mound, approximately 24 x 15 m and 0.7 m in height (Tables 5 and 33), was raised, and a structure measuring approximately 88.5 m² was built on its summit. This structure was built using single-set posts and was rebuilt at least once.

Table 33: Mound volume and palisade area by phase.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Stage volume (m²)</th>
<th>Area within palisade (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>225</td>
<td>0.32</td>
</tr>
<tr>
<td>2</td>
<td>556</td>
<td>0.82</td>
</tr>
<tr>
<td>3</td>
<td>919</td>
<td>1.3</td>
</tr>
<tr>
<td>Total</td>
<td>1700</td>
<td>-</td>
</tr>
</tbody>
</table>

Hearths and trash-filled pits were located within the structure itself, and two large flank middens were found on the east and southeast slope of the mound. These middens contained mostly animal (deer) bone and mussel shell, but also pottery. A cursory examination of the bones showed that a variety of elements are present and many of the long bones were purposefully smashed, with a few showing evidence of pot polish, chop marks, and carnivore gnawing. The condition of these animal bones, as well as the presence of considerable domestic refuse from pits and mound fill, indicates that the Phase 1 mound was residential in nature.
The inner palisade (Features 65 and 92/93) was built at this time. It consisted of approximately 570 20-cm diameter posts set in a nearly 1 m deep trench at 20 cm intervals (Figure 30), and enclosed 0.32 ha (Table 33). Although it is not entirely clear at the scale of the map, in the field it was obvious that Feature 92/93 curved to meet Feature 65. We traced Feature 92/93 until it was intersected by a WPA trench near N1669 E1575. The WPA trench totally obliterated the palisade, making it impossible to follow it further.

A 2-sigma calibrated radiocarbon range of A.D. 1278-1398 with multiple intercepts (Beta 181396, 181398, wood charcoal; Appendix E) was obtained. No valid radiocarbon assays are available from the mound; however, the recovery of Ramey Incised, Powell Plain, and Matthews Incised, *var. Manly* sherds from feature fill lend support to this date.
Structure 2 was likely a part of Phase 1 but may also have been earlier. The middle palisade superimposes the structure, nearly bisecting it from northwest to southeast (Figure 66), thereby ruling out any association with later phases. It is possible that it could precede Phase 1, but it was included here. Structure 10 may be a part of Phase 1 or 2. It is located only about 1 m south of the edge of the Secondary mound, likely too close to be part of Phase 3 (Figure 63).

Phase 2

The second construction phase, Phase 2, saw an increase in both the size of the mound and the area encompassed by a new palisade (Figure 116). The Primary mound measured 18 x 30 m, with a total height of 1.6 m and a volume of nearly 800 m$^3$ (Tables 5 and 33). The recapping of the mound extended far enough south to superimpose parts of the Phase 1 palisade, which had likely been removed.

Figure 116: Phase 2.
A structure was built atop the summit of the Primary mound. It was considerably larger than the Phase 1 summit structure, covering a total of nearly 250 m² (Figure 48). However, this was not the floor area of a house, but the outline of a fence surrounding an interior building, likely blocking the view of the general public. No trash-filled pits were found within this structure, and almost no debris was found (n=49; only one artifact was in a feature, the rest were found in mound fill). All features recorded were fire-related, either hearths or surface fires (perhaps bonfires). The structure does not appear to have burned since no massive patches of burned earth, charcoal, or daub were present, although it is possible that the surface was swept clean before the next construction layer was added. This cleaning would have had to have been quite thorough if Brown – normally quite observant – missed all evidence of burned debris.

Based on the paucity of domestic debris and features found in and on the Phase 2 mound, it was not likely used as a residence. Rather, I believe that this structure was a ceremonial or communal building intended for ritual use or other community events. However, unlike ceremonial buildings in parts of eastern and central Tennessee (Lewis and Kneberg 1946; Myer 1928; Webb 1938), there were no prepared clay platforms or seats within the structure.

At about the same time as the recapping of the mound, the second palisade was constructed. This palisade was approximately 205 m long, enclosed about 0.8 ha, and required 1025 posts to build (Tables 13 and 33). It was constructed in much the same way as the Phase 1 palisade - by placing posts in a deep trench. Unlike the Phase 1 palisade, however, this one was built atop a low ridge, at least its eastern edge (Figure 31). This ridge may not have been man-made, but was likely a naturally
occurring feature that was taken advantage of by Annis’ inhabitants (see Chapter 4). A 2-sigma radiocarbon date range of A.D. 1256-1385 with an intercept of A.D. 1285 (Beta 181397, wood charcoal; Appendix E) was obtained for a post belonging to this palisade.

Structures 10, 15, and 16 have been assigned to Phase 2. Structure 15 is clearly associated with Phase 2. It lies only about 0.5 m south of the Phase 1 palisade (Figure 63), far too close to be contemporaneous with it. In addition, examination of WPA photographs provides evidence that the Secondary mound was built over the remains of Structure 15 (Figure 94), thus ruling out a Phase 3 construction.

As mentioned above, Structure 10 lies too close to the edge of the Secondary mound to be included in Phase 3 (Figure 63). However, it was located only about 14 m south of the Primary mound and contained some of the only true exotic artifacts from the site, a cache of whelk shell beads and blanks. If my interpretations are correct and the Primary mound was unoccupied at this time, then Structure 10 may have been the residence of an important person, based on the presence of these beads.

Structure 16 is also problematic. It superimposes the Phase 1 palisade (Figure 63), ruling out a Phase 1 construction but not Phases 2 or 3. No clear evidence exists to assign it to either phase, therefore it is included on both the Phase 2 and 3 maps.

Phase 3

The final construction phase again saw an increase in both the size of the mound and the area circumscribed by the palisade, and was also the most labor-intensive
The mound increased in height by 2.1 m and in volume by nearly 400 m³ over the previous phase (Tables 5 and 33).

A wall-trench structure measuring 105 m² was built on the summit of the Phase 3 mound (Figure 51). Unlike the Phase 2 structure, it contained both fire-related features, including a hearth and several surface fires, and trash-filled pits. This leads me to believe that this mound again served a residential purpose, presumably for the local chief. Large patches of burned earth, charcoal, charred cane, and roof poles were found, indicating that the structure likely burned.

Domestic debris was found, primarily in mound fill and including a few plates, but a few artifacts were found in features. It is possible that the surface of the mound and the associated features were cleaned out before the destruction of the structure. A cache
of chert was found near the base of the mound fill, nearly on the surface of the Phase 2 mound. This may have been an offering placed at the beginning of the Phase 3 mound construction.

The final palisade was constructed and measured 277 m long, encompassed 1.3 ha (possibly as much as 1.8 ha but this is unclear due to erosion), and required 1,385 posts (Tables 13 and 33). Not only was it the largest palisade, it was the only one with a clear bastion (Figure 62). This may have been a fortified gate or watchtower, however, since only one bastion would not have been sufficient for defensive purposes. Since we were unable to relocate this palisade in 2004, no radiocarbon date is available (see Chapter 4).

Structure 16 may be associated with Phase 3, although Phase 2 is also a possibility (Figure 117). As mentioned above, it superimposes the Phase 1 palisade, ruling out a Phase 1 construction, but not enough evidence exists to safely assign it to either Phases 2 or 3.

**Summary**

There was an initial, scattered, occupation of the riverbank followed by enlargements of the mound and the building of palisades—presumably with more houses concentrated in the area. Each of the three identified construction phases at Annis saw an increase in the overall volume of the platform mound and the length of the palisade. The palisades were presumably enlarged to safely fit more houses within them; however, as I have shown, not all houses were inside palisades nor can all houses be securely assigned to an individual phase.
What is clear is that each phase required a substantial increase in the amount of labor required for its construction. In addition, the use of the mound shifted over time. During Phases 1 and 3, based on the presence of domestic refuse, the mound was used as a residence, presumably for the local chief and his/her family. However, during Phase 2, the mound summit was likely used for ritual purposes. In either case, the mound remained a focal point of the community and access to its summit was likely restricted.

As discussed in Chapter 3, quantification of labor and intra-site comparisons of expenditures are crucial to the understanding of change over time. Since there is little to no artifact-based evidence for status differentiation at Annis (either in the mound or the village), I will turn to the calculation of the labor necessary for each phase in Chapter 8.
Chapter 8

Population, Labor, and Community Organization at Annis

Construction of monumental architecture is a hallmark of Mississippian culture in the Southeast, and it is central to most discussions of social organization. Mounds are variously seen as physical manifestations of elite leadership, as markers of political centers, and as locations of important rituals (Anderson 1994; Blitz and Livingood 2004; Cobb 2003; Knight 1986, 1989; Lindauer and Blitz 1997; Steponaitis 1978; Trigger 1990). Of key concern in discussions of Mississippian social inequality is the ability of elites to mobilize labor to construct platform mounds, palisades, and the like. These constructions can benefit both the elite and the community as a whole, although this is too stark a contrast as there is likely a continuum of status within social groups.

Most discussions of mound volume as a measure of social influence focus on the overall size of the mound (e.g., Cobb 2003; Milner 1998; Muller 1986, 1997; Payne 1994, 2002). This has been done for a variety of reasons, often because excavation data do not permit detailed investigations of internal mound stages, particularly at major mound centers such as Cahokia and Moundville. While this is important in its own right, it does not allow us to determine the degree of intensity of mound building at different times in the history of a particular site. This has led to a debate between those who propose that large mounds are a result of a long duration of use (e.g., Hally 1994; Williams and Shapiro 1996) and others who argue that they are a result of mobilization of
labor, perhaps coercively, by chiefs (e.g., Collins and Chalfant 1993; Steponaitis 1978),
although the two are not mutually exclusive (gradual buildup of mounds may still occur
with major mantles added periodically).

Recently, John Blitz and Patrick Livingood (Blitz and Livingood 2004) have
written that between 10 and 40 percent of mound volume variation is explained solely by
duration of use. The remainder could be attributed to variation in tools, population, and
possibly chiefly power. As Blitz and Livingood point out (2004:299), their results can be
taken to support either argument.

Focusing on individual mound stages rather than on the final size of a mound can
deal with this dilemma in more detail. In the “duration-of-use” scenario, stages may be
of comparable size within a particular mound, thus indicating periodic recapping. In the
“chiefly power” scenario, stages may fluctuate in volume, indicating different levels of
effort put into particular mound stages, presumably at the direction of a local leader.

