

LITHIC RAW MATERIALS AND CHIPPED STONE TOOLS:  
A COMPARISON OF TWO SITES IN  
THE MOUNDVILE CHIEFDOM

by

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A THESIS

Submitted in partial fulfillment of the requirements  
for the degree of Master of Arts  
in the Department of Anthropology  
in the Graduate School of  
The University of Alabama

TUSCALOOSA, ALABAMA

2004

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## **ACKNOWLEDGEMENTS**

First and foremost I would like to thank my parents, Pete Barry and Christina and Frank Terhune, as well as my family and friends for supporting me in every imaginable way throughout this process. I would also like to thank my committee members, Dr. Jim Knight, Dr. Philip Carr, Dr. Kathy Oths, Dr. Ian Brown, and Dr. Keith Jacobi, for their patience and input as I wrestled with this topic. This thesis would in no way have been complete without the help and resources of Van King and Eugene Futato. Mr. King provided a comparative collection of lithic raw materials and even took the time to drive to Tuscaloosa and help me in identifying some of the materials I initially had trouble with. Mr. Futato provided his knowledge, time and comparative collection at OAR for the materials from Mound Q. I also need to thank Matt Gage and Duke Beasley for their advice and support with geological matters and when I was inundated with numbers and codes from my data. I would like to thank Jenn Myer for making the assemblage from the Fitts site available through her excavations and ideas. In addition, I have to thank Cameron Lacquement and Michelle Taylor for helping me format this thesis into a readable presentation. No small thanks to Amanda Page for keeping me somewhat sane throughout graduate school. Last but not least I have to thank my friends and colleagues from UA and elsewhere who listened to me ramble on and on about rocks.

## CONTENTS

ACKNOWLEDGMENTS	iii
LIST OF TABLES	vi
LIST OF FIGURES	vii
ABSTRACT	viii
1. INTRODUCTION	1
2. CONTEXT AND SETTING	4
The Control Model	6
The Laissez-Faire Model	8
Lithic Technology	10
Mound Q	11
The Fitts site (1TU876)	12
3. LITHIC TECHNOLOGY: DEBITAGE AND TOOL DEFINITIONS	14
4. RAW MATERIAL: ORIGINS, PROPERTIES AND DESCRIPTIONS	21
Local Materials	26
Non-local Materials	30
Other Materials of Unknown Origin	35
5. PROJECT DESIGN AND METHODOLOGY	37
6. LITHIC RAW MATERIAL USAGE IN THE MOUNDVILLE CHIEFDOM	46
Lithic Raw Material Usage	47
7. TOOL TYPES AT THE MOUND Q AND THE FITTS SITE	56
Tools and the Lithic Raw Materials Used to Create Them	60
Stages of Reduction	63
8. CONCLUSION	70
Recommendations for Future Work	75



## LIST OF TABLES

1. Table 6.1. Raw Materials Compared by Site, by Weight and Percent	49
2. Table 6.2. Raw Materials Compared by Local, Non-local and Unknown Provenance, by Weights and Percents.	50
3. Table 6.3. Local Raw Materials by Weight and Percent.	51
4. Table 6.4. Non-local Raw Materials by Weight and Percent.	52
5. Table 6.5. Non-local Material by Region of Procurement.	54
6. Table 7.1. Tool Types Compared by Site.	58
7. Table 7.2. Expedient Versus Formal Tools.	59
8. Table 7.3. Raw Materials Used in Tool Production at Mound Q and The Fitts Site.	60
9. Table 7.4. Local Versus Non-local Materials for Tool Use.	61
10. Table 7.5. Region of Origin for Non-local Materials Used in Tool Production.	62
11. Table 7.6. Platform Configuration on Complete Flakes (The Fitts Site).	68
12. Table 7.7. Platform Facet Count on Complete Flakes (The Fitts Site).	68
13. Table 7.8. Dorsal Scar Count on Complete Flakes (The Fitts Site).	68

## LIST OF FIGURES

1. Figure 6.1. Proportion by weight of local versus non-local materials, compared by site.	50
2. Figure 6.2. Non-local materials by region of procurement.	55
3. Figure 7.1. Expedient versus formal tools.	59
4. Figure 7.2. Local versus non-local material use and tools.	61
5. Figure 7.3. Non-local debitage by weight within each size grade (Fitts site).	66
6. Figure 7.4. Local debitage by weight within each size grade (Fitts site).	67



## **ABSTRACT**

The Moundville Chiefdom of Alabama was among the largest and most complex Mississippian settlements in pre-contact North America. The chiefdom itself was thought to have been a three-tiered, hierarchically organized, political system with elites in power at the Moundville paramount center, secondary elites at single-mound sites, and the so-called commoner farmsteads centered on these settlements, as well as scattered throughout the Black Warrior Valley. These elite are thought to have had control over much of the economy by their ability to access non-local goods and materials, and center the production of these at Moundville itself. In contrast, the commoners are considered to have been farmers who supplemented their diet with hunting and fishing, while supplying the elite with crops and the choice meats. The inhabitants of these outlying sites are not viewed as having access to non-local materials; much less contribute in the manufacture of products outside of everyday items.

The problem with this hypothesis is that, in reality, only a small fraction of non-elite contexts has been excavated and studied. Over the past one hundred years much of the ongoing research has taken place at the elite contexts of Moundville itself and overlooked the vast number of smaller, ordinary sites.

The subjects researched here involve another step into uncovering the dynamics between elite and commoner. A comparison of an elite context at Moundville itself, Mound Q, and an outlying non-mound site, The Fitts site (1TU876), allows found that the inhabitants of the Fitts site utilized stone tools with greater frequency than those of

Mound Q. Further, the chipped stone tools of the Fitts site seem to have been more formal than expedient. The opposite is true at Mound Q. This is the contrary to what was expected. The types of raw materials used at each site differ as well. While the Fitts site residents used predominantly local materials, the elite at Mound Q preferred non-local materials from the north in the Tennessee River Valley of northern Alabama. These differences between paramount center and outlying non-mound site are explored through an inter-site comparison within the Moundville Chiefdom.

## **CHAPTER 1**

### **INTRODUCTION**

In the late prehistoric United States, complex societies emerged that produced goods and obtained resources that circulated among different communities across large distances (Brumfiel and Earle 1987). These societies included Mississippian chiefdoms that had systems of exchange involving a variety of raw materials (i.e., lithics, shell, etc.) and crafts (i.e., ceramics, lithic tools, shell goods, etc.). The Moundville chiefdom located in the Black Warrior Valley, Alabama, was one of the largest and most complex members of these exchange networks possibly employing a prestige goods economy. A variety of lithic materials, the raw resources of which stone crafts and tools were made, were locally available in the Black Warrior Valley. However, raw materials of a higher physical quality, as well as an apparently higher cultural value, were of a non-local origin and were therefore limited in their circulation. It is speculated that elites living at Moundville controlled the acquisition and distribution of these higher quality raw materials (Welch 1991). The aim of this work is to provide a clearer picture of the political economy of the Moundville chiefdom as manifested in flaked stone tools and debitage. The origins and distributions of different types of a sample of lithic raw materials within the chiefdom will be determined in this analysis.

This will aid in our understanding of the relationship between the Moundville paramount center, and an outlying non-mound site known as Fitts site (1Tu876) during the late Moundville II and early Moundville III phases (ca. AD 1300-1450).

In order to characterize Moundville's exchange, lithic raw materials and distribution patterns will be studied. Aside from locally available raw materials, which were apparently widely used by all levels of the society, non-local materials are thought to have been imported to the Moundville site from beyond the chiefdom, and then redistributed throughout the valley with much higher quality material staying at Moundville. In most circumstances, the majority of materials from which flaked stone tools were produced were local in origin (Welch 1991:152). Tuscaloosa gravel, for example, is easily procured from local stream beds and is the predominant material from which expedient tools were made. In contrast, most non-local materials appear in the archaeological record for possibly "specialized" bit-tool use, but significant quantities of these are usually only reported from elite contexts (Welch 1991:154, 170), although this argument may be circular as larger samples from non-mound sites become available.