Building onto an existing mound is a cheap way to get an impressive monument.

Palisades do not receive the same attention that mounds do but are no less
important (but see Iseminger et al. 1990; Lafferty 1977; Milner 1999; Vogel and Allan
1985). They require as much, if not more, labor than mounds and, more importantly,
they provide a benefit to elite and commoner alike in the form of a defensive barrier.

Of course, the entire question of chiefly power and social organization cannot be
boiled down to labor alone, nor has anyone who has looked at labor believed that to be
the case. Ideology, prestige goods, settlement patterns, and burial practices, among
others, are crucial components of this question (e.g., Anderson 1999). However, labor,
unlike ideology, has an advantage of being quantifiable and, hence, is a useful starting
place. In addition, fancy artifacts and burials are not present at Annis and the distribution of nearby Mississippian sites is unknown, leaving labor as one of the few variables available.

**Population**

Before discussing the impact of construction on the population of Annis, an estimate of the number of people living there must be obtained. This is because the real issue is the amount of labor that must be extracted from the local population (individual households) for various forms of monumental architecture, only some of which directly benefits them (e.g., palisades). This can be done using the number of structures at the site, estimating the number of people who lived in each structure, the longevity of each building, and using structure density to extrapolate to the areas of the site that have not been excavated.

Table 14 shows that at least 31 structures were excavated in the village, including all complete rebuilding episodes and stray wall trenches—this is a minimal figure because of soil conditions (it is likely that some building episodes were missed). Each structure likely housed an individual family. Families probably consisted of 4-5 people, based on Milner’s (1998:123) demographic models as well as data from 19th century Plains and Eastern Woodland groups (Schoolcraft 1851-1855, cited in Milner 1998).

Experimental studies from the eastern United States indicate that most untreated wooden fence posts have an average use-life of less than 10 years (Warrick 1988) (Table 34). However, the wall would need to be rebuilt as soon as several posts showed
signs of decay—in other words, to maintain wall integrity one would have to replace it sooner than an average use-life would suggest. While sections of posts that are completely above ground can sometimes last up to 20 years (Highley 1995), they rot much more quickly at ground level (Anonymous 1996; De Groot et al. 1979). Therefore, I assumed a house longevity of 5 years per building episode. This is around the same figure used by other researchers in the Mississippi Valley (Milner 1986, 1998; Smith 1978). For 31 structures, the site was occupied for a total of 155 years, which closely matches the C14 range of ca 150 years (Appendix E). However, this includes structures that were clearly not contemporaneous (some were superpositioned on others) and is likely too long a time span.

<table>
<thead>
<tr>
<th>Wood Type</th>
<th>Average Use-life (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern White Cedar</td>
<td>26.9</td>
</tr>
<tr>
<td>Elm</td>
<td>8.3</td>
</tr>
<tr>
<td>White Pine</td>
<td>7.9</td>
</tr>
<tr>
<td>Red Oak</td>
<td>5.8</td>
</tr>
<tr>
<td>Maple</td>
<td>4.0</td>
</tr>
<tr>
<td>Hickory</td>
<td>3.8</td>
</tr>
</tbody>
</table>

Table 34: Use-life of untreated wood fence posts. Data from Warrick (1988).

In order to estimate the total population, we must also account for the total number of structures that likely existed at the site, including those that were not excavated. The total area exposed by the combined WPA and Penn State work was 0.5 ha (5,017 m²) of the 1.3 ha (13,000 m²) that was likely enclosed by the Phase 3 palisade, which marks the greatest spatial extent of the site and includes eroded areas. Assuming
that structures occurred at equal densities in the unexcavated areas, 49 additional structures may have existed, bringing the total to 80.

If 4-5 people occupied each structure, the maximum population of the village was 360 people for 80 structures and 140 for 31 structures. These figures assume that all structures were occupied at the same time (which they clearly were not), and that all areas within the palisade were habitable (which is unlikely given that erosional features were present in Mississippian times; see Chapter 4). Therefore, these numbers are significant overestimates.

A more reasonable method of estimating population requires several steps. First, the total number of structures (n=31) was multiplied by five (years). Second, the structure density for the area excavated (0.5 ha) was extrapolated to the entire area enclosed by the Phase 3 palisade (1.3 ha). The resulting number was divided by the duration of the occupation and multiplied by 4.5 to obtain the total number of people.

If we assume that the site was continually occupied for the entire 150 years (2-sigma radiocarbon range), and the only structures that exist are the 31 that have been identified, then it is possible that only 12 people lived at the site. This is clearly too small, but it does raise the possibility that only a few people lived at Annis with others scattered throughout the nearby region.

If it is assumed that a palisade enclosed the village at all times, then a potentially useful way to derive population is by looking at the duration of the palisade posts. Most studies of untreated wood look at fence posts that are generally less than 10 cm in diameter. However, data compiled by Warrick (reproduced in Table 34 above) include posts that range from 5-18 cm. The higher end of this range encompasses the relatively
small posts at Annis. The only identified species at Annis is ash (*Fraxinus* sp.), which is not very resistant to decay (Simpson and TenWolde 1999), although I was unable to find use-life estimates for ash fence posts. The mean use life of untreated posts in Table 34 is 10 years. However, the mean is not useful here because cedar is a special case. The median (7 years) corrects this problem. This was doubled to 15 years to account for error and the possibility of some repair of posts that was not seen during excavation. There is little to no evidence for palisade repair; that is, in only a few places is there a possibility that a new post may have been inserted. Therefore, a reduced estimate of 45 years of occupation (a few generations that correspond to construction episodes) produces a higher, but still low, population of 40 people within the small site boundary of 1.3 ha. If we use the mean post life of 7 years, the occupation could have been as brief as 21 years with a population of 86 people.

Given these numbers, it is likely that between 40 and 90 people would have lived at Annis, with the lower end more likely. A viable breeding population of the polity centered on Annis would be 200-450 people (Birdsell 1953, 1968; Marlowe 2005; Wobst 1974). If we assume that 1/5 of these people contributed labor for construction projects, then 50-100 people constituted the workforce. In the following discussion, I calculate labor estimates for mound and palisade building using these projected workforce sizes as well as larger ones of 150-200 workers.
Mound Fill

In order to estimate the labor costs of mound building, several factors must be considered. These include the time required to excavate soil, the time required to transport it, and the volume for each mound stage.

The total volume for each mound stage is presented in Table 5. Each stage saw an increase in surface area and height, hence volume, from 225 m³ to a final total of 1700 m³. Estimates for excavation rates came from field experiments carried out by Erasmus (1965) and Penn State in 2004 (see Chapter 3), the latter being extremely conservative figures for digging soil.

Following Erasmus, it has become standard to use a 5-hour day in studies of labor investment. However, as mentioned previously, modern workers using hand tools often work for seven hours or longer. Therefore, I chose to present estimates for both 5 and 7-hour workdays here.

Erasmus’ workers excavated 2.6 m³ in 5 hours, an hourly rate of 0.52 m³. Our students excavated just under 2 m³ in 7 hours, or 0.29 m³ per hour. The workers in Erasmus’ experiment were used to physical labor, while our students were not. However, our students were using tools commonly found on Mississippian sites, and they working in soil that would have been encountered by Mississippian workers at Annis. Both experiments have their strong and weak points, therefore estimates derived from both are presented (Table 35). The Penn State estimates are for only one person working at a time since, as mentioned in Chapter 3, one “bucket filler” could easily keep up with several diggers. Most of the time, they just sat chatting while waiting to fill the bucket.
The data in Table 35 indicate that each mound stage took significantly longer to construct than the one before it, nearly tripling from Phase 1 to Phase 3. Also, adding two more hours to each workday substantially reduces the number of days needed. The 7-hour day is reasonable for our students since the diggers took periodic breaks.

The time necessary to transport fill was calculated using data published by Erasmus (1965) from his work with Mexican peasants in the 1960s. In a 5-hour workday, his workers moved 3.17 m³ over a distance of 50 m and 1.76 m³ over a distance of 100 m. Assuming these rates remain constant, 0.63 m³ could be moved per hour at 50 m and 0.35 m³ over 100 m. These distances are reasonable for Annis since the mound fill was scraped up from the nearby village area. As noted by Ralph Brown (1940), “…the soil is sandy clay, such as would be produced by a mixture of soils in the neighborhood, chiefly to the west and northwest, from whence the soil for the mound was probably got…”.

Erasmus’ workers averaged 0.02 m³ (44 lbs) per load. This is a heavier load than most of those reported in the Eastern Woodlands as estimated from basket loads in mound fill (Table 1), although well within the capabilities of people used to heavy work.

Table 35: Person-days required to excavate soil for each mound stage. Rounded to nearest day.

<table>
<thead>
<tr>
<th>Mound Stage</th>
<th>Erasmus (1965)</th>
<th>Penn State</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5 hours</td>
<td>7 hours</td>
</tr>
<tr>
<td>Phase 1</td>
<td>86</td>
<td>62</td>
</tr>
<tr>
<td>Phase 2</td>
<td>214</td>
<td>153</td>
</tr>
<tr>
<td>Phase 3</td>
<td>353</td>
<td>252</td>
</tr>
</tbody>
</table>
In fact, it is not uncommon for people to carry heavier loads for much longer distances and for entire days (Bastien et al. 2005a; Bastien et al. 2005b; Cavagna et al. 2002; Heoglund et al. 1995; Maloiy et al. 1986; Malville 1999, 2001; Malville et al. 2001), so Erasmus’ figures are reasonable and are used here. Table 36 illustrates the time necessary to transport soil for mound construction at Annis.

Table 36: Person-days for soil transportation.

<table>
<thead>
<tr>
<th>Mound Stage</th>
<th>5-hour workday 50 m</th>
<th>5-hour workday 100 m</th>
<th>7-hour workday 50 m</th>
<th>7-hour workday 100 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1</td>
<td>71</td>
<td>128</td>
<td>51</td>
<td>92</td>
</tr>
<tr>
<td>Phase 2</td>
<td>177</td>
<td>318</td>
<td>126</td>
<td>227</td>
</tr>
<tr>
<td>Phase 3</td>
<td>292</td>
<td>525</td>
<td>208</td>
<td>375</td>
</tr>
</tbody>
</table>

By adding together the time necessary to excavate and carry soil, total expenditures for the mound can be obtained (Table 37). Again, total expenditures increased as the overall size of the mound increased, with greater effort necessary when earth must be transported for a longer distance, and labor costs may have risen as the steepness of the mound slope increased.

Table 37: Total person-days required for mound construction.

<table>
<thead>
<tr>
<th>Mound Stage</th>
<th>Excavation of Soil</th>
<th>Carrying of Soil</th>
<th>Total Person Days</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Erasmus 5-hour</td>
<td>Penn State 5-hour</td>
<td>50 m 5-hour</td>
</tr>
<tr>
<td>Phase 1</td>
<td>86</td>
<td>155</td>
<td>71</td>
</tr>
<tr>
<td>Phase 2</td>
<td>214</td>
<td>384</td>
<td>177</td>
</tr>
<tr>
<td>Phase 3</td>
<td>353</td>
<td>634</td>
<td>292</td>
</tr>
</tbody>
</table>

However, what does this mean in terms of the impact on local workers? Obviously, not all residents would have participated in construction; the very old, very
young, and perhaps women would not likely have been actively moving earth, but would have taken on other related and important tasks (such as food preparation).

Table 38 calculates labor costs for various workforce sizes. If we assume that one-fifth of the total population of the polity centered on Annis worked on the construction projects, a population of 500 to 1,000 people would produce 100-200 workers. These 100 people could have built the entire mound in about twenty days, with no more than twelve days devoted to any particular stage. Even if only 50 people worked on the mound, a maximum of 23 days would have been required for any one stage.

Table 38: Mound construction costs for varying workforce sizes. Rounded to the nearest \(\frac{1}{4}\) day.

<table>
<thead>
<tr>
<th>Mound Stage</th>
<th>Workforce</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>5-hour</td>
</tr>
<tr>
<td>Phase 1</td>
<td>3-5.5</td>
</tr>
<tr>
<td>Phase 2</td>
<td>8-14</td>
</tr>
<tr>
<td>Phase 3</td>
<td>13-23</td>
</tr>
</tbody>
</table>

**Palisades**

To calculate the labor required to construct the palisades, I factored in: a) the time needed to cut down a tree using stone tools; b) transportation of the post to the village and setting it in place; and c) the excavation of a trench in which to set the posts. Several observations or assumptions were important in calculating the following figures. First, the average distance between posts at Annis is 20 cm. Second, the handful of
palisade posts that can be measured average about 15 cm in diameter, fitting within the range of 15-25 cm for the vast majority of Eastern Woodlands palisades (Milner 1999:Figure 2). Third, I estimated only the time required to cut down the tree, and did not account for the additional time required to trim branches. Fourth, posts were assumed to be 3-4 m in length, based on the few descriptions derived from post depths from other palisades in the east (Ritchie 1980:307; Vogel and Allan 1985).

The majority of tree species in Kentucky are hardwoods, although numerous pine forests are also present (http://www.forestry.ky.gov, accessed June 10, 2005) and hardwoods predominate in Butler County (Mitchell 2003). However, the species of only one post at Annis has been identified. Therefore, I used the formula for a tree of unspecified hardness in all labor calculations. Assuming a diameter of 15 cm, a time of 14 minutes is predicted. This was rounded up to 15 minutes per tree. Using this figure, I calculated the time necessary to cut the trees for each successive palisade for the same workday lengths used in the mound calculations (Table 39). Obviously, as the length of the palisade increased, so did the time required.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Length (m)</th>
<th># Posts</th>
<th>5-hour days</th>
<th>7-hour days</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>114</td>
<td>570</td>
<td>28.5</td>
<td>20.5</td>
</tr>
<tr>
<td>2</td>
<td>205</td>
<td>1025</td>
<td>51</td>
<td>36.5</td>
</tr>
<tr>
<td>3</td>
<td>277</td>
<td>1385</td>
<td>69.5</td>
<td>49.5</td>
</tr>
</tbody>
</table>

Transport costs were determined using Iseminger and colleagues’ (1990) estimated speed of 2.4 km per hour (1.5 mph) for the Cahokia East Palisade and calculated for both four and six people carrying each log over both 0.5 km and 1 km for
different workday lengths (Table 40). Thirty minutes were added to set each post in place. These distances are reasonable given the small size of the site and the heavily forested nature of the prehistoric Green River area. No effort was made to account for water transport of logs, although this could well have occurred since the site abuts the bank of the Green River. Floating the logs would, of course, reduce transportation time enormously.

Table 40: Palisade post transportation costs.

<table>
<thead>
<tr>
<th>Phase</th>
<th># posts</th>
<th>Person-Days</th>
<th>6-person crew</th>
<th>4-person crew</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Carry posts 1 km</td>
<td>Set posts 5-hours</td>
<td>Carry posts 1 km</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.5 km</td>
<td>7-hours</td>
<td>0.5 km</td>
</tr>
<tr>
<td>1</td>
<td>570</td>
<td>287</td>
<td>144</td>
<td>114</td>
<td>244</td>
</tr>
<tr>
<td>2</td>
<td>1025</td>
<td>517</td>
<td>258</td>
<td>205</td>
<td>439</td>
</tr>
<tr>
<td>3</td>
<td>1385</td>
<td>698</td>
<td>349</td>
<td>277</td>
<td>594</td>
</tr>
</tbody>
</table>

The palisades at Annis Village were constructed by setting posts into a deep trench (Figure 30). Based on WPA plan maps and a section of one palisade that was excavated in 2003, I estimated a width of 30 cm and a depth of 1 m for each of the three trenches, and used the same data used in the calculation of mound fill excavation (Table 41). Carrying time was not calculated since earth would have been simply dumped next to the trench and used to stabilize the posts.
To obtain the total costs of palisade construction, the total person-days for tree cutting and transport, post setting, and trench excavation must be combined. Table 42 shows the total costs.

Table 41: Palisade trench excavation costs for 5 and 7-hour workdays. Rounded to nearest day.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Trench Volume (m³)</th>
<th>Erasmus</th>
<th>Penn State</th>
<th>Total Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5-hour</td>
<td>7-hour</td>
<td>5-hour</td>
<td>7-hour</td>
</tr>
<tr>
<td>1</td>
<td>34.2</td>
<td>13</td>
<td>24</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>61.5</td>
<td>24</td>
<td>30</td>
<td>42</td>
</tr>
<tr>
<td>3</td>
<td>83.1</td>
<td>32</td>
<td>41</td>
<td>57</td>
</tr>
</tbody>
</table>

Table 42: Total palisade construction costs for 5 and 7-hour workdays. Rounded to the nearest day.

<table>
<thead>
<tr>
<th>Phase</th>
<th>5-hour</th>
<th>7-hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>365-678</td>
<td>269-495</td>
</tr>
<tr>
<td>2</td>
<td>657-1213</td>
<td>484-901</td>
</tr>
<tr>
<td>3</td>
<td>888-1640</td>
<td>655-1219</td>
</tr>
</tbody>
</table>

However, numbers alone do not tell us much until we estimate the impact on the population of Annis. Using the same workforce estimate of 100-200 people, it is clear that less than twenty days would have been necessary to construct any one palisade (Table 43). Interestingly, proportionally more labor was required to move and raise the posts than to actually cut them down, making it likely that the sparseness or denseness of forests was an issue.
It is important to note that the palisades at Annis were not large, plastered fortifications such as those seen at Angel, Aztalan, Cahokia, and Moundville, among others (Anderson 1969; Barrett 1933; Black 1967; Iseminger et al. 1990; Vogel and Allan 1985). Rather, these palisades were expedient constructions meant to deter ambushes and sneak attacks in the middle of the night or early in the morning. Palisades of this type are the most common form in the Eastern Woodlands (Milner 1999, 2000). These smaller palisades were likely woven with the branches removed from the posts to form a more effective barrier. Obtaining and weaving these small branches would not have taken much time, especially if they were mostly trimmed from the posts. Experimental construction of a 3 m long and 1 m tall woven Neolithic hurdle in England took two hours for two experienced workers (Coles and Darrah 1977). I did not factor in weaving.

Table 43: Palisade construction costs for varying workforce sizes. Rounded to nearest ½ day.

<table>
<thead>
<tr>
<th>Phase</th>
<th>5-hour workday</th>
<th>7-hour workday</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Workforce</td>
<td>Workforce</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>7-14</td>
<td>4-7</td>
</tr>
<tr>
<td>2</td>
<td>13-24</td>
<td>7-12</td>
</tr>
<tr>
<td>3</td>
<td>18-33</td>
<td>9-16</td>
</tr>
</tbody>
</table>
time since there is no evidence that this occurred at Annis, but the task could have been accomplished in a few days with a workforce of 50 people.

Looking at both the mound and palisade estimates together, one sees an unsurprising increase in labor costs with each successive construction episode, as each phase on Annis’ expansion saw an increase in the overall volume of the platform mound and the area circumscribed by the palisade. Labor costs are relatively similar for mound and palisade construction, with slightly more effort expended in the palisade, but, then, people were likely to have been more enthusiastic about wall construction than mound building, regardless of their feelings for the chief. A proportionally larger increase in labor is evident for the addition of soil for the mound, indicating that the mound required more time to build and occupied more people, although construction time for the entire mound is a maximum of about forty days with no more than twenty days required to build any single stage. Similarly, the palisade required more labor as it grew, although no more than 33 days would have been necessary for any one expansion at the lowest population estimate.

**Summit Architecture**

The costs of summit architecture is also important to discussions of Mississippian social organization. Construction of these buildings has no direct benefit to anyone but the chief, therefore workers are not providing their labor for their own social betterment.

The buildings at Annis changed in size and form over time. I estimated the number of posts based on the length of wall trenches and the average spacing of posts
within these trenches and elsewhere. Since I do not have sufficient data on wall-trench depth, excavation of soil is not considered in this section but would have added to overall labor costs.

While the different summit structures do not vary to any great extent, it is clear that they required considerably more effort than did the average village structure (Table 44), which were much smaller. Figure 118 shows the average areas encompassed by structures at Annis. Two standard deviations are shown overlain on each mound and village structure to illustrate the range of variation and the overall size of the summit buildings.

Table 44: Tree-felling costs per summit structure. Rounded to nearest person-day.