It is predicted that higher quality, non-local lithic raw materials will be found in greater proportions in Moundville's lithic assemblages than at the Fitts site, an outlying non-mound site. Conversely, local materials will constitute a greater proportion of the overall lithic assemblage at Fitts site than at Moundville. In addition, tool types between the two sites will be compared to determine what differences exist, if any, in tool assemblages. The lithic raw materials from which the tools were produced will also be compared to determine if a preference exists either for local or non-local materials for tool use. Finally, using a combination of mass analysis and individual flake analysis,

reduction stages for local and non-local materials at each site will be assessed as indicating either early core reduction or late biface reduction. The aim of this study is to aid in identifying the nature and extent of lithic raw material usage in the different social contexts of the Moundville chiefdom, thus, shedding new light on the behavior and relationships of Moundville's elite, living on the mounds, and the so-called commoners living in the hinterlands during the later phases of Moundville's existence.

## **CHAPTER 2**

### **CONTEXT and SETTING**

Early, influential works on the subject of chiefdoms began to appear about fifty-five years ago with Julian Steward (1948), and continued with Kalervo Oberg (1955), Marshall Sahlins (1958), Elman Service (1962), and Morton Fried (1967). It is beyond the scope of this thesis to summarize their influence and contributions to the subject here, but it is important to note the beginnings of our understanding of chiefdoms, as we know them today. Service (1975:74) defined chiefdoms as societies where “leadership is centralized, statuses are arranged hierarchically, and there is to some degree a hereditary aristocratic ethos.” The status differences within a chiefdom hierarchy include those of ascribed differences in rank (Service 1975). This means that people were born into their social situation and their offspring would share the same level of status.

One of the leading theoretical characteristics of chiefdoms as defined by Service is that of a redistributive economic organization. Simply stated, chiefdoms were political organizations that involved two, or possibly three, levels of socio-political hierarchy. The domestic unit, the lowest level of the hierarchy, would have been the basic unit of production, subordinate to secondary centers and a paramount center where a chief would reside and collect subsistence products or other goods for reallocation back into the system in times of need, or for supplementing units residing in diverse and specialized environments.

Problems with this theoretical characteristic of chiefdoms became apparent after testing models of historically known cases. Earle (1977, 1987), in his study of Hawaiian chiefdoms, showed that domestic units may be completely self-sufficient, therefore not in need of supplemental foodstuffs, and that the chief and his elites may not need or wish to reallocate products for this purpose. In short, in using the term “chiefdom” it is not necessary to consider all chiefdoms the same, as if they were equivalent in a monolithic evolutionary typology. Different chiefdoms in different parts of the world would have evolved diverse methods of social reproduction.

Thus, it is not beneficial to look at chiefdoms as having necessarily the same rigid structure or mode of production across cultural boundaries. Mississippian chiefdoms of the southeastern United States are not the same as Maori chiefdoms or Neolithic European chiefdoms. We shall expect variation among Mississippian chiefdoms themselves.

Chiefdoms, as defined by Earle (1987:288), are “regionally organized societies with a centralized decision-making hierarchy coordinating activities among several village communities.” What makes Mississippian societies Mississippian? Although variation exists among Mississippian chiefdoms, they all share some basic characteristics. According to Scarry (1996:13), they “practiced clear-field agriculture with maize as the dominant crop ...had hierarchical political organizations with evidence of ascriptive status differentiation, and...a shared a set of religious cult institutions and iconographic complexes.”

The Moundville chiefdom of west-central Alabama was one of the largest Mississippian centers in the Southeast and one of the most studied archaeological sites in

the United States. The Moundville chiefdom consisted of the paramount center of Moundville in the Black Warrior River Valley, several secondary mound centers, and hundreds, if not thousands, of outlying sites referred to as farmsteads (Knight and Steponaitis 1998). The elite of the chiefdom resided at Moundville living on the summit of some of the mounds with their retainers presumably collecting the harvests of the surrounding areas and controlling the “elite goods” such as palettes, gorgets, high quality raw materials, and so on. (Knight and Steponaitis 1998; Welch 1991). The secondary centers acted as middlemen between the elite living at the Moundville paramount site and the “commoners” living around the secondary mound centers and scattered throughout the hinterlands.