<table>
<thead>
<tr>
<th>Structure</th>
<th># posts</th>
<th>Post spacing</th>
<th>5-hour</th>
<th>7-hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1 summit</td>
<td>289</td>
<td>20</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Phase 2 summit</td>
<td>282</td>
<td>30</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>Phase 3 summit</td>
<td>190</td>
<td>20</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Average village</td>
<td>70</td>
<td>20</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>
Presumably, thatching the roof would have added significant time to the building of any structure. Experimental construction of buildings in Africa, Europe, and the southeastern United States indicates that a relatively small structure still requires a large amount of grass, cane, or other materials to cover the walls and roof, sometimes up to a ton for a house 3 m on a side (Hansen 1959; Knuffel 1973; Lacquement 2004). Approximately 3 hours per square meter of thatch is required for reconstructions of English houses using appropriate tools (Leo Wood, www.thatch.org, personal communication January 21, 2005), although these thatched roofs are thicker than those found on native houses worldwide. Since summit structures were considerably larger than village structures, their total cost would have been significantly larger, although still easily accomplished with the available workforce.
Implications of Labor at Annis

In order to fully address the implications of the increase in labor expenditure during the different construction phases at Annis, we must also look at artifacts, features, and summit architecture.

Phase 1

During Phase 1, a structure was built atop the low platform mound. This structure was residential in nature, based on the presence of artifacts, storage pits, and flank middens. These middens do not appear to be related to feasting since they contain many parts of deer, including mandibles, and many of the long bones appear to be purposefully smashed, presumably to extract marrow. Rather, they were likely domestic refuse from the processing of the deer on the mound summit. These bones were everyday debris rather than special cuts of meat with enough good parts so one did not have to extract marrow. Presumably, a local leader, perhaps a chief, commissioned the construction of the mound and had the right to dwell atop it. Living on the mound both symbolically and physically elevated the chief (and presumably his/her family) above their neighbors.

Ramey Incised pottery, ideologically important in the American Bottom (Pauketat and Emerson 1991), was found in a feature in the mound. It is not surprising to find such pottery restricted to the mound as it was likely a valued object. However, it was most likely thought to be important because it was a tradeware from a faraway place rather than having the same ideological meaning to people at Annis as it did to those near Cahokia. The fact that these sherds were imported and other (but not all) Mississippi
Valley-like material from the village were local copies further indicates the importance of this material to the residents of Annis.

At or about this time, the first palisade was built. This represented a need for local defense and possibly a social boundary. As calculated above, between 75 and 95 person-days went into the palisade, probably pulling people away from subsistence tasks. However, given enough people and scheduling of the project at a convenient time, this could have been easily accomplished without undue hardship on the local population.

Phase 2

During Phase 2, the mound doubled in size and a larger palisade was built, again engaging a number of people in construction projects. The summit residence appears to have been ceremonial in nature rather than domestic, based upon the absence of pits and household refuse. The presence of a fence on the summit was a social boundary, likely a screen meant to shield summit activities, presumably carried out by elites, from view.

While elites may not have been in residence atop the mound during Phase 2, it is likely that they still occupied positions of authority. There may have been a more group-oriented leadership strategy in practice, rather than leadership centered on one individual.
Phase 3

Phase 3 is perhaps the most interesting from a labor-investment standpoint. The mound nearly tripled in height (from 1.6 to 3.7 m) and doubled in volume (from 556 to 919 m$^3$). A domestic structure again appeared on the summit and an offering was placed atop the previous mound surface before recapping began. Finally, a palisade with a bastion was constructed around the village.

During Phase 3, it appears that the people at Annis returned to a social organization headed by a chief. It is also possible that a new group moved in after a period of abandonment, as has been suggested for nearby Mississippian sites such as Andalex (Niquette 1991). This scenario is unlikely at Annis since the palisades do not overlap but are nested. More likely, an influential individual emerged from the pack and consolidated authority.

This individual was able to commission labor projects to make a clear statement of his or her authority. By placing an offering on the Phase 2 mound surface and subsequently recapping the mound, the chief was able to forge a purifying tie with the earth, an important part of Mississippian religion (Knight 1986). By taking up residence in a large house atop the mound, the chief again figuratively and literally elevated him or herself above the other residents of the site.

It is possible that this shift in leadership strategy was driven by social conditions. The construction of a large palisade with a bastion may point to an increase in tensions between neighboring groups. As mentioned in Chapter 6, this bastion faces out into a wide, flat area and may have served as a watchtower to protect people working in nearby
fields. However, since few Mississippian sites have been excavated nearby and there is only one burial at Annis, this hypothesis cannot be confirmed at this time.

Summary

I have interpreted the changes in social organization reflected in the different building phases as a shift from a Phase 1 community led by a chief, to a more council-based group during Phase 2, and back to a chief during Phase 3. In this scenario, chiefs lived atop the mound during Phases 1 and 3 as recognition of and as a symbol of their authority and their position within the community. No one resided on the mound summit during Phase 2, however it is likely that local leaders were still in residence on the site.

Based on this evidence for chiefly cycling (Anderson 1994) or community fissioning (Blitz 1999), along with increased labor expenditures over time in both mound volume and palisade construction (Tables 37 and 42), it seems clear that the “chiefly power” hypothesis for mound volume is more likely here than the “duration-of-use” suggestion. By this I mean that mound construction was triggered by an individual and that the mound did not grow accretionally. As a new individual or group succeeded to a leadership position, a new layer was added to the mound and a new palisade was created. Each mound stage was constructed in a single, short-term, burst of activity and was capped by a new summit structure. No interim stages were noted that could be interpreted as accretional deposits.

A key point is that, while both the palisade and mound construction occupied the time of quite a few people for short periods of time, there is no reason that these building
projects would have pulled people away from important subsistence tasks for prolonged periods. It is likely that a chief would have commissioned this work during a down-time in production (e.g., not at the height of harvest or planting season) as it would not be in the best interests of him/herself or the villagers to do so. This work could easily be accomplished at other times of the year with minimal impact on the day-to-day lives of the people.

Finally, there are key differences between contributing labor to a mound or to a palisade. Contributing labor to a palisade is of immediate benefit to more people than just the chief. Palisades provide protection to many people, both those living within the village itself and those living in nearby farmsteads who can retreat to the main village when threatened. Mounds, on the other hand, are most visibly a representation of the chief’s influence. While it is argued that mounds also represent rites of community renewal and objects of display (Knight 1986, 1989), only a select group of individuals were permitted to ascend to their summits. Therefore, conscription of labor, even on as small a scale as that seen at Annis, means that the individual workers give labor primarily for the benefit of others, not for themselves. Further, while the labor to construct the mound was not much, its result was enduring—out of proportion to the work that went into it—in that sense, it was a true monument.

Of course, as stressed at the beginning of this chapter, the entire question of chiefly power and social organization cannot be boiled down to labor alone. But, since labor is quantifiable it is easier to measure than ideology, particularly since fancy artifacts and burials are not present at Annis.
Chapter 9
Annis in Regional Perspective

It is difficult to place Annis into a proper context, mainly because the Green River Mississippian is very poorly understood. Within 10 km of Annis, only two Mississippian sites, Martin Mound (Lewis 1990; Milner and Smith 1986) and Evans Rockshelter (Hockensmith 1991), have been excavated and only a handful of Mississippian components are recorded in the Kentucky state site files. However, one site, 15BT120, was found during recent surveys (see Chapter 4), indicating that smaller Mississippian sites do exist in the immediate vicinity.

Mississippian houses and artifacts have been found superimposed on Archaic shell mounds along the Green River, including Carlston Annis, Chiggerville, Indian Knoll, Barrett, Butterfield, and Ward (e.g., Webb 1946, 1950; Webb and Haag 1939, 1940, 1947) and recent surveys and test excavations have identified a number of small sites in Hopkins, Ohio, and Muhlenberg Counties (Schlarb et al. 2004; Smith 1993a, 1997), indicating that the region had not been abandoned. Detailed investigation of these Mississippian components and their relationship, if any, to mound sites has not been done. However, work done at a handful of mounds has been published.
Western Coalfields/Upper Green River

In the Western Coalfields and Upper Green River regions of Kentucky, only five mound sites are known: Annis, Andalex (Niquette 1991), Corbin (Fryman 1968), Jewell (Bader 1995; Hanson 1970; Lowthert et al. 1998), and Martin (Lewis 1990; Milner and Smith 1986) (Figure 119). Other important sites are Morris (Rolingson and Schwartz 1966), Kirtley (Rolingson 1961), and Eaton (Hanson 1959).

Figure 119: Selected Mississippian sites. Stars are major mound sites, triangles are smaller mound sites, circles are non-mound sites.
Martin (15BT1)

Martin is by far the closest site to Annis, less than 0.5 km upstream (Figure 120). It is located on a prominent spot overlooking the Green River, and was excavated by the WPA in 1940 but no report was ever written. A cursory inspection of the field notes indicates that at least 50 people were buried there, both in cremations and stone box graves. Based on the presence of stone box graves, Martin was probably a mid-to-late Mississippian occupation, e.g., after A.D. 1200 (Brown 1981; Brown 1974), and was likely contemporaneous with Annis. Since burials were practically non-existent at Annis, at least some of its inhabitants were likely buried at Martin.

Figure 120: Location of Martin Mound. Sites not drawn to scale.
Andalex (15HK22)

Andalex was excavated in the late 1980s by personnel from Cultural Resource Analysts, Inc. (Niquette 1991). The site consisted of a low, partially destroyed, mound, and a fortified village with a plaza (Figure 121). The mound was approximately 35 x 45 m and 1.5 m high at the time of excavation.

Three wall-trench houses were located beneath the mound, indicating that the site was occupied before the mound was constructed. A small clay platform was associated with one of them. Four construction layers were noted in the mound, each topped by a successively larger and more complex structure, at least one of which was burned. A number of radiocarbon dates are available for both summit and village structures at Andalex. These range from about A.D. 1000 to 1400, with most clustering in the 13th and 14th centuries. The pre-mound structures have an average date in the mid-11th century A.D., making this one of the earliest known Mississippian components in the region. The increasing size of the mound structures over time and the radiocarbon dates are similar to what is seen at Annis.
Unsurprisingly, most of the pottery from Andalex is undecorated. A minority of decorated sherds were found. Of these, the majority were found in the mound rather than the village (Kreisa 1991a). Among the decorated types are single sherds of Matthews Incised, *var. Manly* and Nashville Negative Painted, as well as a number of incised types, including Mound Place Incised. A relatively high number of pans, represented by Kimmswick Plain and Fabric-Impressed sherds, were found in the mound, suggesting that they may have been used as serving dishes (as mentioned in Chapter 6). There is little variability in the ceramic assemblage at Andalex, certainly less than is seen in the Mississippi Valley, and Kreisa (1991a) suggests that the residents of the site were relatively isolated from other Mississippian groups.

Figure 121: Plan view of Andalex. Redrawn from Niquette (1991).
Labor costs for site construction at Andalex were likely somewhat less than they were at Annis. Only one palisade was present, which may have had bastions. Unfortunately, it does not seem to have been traced across the entire village, thereby making calculations of labor difficult if not impossible. The final size of the mound was slightly larger than Annis in base area but, since it had been partially destroyed, the overall height is unknown. However, it contained minimally 1,660 m$^3$ of soil and would have required between 800 and 1,800 person-days to construct. This is similar to what I have calculated for Annis and could have been accomplished in less than 20 days by 100 or so workers from Andalex and nearby sites.

**Corbin (15AD4)**

The Corbin site was excavated by archaeologists from the University of Kentucky in 1965-1967 (Duffield 1967; Fryman 1968). It consisted of four mounds (one of which was a natural landform) and a palisade (Figure 122). All of the mounds were intentionally plowed down by the landowner before excavation was begun, therefore their dimensions are uncertain, although I have estimated their volume below.
Three of four mounds bore evidence of Mississippian occupation in the form of houses or isolated wall trenches. Mound A measured 25 x 35 m and was 1 m high at the time of excavation, approximately 530 m$^3$ in volume. One construction stage was noted and one short wall trench was mapped.

Mound B was 14 x 11 m and was 0.75 m tall, or around 97 m$^3$ in volume. Several structures were built underneath Mound B, indicating that a Mississippian occupation existed before mound building began. However, they were not completely covered by the mound, raising doubts as to whether they are related. Mound B is also notable for a large sub-mound stone platform measuring about 7.5 m on a side. The platform was completely covered by the mound and was likely central to early mound construction.

Mound C was 24 x 17 m and about 0.3 m tall. It contained five superimposed wall trench structures as well as a midden with domestic refuse, primarily mussel,
gastropod, and snail shell. It is best thought of as a house mound rather than a platform mound. Finally, Mound D was a natural rise with some evidence for occupation. No complete structures were identified on it, but one segment of wall trench was found.

Several sections of the palisade were uncovered. The palisade enclosed approximately 2 ha (4.9 acres), according to Fryman (1968), but digitizing the palisade from his maps indicates that the enclosure was only about 1 ha. It is unclear if Fryman was in error or if the scale on the map is incorrect. The mounds measure larger on the map than they are reported in the text, leading me to believe that there is a problem with the map scale. Assuming that posts were spaced at 20-cm intervals, about 1,800 posts and 600-900 person-days would have been necessary to build it. This is a higher cost than at Annis, but given a work crew of 100 people it would have taken less than ten days to build.

Artifacts were primarily Mississippian and consisted of triangular points and shell-tempered pottery (with loop handles most common). Interestingly, unlike other Green River sites, over 50% of the sherds were check-stamped and less than 10% were plain (see also Lewis 1990), perhaps indicating closer contact with groups in Tennessee and the Carolinas than with those downstream in Kentucky (Fryman 1968). Relatively high percentages of check-stamped sherds have also been found at Cumberland Valley sites to the south and east such as Crole-Evans (Jefferies et al. 1996) and Rowena (Weinland 1980). Fryman (1968; see also Lewis 1990) argues that Corbin dates to approximately A.D. 1000-1200.
Jewell (15BN21, 349, 384, 390)

The Jewell site consists of a platform mound, two stone-box grave cemeteries, and a surrounding village. There are some hints that a palisade may have been present, but this is not certain. It was excavated by University of Kentucky archaeologists in the early 1960s (Hanson 1970), surveyed by Western Kentucky University crews in the 1970s (Schock and Langford 1979, 1982), and investigated again by the Kentucky Heritage Council in 1996 (Lowthert et al. 1998).

The mound was built in three, possibly four, stages. Two pre-mound structures were found, indicating that there was a Mississippian occupation before mound construction began. The first stage of the mound was 62 x 45 m and 0.32 m high, with a volume of ca 865 m³. One burned structure was found atop the mound, which was surrounded by an earthen embankment about 40 cm high.

Stage 2 occurred in two parts. The first filled in the area enclosed by the embankment and the second enlarged the mound in area to 79 x 72 m and in height by about 0.72 m. Approximately 4,760 m³ of earth was required for this phase of construction. Several structures, some superimposed, were located on the summit of the Stage 2 mound. An embankment 0.64 m high was built around one of these structures.

The third stage was built in a similar manner to the second. The area within the embankment was filled in and the mound was enlarged in height by about 0.75 m and in total area. A large structure was built on the summit. The exact area covered by the mound at this stage is unclear due to erosion and plowing, but it was minimally 80 x 75
m based on Hanson’s schematic drawing. This would require about 4,400 m³ of earth, although this is an underestimate since the exact area is unknown.

The fourth mound stage was largely plowed away, but may have increased the mound’s height by 0.4 m. I did not calculate volume for this stage since it is not well documented.

Labor estimates for each stage are presented in Table 45. Total excavation and soil carrying time are presented. Costs are higher than at Annis, but each stage could have been accomplished in six to about fifty days by a workforce of 100. Given that there are over 50 known Mississippian sites in the vicinity (Lowthert et al. 1998), this workforce estimate is reasonable.

Table 45: Mound construction estimates for Jewell in five and seven-hour person-days. Calculations based on data presented in Fryman (1970).

<table>
<thead>
<tr>
<th>Mound Stage</th>
<th>Volume (m³)</th>
<th>5-hour day</th>
<th>7-hour day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>856</td>
<td>608-827</td>
<td>474-591</td>
</tr>
<tr>
<td>2</td>
<td>4760</td>
<td>3342-4551</td>
<td>2387-3251</td>
</tr>
<tr>
<td>3</td>
<td>4400</td>
<td>3089-4412</td>
<td>2187-3005</td>
</tr>
<tr>
<td>4</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Plain pottery dominates the artifact assemblage at Jewell, although there is a sizeable minority of Wolf Creek Check-Stamped (Bader 1995; Lowthert et al. 1998). Radiocarbon dates for the site average cal A.D. 1279 (Lowthert et al. 1998), meaning that Jewell is probably contemporaneous with Annis.
Morris (15HK49)

Morris is a fortified site in Hopkins County (Figure 123) that was excavated in 1940-41 by University of Kentucky archaeologists under the umbrella of the WPA. Archaic and Woodland components were also present (Rolingson and Schwartz 1966), but only the Mississippian occupation will be discussed here. No mound was present at the site, but two palisades were built.

All but two structures at Morris were built using wall-trenches, and several show signs of rebuilding. One single-set post building was nearly double the size of any other structure (Figure 123). This structure may have been a special-purpose building although the artifact assemblage reported is no different from the residential structures nearby (Rolingson and Schwartz 1966:Table 8).

Figure 123: Morris site plan. Solid squares are wall-trench structures, dashed square is a single-set post structure. Concentric lines are palisades, dashed lines are projections of their course. Redrawn from Rolingson and Schwartz 1966.
The palisades were approximately 240 m and 280 m in length. Posts averaged 15 cm in diameter. The inner palisade was constructed using single-set posts and the outer palisade was constructed by setting posts in a trench. Assuming they were spaced at 20-cm intervals, 1,200 and 1,400 posts would have been needed, respectively. The costs for their construction would have been similar to that of the Phase 3 palisade at Annis since the palisades are of similar length (see Chapter 8). That is, the costs were significant but easily accomplished.

Two radiocarbon dates were reported, A.D. 1399 and A.D. 1506 (Trautman 1963 cited in Lewis 1990). However, Clay (1997) reports that a series of dates for Morris and several other Kentucky sites run by the same lab were in error. Lewis (1990) and Clay (1984), based on the ceramic assemblage, argue for a more reasonable date of A.D. 1000-1300.

Eaton (15McL6)

Eaton is shown on Figure 119 as a mound, but is more likely the remnants of a house mound rather than a platform mound. It was excavated in 1937-38 by WPA workers under the direction of John Cotter and John Elliot, and was written up as a University of Kentucky class paper (Hanson 1959). Eaton is one of the few small sites for which information is available in the Coalfields region.

The mound was approximately 18 m in diameter; no height was reported. A wall-trench structure, 7.5 m per side, was either beneath or on the mound, but it is not clear from the report which is the case. Ceramics were predominantly plain shell-tempered
types, but some fabric-impressed and red-slipped types were present (Hanson 1959; Lewis 1990), suggesting a date of A.D. 1000-1200.

**Kirtley (15McL19)**

Like Morris and Eaton, Kirtley was also excavated using WPA labor, in 1937 (Rolingson 1961). It is only separated from Eaton by about 2 km (Figure 119), and the two sites were likely occupied at about the same time. Kirtley seems to have been occupied for a longer time, based on the presence of 15 houses, including rebuilding episodes. Six to eight house locations were occupied at any given time (Lewis 1990).

Both single-set and wall-trench structures were present, as were middens, pits, and two burials (one pit and one stone box). Both Archaic and Mississippian projectile point types were found. The ceramic assemblage is entirely shell-tempered, with plain wares most common, although some slipped and fabric-impressed sherds were present. Based on this evidence, Lewis (1990) argued that the site was occupied from A.D. 1000-1200, although Clay (1997) suggested that the later end of this range is more likely.

**Western Coalfields/Upper Green River Summary**

Several trends can be noted in the Coalfields/Upper Green region. First, all of the mound sites for which good information is available (Andalex, Annis, Corbin, and Jewell) have clear Mississippian occupations that predate mound construction, with Andalex being the earliest.
Second, most sites, with or without mounds, were long-term occupations as evidenced by the presence of mounds, palisades, and rebuilding of structures. Residents of sites required the mobilization of labor for the construction of mounds, palisades, and houses, although labor costs would have been minimal even with a modest population base.

Third, all sites discussed above seem to fall in the A.D. 1000-1300 range, although Annis likely was occupied up to about A.D. 1400. Clay (1997) argued convincingly for the cessation of construction of new mounds after about A.D. 1250 for parts of the lower Ohio River valley, and there is no evidence that the situation changed further east in the Coalfields region.