The time period studied here is the Moundville II to Moundville III phases (A.D. 1300-1450), also referred to as the “Paramountcy Entrenched” (Knight and Steponaitis 1998). At this time in Moundville’s history the paramount center had emptied out and been primarily used as a necropolis with only the elite and their retainers residing there with outlying sites supplying them to some degree or another.

### *The “Control” Model*

Welch (1991) proposes that the Moundville chiefdom employed what he called a control model for the operation of its economy, with a few differences. This he calls the “Moundville model,” but I will refer to it as the “control” model to establish a dichotomy between it and the opposing viewpoints. According to Welch, there is no evidence of domestic units producing crafts and sending them to Moundville. As Welch states, “the paramount center is the only location in the Moundville chiefdom where evidence of craft specialization has been found” (1991:181). A proposed greenstone workshop area north



of Mound R, the relative absence of non-local stone (in early reduction stages at least) from outlying non-mound sites, and proposed pottery specialists attached to the elite residences, suggest that most, if not all, craft production was taking place at Moundville itself. The control model has the basic problem of assuming that there was no subsistence self-sufficiency and a strictly upward flow of craft items from domestic unit to paramount center. Neither seems to be the case for reasons stated above. Welch attempts to correct this with his model by stating that subsistence surplus was passed along from domestic unit to secondary elite centers and then onto the paramount center for whatever purpose (tribute, prestation, festivals, communal feasts, etc.), and all non-local craft items were being produced with imported raw materials at Moundville, or imported as finished products to the paramount center. The only downward flow of goods was some of the non-local craft items, which were, for the most part, restricted to the secondary elite.

This discussion will avoid the debate over what constitutes “specialization” in the true sense (Muller 1997). The idea of attached specialists to elite living at Moundville does not seem that farfetched, but the surrounding everyday activities of the elite themselves do not lead one to believe that anyone, the elite and craft producers alike, were exempted from “toiling in the fields,” or at least getting their hands dirty in some sort of food producing activity to some degree. Therefore, there were no true specialists. In any event, the control model involves not only the people under Moundville’s control, but involves a network of exchange with polities outside of the Black Warrior Valley supplying non-local materials and goods to Moundville, with presumably the local craft items being produced at Moundville ending up as “non-local goods” somewhere else.

This model implies that external relationships were vital to the power of elites. Without them, the chiefs and their supporters would not have a base to propagate their elevated status. According to Welch (1996:86), “the subsistence economy was decentralized, but the economy of exotic and presumably valuable goods was tightly centralized.” Welch states that control over one aspect of the economy can effectively assert control over most, if not all, of the rest of the economy (Welch 1996:89). The foundation of this model would be weakened if craft items, or the tools and materials used for craft production, were found at outlying non-mound sites.

#### *The “Laissez-Faire” Model*

Muller (1997) uses a laissez-faire model for Mississippian societies stating that most Mississippian environments, including the Black Warrior River floodplain, were adequate to support subsistence needs for the estimated population, and maintain all levels of the society as self-sufficient even in “down” years. Muller (1997: 381) states that although he does not believe the Mississippian people were of a low social and hierarchical organization, this does not translate into the power, authority and control that the terms “elite” and “commoner” connote. This view conflicts with the control model in that without frequent subsistence failures, commoners do not need to depend on the chief or the elite to sustain them in hard times. Archaeologically, this is also difficult to see since only Moundville has been extensively studied and the subsistence goods would have been generally the same as those consumed at outlying, non-mound settlements in the floodplain environment (Welch 1991).