Fourth, there is no evidence that any of the Coalfields/Upper Green sites participated in a prestige-goods economy or were part of a tightly integrated polity. By this I mean that it is difficult to argue that these Mississippian societies were established specifically for their participation in such an economy. Apart from some decorated sherds found in mound contexts at several sites and a handful of whelk shell beads at Annis, there are few exotic items to be found. This does not mean, however, that there were not local people of importance. Rather, influence can be measured through labor investment in mounds, as at Andalex, Annis, Corbin, and Jewell, and in palisades at Annis, Corbin, and Morris (Table 46). Again, though, differences exist between labor on mounds and on palisades, with palisade construction benefiting a higher proportion of the population.
Further west in the Confluence region, there is some evidence for variation in occupation based on trends at Kincaid (Figure 119). A wider range of decorated pottery is present and other fancy artifacts are more common than in the Coalfields/Upper Green, but these still make up a minor part of the collection at sites in this area (e.g., Cole et al. 1951; Edging 1995; Kreisa 1988, 1990a, 1995; Stout 1989; Wesler 2001). It could be that exotic material was consumed by the residents at larger sites such as Angel or Kincaid and sites further west were “starved” of goods as a result (e.g., Steponaitis 1991). Kreisa (1995) argued that small mound sites in the Confluence region were “secondary centers” planned by and subservient to Kincaid after A.D. 1200 and that strategic resources and fancy artifacts were controlled by the elite at the larger site. From this perspective, elites at Kincaid purposefully sent people out to settle new areas as the population at the major site increased. Clay (1997) on the other hand, argued that these sites were in fact occupied after large sites such as Kincaid were in decline. In this

<table>
<thead>
<tr>
<th>Site</th>
<th>Person-Days</th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mound</td>
<td>Palisade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Andalex</td>
<td>800-1800</td>
<td>?</td>
<td>800-1800</td>
<td></td>
</tr>
<tr>
<td>Annis</td>
<td>800-2100</td>
<td>300-1700</td>
<td>1100-3800</td>
<td></td>
</tr>
<tr>
<td>Corbin</td>
<td>2200-4000</td>
<td>600-900</td>
<td>2800-4900</td>
<td></td>
</tr>
<tr>
<td>Jewell</td>
<td>600-4400</td>
<td>?</td>
<td>600-4400</td>
<td></td>
</tr>
<tr>
<td>Morris</td>
<td>n/a</td>
<td>1500-3100</td>
<td>1500-3100</td>
<td></td>
</tr>
</tbody>
</table>

Table 46: Labor investments at Green River sites. Ranges reflect 5 and 7-hour workdays and differences between Erasmus and Penn State excavation data as discussed in Chapter 3.
scenario, residents of these smaller sites were not affected on a day-to-day basis by the elites at Kincaid or Angel but did interact with them at some level. Recent data indicate that the majority of these sites, including larger sites such as Jonathan Creek and Angel, either saw their first construction or grew rapidly following the decline of Kincaid around A.D. 1200 (Cobb and Butler 2002; Hilgeman 2000; Schroeder 2004). Similarly, mound construction at Annis, Andalex, and other Coalfields/Upper Green sites seem to have taken off at about the same time. As mentioned above, most of these sites had earlier occupations, but initial mound construction did not occur until some time later.

While the jury is still out on this debate in the Confluence region, the bulk of the evidence in the Coalfields/Upper Green region favors the latter hypothesis. Annis, for example, is over 150 river km from Angel, the nearest major site, and over 50 overland km from Andalex and Jewell. There is no evidence for much interaction between any of these sites, although undoubtedly residents of separate sites did exchange ideas, material, and people at times, and presumably fought each other as well (based on the presence of palisades).

A much larger sample of Mississippian sites is available for floodplain environments in the Confluence area, reflecting both the importance of the area to Mississippian people as well as to modern inhabitants (as measured by construction projects requiring archaeological mitigation). The efforts of a series of researchers directed by R. Barry Lewis at the University of Illinois (e.g., Edging 1985, 1995; Kreisa 1988, 1990a, b, 1991b, 1995; Lewis 1986, 1996; Stout 1989; Sussenbach and Lewis 1991). To be fair, Kreisa’s model is focused solely on the Confluence area and was not meant as a measuring stick for more eastern parts of Kentucky.
1987; Wolforth 1987) and others (e.g., Butler 1991; Clay 1961, 1963a, b, c, d, 1976,
1979, 1984, 1997; Pollack 2004; Pollack and Railey 1987; Schroeder 2004, 2005; Webb
1952; Wesler 2001) have provided a relatively robust ceramic sequence, radiocarbon
dates, and some ability to track change over time, although due to financial limitations
full-scale exposures of entire community plans are still not available, except for Kincaid
and Angel where more excavation was done. A comparable dataset is simply not
available in the Coalfields/Upper Green region due in part to a Mississippian occupation
less focused on visible architecture such as mounds.

It is clear, however, that residents at Mississippian sites in the Confluence
participated in important planned labor projects. Sites such as Turk, Adams, Twin
Mounds, Wickliffe, and others possess mounds ringing central plazas. This point is most
emphatically made by looking at the Jonathan Creek site in Marshall County (Schroeder
2004, 2005; Webb 1952), which had as many as eight overlapping palisades with
bastions, two mounds, and 89 houses (Figure 124). It is one of the most completely
excavated sites in the region. Schroeder (2004, 2005) has identified two major ceramic
phases at the site, one earlier and one later than A.D. 1200.
It is also clear that considerable effort went into the construction of the site. This occurred in bursts of activity with different amounts of labor occurring at different times, as indicated by the changing lengths of the palisades and evidence of rebuilding of both defensive walls and houses.

There is little evidence for the material differentiation of mound residents at most sites, however, in part because little full-scale excavation has been done. Most discussion of site assemblages in this region has understandably been focused on chronology building and occupational histories (e.g., Butler 1991; Clay 1997). However, in the few cases where we have samples from both mound and village contexts there are minimal
differences. At Tinsley Hill, for example, there are a wider variety of ceramic types represented in the village sample than the mound, although more extensive excavations here were conducted at a village midden and a cemetery (Clay 1963c, d; Schwartz 1961).

Further south, in the Nashville Basin, there is evidence for fortified sites with burials (some containing fancy artifacts such as copper plates) at sites such as Mound Bottom/Pack, DeGraffenreid, Old Town, Brick Church Pike Mound, Gordontown, Rutherford-Kizer, Travellers’ Rest, Sellars, and others (Autry 1983; Butler 1981; Dowd 1974; Miller 1987; Moore and Breitburg 1998; Moore and Smith 2001; Myer 1928; O'Brien 1977, 1978; Smith 1992, 1993b, 1994; Thruston 1890). However, most excavations targeted mounds, many of which have since been destroyed by pothunters and the construction of the city of Nashville. Few smaller non-mound sites have been excavated (but see Ferguson 1972); most of these are habitation sites that also have stone box graves. It has been suggested that hierarchical status differentiation was limited only to mound sites and that non-mound sites were abandoned in favor of nucleated mound sites by about A.D. 1300 (Smith and Moore 1994; Smith et al. 1993), but adequate evidence to support this claim does not exist.

Future investigations into the internal occupational histories at other sites in the Confluence area and elsewhere in the Mississippian world will enable us to answer questions about changing strategies and prominence over time. For example, more intensive excavations focused on refinements of chronology at Moundville resulted in a completely different picture of the site’s history in which the site was more heavily occupied early on but was largely abandoned later, although burial of the dead continued (Knight and Steponaitis 1998). Similar shifts in occupation and construction have been
noted at Cahokia (Anderson 1969; Fowler 1997; Iseminger et al. 1990; Milner 1998; Pauketat 1994), as well as at other Mississippian sites. In short, a return to careful examination of the data, both in the form of artifacts, architecture, and layouts, using combinations of old collections and carefully planned excavations, has the potential to further refine our understanding of Mississippian and its inherent variability (e.g., Anderson 1994, 1996; Blitz 1999; Milner 1990; Milner and Schroeder 1999; Peebles 1987; Steponaitis 1991).
Chapter 10

Conclusion

Life At Annis

The Household

Each household at Annis was a self-sufficient, single family dwelling. These houses were easily constructed in no more than a few days by digging trenches for the walls, cutting posts, and covering the roof and walls with thatch. Within each house, fires would have been used for heat, cooking, and, perhaps as importantly, for fumigating the thatched roof (which would have quickly become infested with bugs). Residents must have spent most of their time repairing buildings, working in nearby fields, preparing food such as deer, corn, and nuts, and dumping trash (occasionally in pits but probably also in the nearby river). Food was occasionally stored in pits, but above-ground storage probably occurred as well and valued items, such as marine shell and stone, were cached along house walls and sometimes forgotten.

Hunting, fishing, and farming were practiced nearby. Some fields were probably near the village itself; others were scattered around other parts of the floodplain at farmsteads. Maize was a primary crop, based upon its presence in several features, although wild resources were almost certainly important. To supplement plant foods, a
wide age range of deer was hunted, meaning that the deer population was healthy (heavy predation would result in a younger herd).

Archaeologically speaking, there were no significant economic differences between important people and everyone else. Important people, however, were set apart by the privilege of residing in large houses atop the mound and by the possession of a handful of exotic artifacts. Yet these people still ate much like everyone else, as reflected by the assemblage from the Sub-Primary mound flank midden, and their houses were merely bigger versions of what most people lived in.

The Community

Much of the time, Annis was probably a sleepy village with people engaged in the tasks necessary for day-to-day existence. Most likely, less than 100 people lived in the village at any given time, with several hundred other people living within a 10 km or so radius of the site. Most of these people would have been in scattered farmsteads (such as the one recorded by a Penn State crew in 2004), but would have still have been members of the Annis polity centered at the main village site. European explorers in other parts of the Southeast described dispersed communities, sometimes a mile across, that were considered to be part of the same town or village but were separated by stretches of abandoned fields and woods. Some Choctaw settlements were described by Adair (1930:302) as:

…scattered plantations, as best suits a separate easy way of living. A stranger might be in the middle of one of their populous extensive towns, without seeing half a dozen of their houses, in the direct course of his path.
Similar descriptions can be found for parts of what are now Alabama, Florida, Texas, and Virginia—this was a common pattern (Adair 1930:302; Elvas 1993:105; Harriot 1972:68-69; Van Doran 1928:163,269; Wedel 1978).

Occasional festive events would have broken the routine of daily life. These events, including mound and palisade building, presumably brought in people from outside the main village area to help with construction and would have been an exciting, albeit short-lived, time.

**External Relations**

Contact with the outside world is evident through the presence of nonlocal goods, such as marine shell and imported pottery. However, everyone seems to have had access to this material since it is present in both the mound and village, although arguably the mound-dwellers had more things from a long distance away (Cahokian pottery).

There was some threat of attack by outsiders, based on the presence of the palisades and a watchtower. These palisades were not massive, fortified walls but instead were probably meant as screens to prevent raiders from gaining easy access to the village. Since raids often happen at night or early in the morning, these screens would have held up the attackers long enough for the residents to be awakened by barking dogs. The presence of a lookout in the watchtower would have allowed people to work in the fields without fear of an ambush. These ambushes would have been perpetrated by the residents of other polities in the Green River region such as Andalex, which was about 60 overland km away.
Status at Annis

Annis was constructed in three stages, each marked by the enlargement of the platform mound, the construction of a building on its summit, and the raising of a new palisade. Each expansion required a substantial labor effort, however, it was likely accomplished by the residents of the site in a relatively short amount of time.

There are many dimensions that mark the presence of elites at archaeological sites. These include labor investment in monumental architecture and elaborate burials, as well as differences in the distribution of pottery, tools, beads, and food remains. At Annis, there is very little evidence for the restriction of materials to elite contexts. The residents of the mound summit enjoyed the privilege of living in a larger house and seem to have had access to some nonlocal items in the form of pottery from the Mississippi Valley. However, this access did not translate into preferential access to foodstuffs, as demonstrated by the makeup of the Phase 1 (Sub-Primary) mound flank midden. Important people were differentiated by life in a big house and a low-cost, but long-lasting, mound. Nothing else, archaeologically speaking, separated high and low ranked people.

As this study demonstrates, community patterns and labor organization can be used to determine social organization, particularly at small sites where there is little to no evidence for a prestige-goods economy. At these sites, artifact-based social distinctions may not be detectable archaeologically because of a variety of factors. First, fancy objects may not have been available because elites at larger sites may have kept them for themselves rather than pass them on. Second, prestige items may have been perishable,
such as bird feathers, certain types of animal hides, and the like. Local leaders were described as wearing these items by European explorers. Third, status distinctions may be more subtle and may only be recognizable through quantification of labor, although labor can also indicate group motivation, rather than elite control.

In addition, important people at smaller sites may not have been considered as “elite” as those at larger sites. By this, I mean that elites at larger sites such as Angel or Kincaid were probably viewed as more important than elites at smaller sites such as Annis because, for whatever reason, they lived in more productive places or had more supporters. An example of this in our own society is that politicians from small towns are generally viewed as less influential regionally than those in state or federal offices, or even those who hold office in cities. Accounts from European explorers describe tributary relationships between polities and jockeying for position between elites from various sites:

Pacaha told Casqui: “You know well that I am a greater lord than you and of more honored parents and grandparents, and that to me belongs a better place than to you.” Casqui responded thus: “It is true that you are a greater lord than I, and your ancestors were greater than mine. And since the great lord who is here [de Soto] says that we must not lie, I will not deny the truth; notwithstanding, you know well that I am older and more than a match for you, and I confine you in your palisade whenever I want, and you have never seen my land.” (Rangel 1993:303).

Situations such as these could have easily resulted in the lack of prestige items trickling down to the residents of Annis and other sites in the Coalfields region or the prestige items only reaching the most powerful people. At Annis, the former is more likely.

With the exception of a few Dover chert artifacts (which were more plentiful in the village), what few imported items that existed at Annis (Ramey Incised, Powell Plain,
and Matthews Incised sherds) were found in mound contexts. Given this relative lack of artifact-based distinctions, we must look to labor and community patterns to give us a picture of what life was like there 800 years ago. At Annis, we see that labor investment in the mound and palisades increased over time as the village grew. We also can infer that patterns possibly changed from a chiefly organization, to a group-oriented leadership strategy, and back to a (more powerful?) chief as the years passed at Annis.

While the costs of construction of these monuments at Annis were low, this does not mean that they were not important. Mounds are impressive, permanent, and relatively cheap to build. As discussed earlier, mounds were of central importance to Mississippian societies. The fact that they may not have required as much labor as may have been thought does not change that fact, nor does it belittle it. Rather, the gathering of people to construct mounds was likely a joyous social occasion with feasting and friendly competition, perhaps between members of different kin groups, as a central part of the process.

Calculations of labor investment has been referred to by some as “coldly scientific” (Kehoe 2002:185), and by others as simply racist (Pauketat 2004:3) because, in their view, low labor costs somehow debase the accomplishments of Native American people. This cannot be further from the truth. In fact, one could easily twist the argument around to say that it is racist to argue that these monuments could not have been built relatively quickly, since this demeans the capabilities of Mississippian and earlier people. Regardless of the costs of labor required to build them, many of these mounds are impressive in their size and scale, something that all archaeologists can agree on.
Future Work

This study, along with the others summarized in Chapter 9, has provided a good starting point for a more complete understanding of Mississippian societies in the Green River/Western Coalfields region. However, additional work is needed to paint a more complete picture of settlement in the area. Reexamination of collections and notes from sites such as Morris, Eaton, and Mississippian components at shell mound sites is essential. For the most part, these have not been adequately reported or systematically examined given the advances in our knowledge of ceramics in the region in the past 40 years.

Around Annis, surveys designed to locate outlying non-mound sites are crucial to understand the number of people that lived in the area and the distribution of sites. It is clear that these sites exist since one (15BT120) was recorded by Penn State in 2004 and a few other sites, such as Martin and Evans Rockshelter, have been excavated. Determining the characteristics of these sites will allow us to determine the extent of the polity that was centered on Annis, if one existed. Further, it is possible that the lack of differentiation noted between mound and village at Annis is because all residents of the main site were considered to be elites. Without adequate survey and excavation coverage elsewhere, however, this is unclear.

Finally, examination of the Martin Mound collection to interpret the mortuary practices of the area and to determine its relationship to Annis must take place. I have suggested here that the sites are contemporary and that residents of Annis were buried at Martin, but this remains unclear.
The area around Annis is located far from most known Mississippian sites and provides an ideal opportunity to investigate a self-contained system consisting of a mound center and the outlying settlements. The combination of new excavations, analysis of previous collections, and future survey work provides a nearly unique opportunity to investigate a potential small-scale chiefdom in its entirety.
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Yoffee, Norman  


Young, Jon N.  
Appendix A

Experimental Tree-Cutting Data

The data in this appendix come from a variety of published sources in Europe, North America, South America, and New Guinea and include only those sources that include specific gravity measurements. It is important to note that all tree species have a range of possible specific gravities; only one of which is reported here (see USDA 1974 for complete ranges). The data from Carneiro (1979) and Townsend (1969) were obtained using native workers; the rest are from experiments done by researchers working with stone tools themselves.

Explanation of Column Headings

Axe Type: material and form of axe
Species: Species of tree
Specific Gravity: density of tree
Diameter: diameter of tree in cm
Time: number of minutes required to cut down tree
Carneiro Formula 1: time predicted by Carneiro’s Formula 1
t = [(0.083d^3)*1.3h]; d=diameter; h=hardness
Carneiro Formula 2: time predicted by Carneiro’s Formula 2
t = [(0.1683d^{2.7})*1.3h]; d=diameter; h=hardness
Location: where the experiment was conducted
Reference: published source of data
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<th>Species</th>
<th>Specific Gravity</th>
<th>Diameter (cm)</th>
<th>Time (min)</th>
<th>Carneiro Formula 1</th>
<th>Carneiro Formula 2</th>
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Notes:
- Specific Gravity values were sourced from various sources, including Jorgensen (1985), Denmark, and other European locations.
- Time values were recorded in minutes, with 15 minutes being the most common.
- Area values were calculated for each species, with Beech having a specific gravity of 317.

Reference:
- Jorgensen, 1985
- Denmark
- Europe

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Appendix B

Annis Sand Mound

Annis Sand Mound (15BT21) was first investigated by Clarence B. Moore. He described it thus:

About 80 yards directly back of the larger mound [15BT2], in a field that has been under cultivation, is a mound of sandy loam, 2 feet 8 inches in height and about 60 feet in diameter of base. The mound evidently has been plowed over and considerably reduced in height. A number of trial-holes carried to the base, in one instance came upon remains of a skull much decayed, and traces of other bones (Moore 1916:481).

The WPA crew began excavation on February 1, 1939 and finished on May 12, 1939. It is unclear what the dimensions of the mound were at the time of the WPA excavation since the first section of Brown’s field notebook has been lost. From the photographs, however, it appears that it was approximately 60 cm high (Figure B.1). The mound remnant today measures approximately 30 m by 25 m and is only about 10-15 cm high (Figure B.2). George Milner and I relocated it in 2002, and a small surface collection was made in 2004. Some of these materials likely came from the main site, Annis Village, either as a result of the WPA crew moving their backdirt or plowing over the years.
Figure B.1: Annis Sand Mound, L1 profile facing northeast. The platform mound is visible at the top left of the photograph (WSWMA negative #4367).

Figure B.2: Annis Sand Mound in 2002, facing grid north. George Milner is standing in the center of the mound. The platform mound is in the trees behind him (PSU photo #02-02).
Features

Only seven features were recorded by the WPA excavators. Two of these features were likely tree falls, one turned out to be simply a relatively deep section of topsoil, and one was a test pit dug by Moore. The remaining three features were described as refuse pits. One of these pits, Feature 2, contained a handful of flakes, some fire-cracked rock, and a small amount of charcoal. Feature 6 consisted of two pits; each was about 60 cm in diameter and nearly 70 cm deep. Fragments of bone (species unspecified) and shell were found but nothing was retained. Feature 7 was approximately 1.8 m in diameter and nearly 70 cm deep. A 10 lb bag of shell, some animal bone, and flakes were retained.

Burials

Counting the burial reported by Moore, there were six individuals buried in the sand mound. Bone preservation was poor and no remains were recovered for storage, therefore what little can be said about age and sex comes from field estimates that are not always reliable.
Burial 1

Burial 1 consisted of skull and long bone fragments (Figure B.3). Sex could not be determined and the individual was likely flexed on the left side. The surrounding pit was noted through soil texture, not color.