As opposed to Welch’s control model, Muller does not see a marked difference between alleged elites and commoners. In patterns of food availability it would not seem

that the elite had that much of an upper hand. Muller states (1997:389) that “the biological differences between elites and non-elites also proved to be relatively slight. In stature, dental pathology, and other measures, elites seem to have been biologically like other members of the same societies.” Using the issue of non-local materials and prestige goods, Muller argues counter to Welch by saying that more excavations need to be carried out in outlying non-mound sites before we can begin to presume that “elite goods” are only located in “elite contexts” (Muller 1997:350). Muller, justifiably, points out a large problem in assuming what is restricted to the elite and what is not. The percentage of mound sites excavated in proportion to non-mound sites is biased towards mound sites. By stating, “there is *no* evidence for the manufacture of items of non-local materials at the outlying sites” Welch’s (1991:170, emphasis in original), argument can be questioned. We can neither prove nor deny that there were or were not items of imported non-local material being produced at the majority of outlying sites, and therefore, we are unable to state what is or what is not an elite item. This is not to say that Welch was making a huge leap with the data available to him, because in 1991 there were only four “farmsteads/hamlets” excavated, and this situation has barely improved in thirteen years; Welch states that there is “*no* evidence” of such. He does not state that there is no possibility of such. Although the control model was consistent with the data in 1991, recent excavations (Knight 2001, 2002; Myer 2002) have brought forth new data to assess the Moundville to outlying non-mound site relationship, which will be discussed in this thesis.

On the subject of making and using tools and the availability of the raw materials for their production, Muller contends that there is little evidence that a monopoly could

have existed. He states that “on the contrary, the manufacture and use of the tools were within the capabilities of every normal person” (1997:253). The idea that specialization, in the sense of possession of specialized knowledge needed for crafting skills, was restricted from a large segment of the population is highly unlikely. It would be equally difficult for anyone in these societies to have the authority to restrict access to non-local raw materials outside of the polity’s boundaries, when anyone could simply trek to the source themselves if they so chose (Muller 1997:252). Muller (1997:400) affirms that “the kinds of movement of raw materials that we are discussing are not carried out by traders but are down-the-line exchanges that probably involved either real or fictive kin relations closer to the source.”

### *Lithic Technology*

The most abundant artifacts through most of human history are stone tools and the by-products of stone tool manufacture. Unlike tools and products made from organic materials, stone or lithic tools and products do not readily deteriorate or decompose over time, although they may be altered or damaged from modern intrusions or weathering. According to Andrefsky (1998:9), “lithic artifacts include all culturally modified stone tool materials found on prehistoric sites.” These materials can include anything from finely crafted tools with a distinctive shape and use, to expedient or informal tools that required little or no modification. Aside from the tools that are found on a site, there is the more commonly found debitage that represents the reduction process from unmodified raw material to a usable implement. This debitage includes reduction flakes as well as shatter that, more often than not, greatly outnumber all other lithic remains contributing to the sometimes overwhelming and tedious nature of lithic analysis. These

materials can aid in the interpretation of prehistoric behavior in many ways. The identification of the different raw material types and the proportion by weight for each type can provide insights into trade, social relations, political economy and others. The data gleaned from these materials can help describe site function or relationships to surrounding sites.

### *Mound Q*

Mound Q is a small mound located on the northwest plaza-periphery of Moundville dating to the Moundville II and Early Moundville III phases (ca. AD 1260-1450). Excavations carried out by Knight in 1992 and 1998 show that, unlike previous ideas of mound use at Moundville, Mound Q not only contained human interments, but also had active residential structures at the summit of the mound (Knight 2001, 2002). Summit buildings and the middens associated with them revealed that there was indeed domestic activity going on in these elite contexts including corn and other plant food preparation and consumption. Faunal remains are also present, with the prime cuts of deer lacking evidence of primary butchering, suggesting that the occupants of Mound Q were provided with these foods. Other animals such as bobcat, cougar, bear, turkey, and pigeon are present, some of which illustrate the exotic tastes the elite enjoyed.