Figure B.3: Burial 1 (WSWMA negative #4359). Facing north.

Burial 2

Burial 2 was an extended burial consisting only of skull and long bone fragments (Figure B.4). Brown’s burial form indicates that the skeleton was an adult male but no justification for this was noted. The burial pit was again noted only through texture.
Burial 3

Burial 3 was a small pit containing a number of fragments of long bone, none more than 1 cm long. No photograph was taken, but Brown believed it was a reburial or a disturbed burial.

Burial 4

Burial 4 was partly disturbed by plowing. It was an extended burial consisting of a left humerus, femora and tibiae (without epiphyses), and skull fragments (Figure B.5). Brown classified it as an adult based on the length of the burial pit.
Burial 5

Burial 5 was a fully flexed burial of an infant (Figure B.6). The infant was buried on its left side and the right arm bones were missing, as were the epiphyses and “many small bones.” The grave was capped by a small sandstone slab that was just large enough to cover the pit.

Figure B.5: Burial 4, facing south (WSWMA negative #4360).

Figure B.6: Burial 5, facing west (WSWMA negative #4371).
Artifacts

Only nine potsherds were found, all located in the top 1.5’ of the mound with one exception at 2-3’. Eight of these sherds were plain shell tempered, including one jar (Table B.1). The other was a cord-marked grog-tempered body sherd, and was the sherd found at the deepest level. The remainder of the artifacts were made of locally available Curlew and Fort Payne cherts. Projectile point forms were primarily Archaic (n=35), although Woodland (n=14) and Mississippian types (n=3) were also found.

Based on the types of artifacts present in the mound, I believe that the sand mound is Archaic in origin with the sherds being an incidental deposit from the later occupation of the river bank. It does not appear to be plaza sweeping debris dating to the nearby Mississippian occupation. If that was the case, there would be a greater number of sherds and Mississippian projectile points in the collection.

Table B.1: Annis Sand Mound Ceramics

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Appendix C

WPA to Penn State Grid Conversion Chart
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Appendix D

Ceramic Descriptions

Body sherds were classified according to temper and surface treatment. No types were assigned unless a rim was present or, in the case of the Ramey materials, a diagnostic or non-local type was apparent. This was done, in part, because many of the body sherds could not be assigned to a particular vessel type and I did not want to confuse Mississippi Plain and Kimmswick Plain, especially given the high numbers of pans at the site. A rough correlation between temper/treatment and types is in Table D.1. Rim sherds were assigned to types generally following published sources for the region (Clay 1963a; Hilgeman 2000; Kreisa 1991a; Lowthert et al. 1998; Phillips 1970; Phillips et al. 1951). Penn State students visually distinguished Bell Plain (finely crushed shell temper) from Mississippi Plain (coarsely crushed shell temper), and all identifications were confirmed by the author. All sherds were passed through screens; any that were <¼” were classified as “sherdlets” and counted, but no further analysis was done.

Table D.1: Types common at Annis.

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<td>fillet</td>
<td>Yankeetown Fillet</td>
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Rims

Rims included rounded, flat, pinched, folded, and folded/pinched types (Figure D.1). Rounded, flat and pinched rims occurred on bottles, bowls, jars, pans, and plates. Folded rims were found mostly on bowls and pans, but occurred on a few jars. Folded/pinched rims occurred exclusively on pans.

![Diagram of rim forms]

Figure D.1: Rim forms: a). rounded; b). flat; c). pinched; d). folded; e). folded/pinched.

Handles

Handle types can be subdivided into two categories: closed and open. The following descriptions are taken from Hilgeman’s (2000) study of ceramics from Angel.

Closed Handles

Closed handles occurred exclusively on jars and included loop, narrow intermediate, wide intermediate, and strap types. Measurements were taken for the top, middle, and bottom width, middle thickness, and handle height to the nearest mm. Types were determined by obtaining the ratio of middle thickness to middle width (Table D.2). Numbers of each type can be found in Tables 7 and 32.
Open handles

Open handles at Annis can be subdivided into lugs, nodes, tabs, and beaker handles. These occurred on both jars and bowls. Several different types of lugs and nodes were found (Tables 7 and 32). The most common lug type was round to oval in plan. Next was a bifurcated lug in which the lug has a deep notch that subdivides it into two lobes. Nearly all bifurcated lugs were round to oval. A handful of “trifurcated” lugs were also found. These were round to oval in plan, but were subdivided into three lobes. Trianguloid lugs are triangular in plan. Finally, crenelated lugs have a stair-step edge pattern in plan.

Nodes are additions to the rim that are about as thick as they are wide, but are sometimes longer parallel to the rim. Nodes occurred in series of 1, 2, 3, 4, and 6, with three and two occurring most often.

Three tabs and a single beaker handle were recorded. Tabs are open, scallop-like handles that consist of a separate piece of clay attached to the rim. The beaker handle was long and cigar shaped and indicates a central Mississippi Valley (specifically...
American Bottom) origin. One end would have been attached to a vessel, however the piece was detached.

Vessel Forms

Vessel forms were determined using a variety of sources (Hally 1986; Hilgeman 2000; Milner 1990a; Steponaitis 1983). Jars were the most common form, followed by bowls and pans. Plates and pinch pots were also found. Total identified vessel forms are in Tables 8 and 31.

Most jars were the standard form, in which the neck was constricted and the rim was vertical or outslanting (e.g., Figure 98). Mississippi Plain, Bell Plain, and Baytown Plain were most common, although a few other types were found, notably Ramey Incised and Powell Plain. A total of 718 jar sherds were complete enough to estimate orifice diameter; these ranged from 4 to 60 cm with a median of 24 cm in the village (Figure D.2) and from 8 to 58 cm with a median of 20 cm in the mound (Figure D.3).
Figure D.2: Vessel diameters for Annis Village. Circles are outliers.

Figure D.3: Vessel Diameters for Annis Mound. Circles and stars are outliers.
Bowls were simple open vessels, wider than they were tall, with no restriction of the orifice noted. These were of Mississippi Plain, Bell Plain, and Baytown Plain types. Diameters ranged from 4 to 60 cm with a median of 24 cm in the village and from 4 to 40 cm with a median of 20 cm in the mound (n=204; Figures D.2 and D.3). A subdivision was made for a bowl/pan category within the village collection. These were vessels that could not easily be described as a bowl or a pan, since they often had a fabric-impressed surface but had far thinner walls than most pans. They were nearly always coarse shell-tempered vessels. Thirty of these were sufficient to determine diameter; these ranged from 12 cm to 58 cm with a median of 39 cm (Figures D.2 and D.3).

Two Mississippi Plain “helmet” bowls were recovered, so named because their form resembled an upside-down World War I military helmet. These had a shallow, globular body with a wide, outflaring rim (Figure 74). Orifice diameters were 20 and 22 cm (Figure D.2).

Pans were large, thick-walled vessels, usually (but not always) with a fabric-impressed surface. Kimmswick Fabric-Impressed and Kimmswick Plain were the types identified, although there was some variation in the weft and weave of the fabric. Rim form E (Figure D.1) was exclusively found on pans, although rounded, pinched, and flat forms also occurred. Diameters ranged from 24 to 58 cm in the village with a median of 44 cm (n=83; Figure D.2) and from 42 to 52 cm with a median of 46 cm in the mound (n=2; Figure D.3).

Pinch pots and pinch pot jars were generally on a fired, untempered clay that was not assigned to a type. Young (1962:68-71) elevated this material to type status and
termed it Butler Burned Clay, but that distinction is not used here. Pinch pots were crude vessels, likely made expeditiously and perhaps by children. Pinch pot jars had a clear shoulder break and resembled standard jars. These ranged from 4 to 20 cm with a median of 9 cm (n=8; Figure D.2).

Plates generally had a vertical rim height of about ½ of the vessel height. These did not have a particularly acute angle and conformed to Hilgeman’s “standard plate” description on Mississippi Plain wares. Only three plate sherds could be measured for diameter, but a dozen were recovered. These ranged from 26 to 40 cm with a median of 26 cm (Figure D.2).
Appendix E

Radiocarbon Dates

CALIB RADIOCARBON CALIBRATION PROGRAM*
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*To be used in conjunction with:

Beta 181396 (Feature 93-inner palisade)
wood charcoal
Radiocarbon Age 660±30
Calibration data set: intcal04.14c
# Reimer et al. 2004
One Sigma Ranges: [start:end] relative area
[1285 AD:1306 AD] 0.487474
[1363 AD:1385 AD] 0.512526
Two Sigma Ranges: [start:end] relative area
[1278 AD:1322 AD] 0.498214
[1347 AD:1392 AD] 0.501786

Beta 181397 (Feature 64C-middle palisade)
Charred nutshell
Radiocarbon Age 710±30
Calibration data set: intcal04.14c
# Reimer et al. 2004
One Sigma Ranges: [start:end] relative area
Two Sigma Ranges: [start:end] relative area
[1256 AD:1307 AD] 0.883524
[1362 AD:1385 AD] 0.116476
Beta 181398 (Feature 93-inner palisade)
wood charcoal
Radiocarbon Age 630±30
Calibration data set: intcal04.14c
# Reimer et al. 2004
One Sigma Ranges: [start:end] relative area
[1296 AD:1318 AD] 0.385481
[1352 AD:1390 AD] 0.614519
Two Sigma Ranges: [start:end] relative area
[1287 AD:1332 AD] 0.410311
[1337 AD:1398 AD] 0.589689

Beta 186154 (Feature 52-Sub-Primary mound flank midden)
mussel shell
Radiocarbon Age 2270±70
Calibration data set: intcal04.14c
# Reimer et al. 2004
One Sigma Ranges: [start:end] relative area
[399 BC:350 BC] 0.364697
[306 BC:209 BC] 0.635303
Two Sigma Ranges: [start:end] relative area
[515 BC:161 BC] 0.993462
[132 BC:118 BC] 0.006538

Ranges marked with a * are suspect due to impingment on the end of the calibration data set

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# CE Buck, G Burr, KB Cutler, PE Damon, RL Edwards, RG Fairbanks, M Friedrich,
# TP Guilderson, KA Hughen, B Kromer, FG McCormac, S Manning, C Bronk Ramsey,
# RW Reimer, S Remmele, JR Southon, M Stuiver, S Talamo, FW Taylor,
VITA

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