Craft production also took place on and around the mound, with ferruginous sandstone saws used for pendant and palette making, copper fragments, bone tools, greenstone celts, pigments, and paint palettes, as well as chipped stone tools including a small bit-tool technology. According to Knight (2002: 99) chipped stone tool production was not a dominant activity at Mound Q. Relatively few tools exist, and the debitage counts are especially low when one considers the fact that many flakes are produced

during tool production. Mound Q seems to have employed an expedient core technology predominantly using local cherts, available in the Black Warrior Valley. However, non-local cherts, especially blue-gray Ft. Payne, were used in tool production as well. The specific use of these tools is unknown, and shell bead production can probably be ruled out with a lack of corroborating evidence for such activity (Knight 2001:6). These mounds were not just ceremonial areas or empty holy places, but “they were instead the bustling residences of elites prominently engaged in the skilled crafting of goods” (Knight 2001:8).

*The Fitts Site (1TU876)*

The Fitts site is an outlying non-mound site approximately four kilometers north of Moundville. It dates to the Moundville III phase in the Moundville chronology. Fitts is located in “a cluster of at least 38 non-mound Mississippian sites around Foster’s Landing or Wiggins mound” (Myer 2003:4). Even prior to the analysis completed in my study, it seemed that the Fitts site residents were active in some form of craft activity (Myer 2003). From the 2002 excavations, 1 fragment of a tabular stone pendant was recovered along with 96 hematitic sandstone saws, 3 abraders, 1 sandstone discoidal, and 25 ground or ground and snapped fragments of sandstone. Along with the ground stone tools and fragments of sandstone, a large number of microdrills, cores, bifaces, and bifacial tools were recovered during surface collections and excavations during the summer of 2002. The presence of these artifacts was surprising due to the fact that it had been previously thought that the paramount center of Moundville was the only site involved in the production of stone pendants or most craft goods in general (Welch 1991).

The study of the Fitts site is an excellent example of how more non-mound sites need to be studied in order to truly understand the diversity among them and their relationship to Moundville.

## CHAPTER 3

### LITHIC TECHNOLOGY: TOOLS AND DEFINITIONS

The artifacts under study in this analysis were chipped-stone tools and the debitage created in their production. It should be noted that some chert artifacts were excluded from this analysis. Cobbles, pebbles, broken specimens of these, and “pot lids” were left out. To reduce subjectivity, only objective pieces, flakes, shatter and tools that showed signs of human alteration were studied. I had originally included categories called “raw material” and “raw material test,” but after further consideration realized that these were either too difficult to discern or too subjective in my opinion. Cobbles and pebbles only exhibit signs of cortex and lack other diagnostics to distinguish between cherts. The category “raw material test” was discarded because I felt that examples of these could have easily been cobbles/pebbles which had an unfortunate run-in with a plow or a shovel. Pot lids are chert pieces that have been heated beyond their “breaking point” and are separated. Their formation is sometimes due to natural processes as opposed to human involvement in a reduction sequence.

In order to clarify some of the terms and subjects covered in this thesis I have included a short list of definitions related to the study of lithic technology. Some of these definitions are taken from previous research and they are noted as such. Other unnoted definitions are my own.



*Biface.* Andrefsky (1998) defines a biface as a tool with two surfaces (faces) that meet to form a single edge all the way around the object. I agree with the part of the definition demarcating the two faces forming a single edge, but I do not assume it is already a tool. I assume that it may also be on its way to becoming a tool in the reduction sequence.

*Bifacial Tool.* As stated above, I do not categorize all bifaces as tools. In order to classify a biface as a tool, edge damage or use wear has to be present. The main criterion of this category, however, is that it is a bifacial tool when it has edge wear or use damage that cannot be classified as anything else. This, of course, has an exception in regard to projectile points. They may not have any use wear or edge damage, but morphology will usually indicate its function such as a hafting element.

*Broken Flake.* A flake that has been broken and is missing any of the characteristics described below, including lateral sides.

*Complete Flake.* A detached piece of rock that exhibits characteristics including a platform, platform facets, dorsal and ventral sides, proximal and distal ends.

*Core.* An objective piece that exhibits flake or blade removals.

*Core Tool.* This is “a core used for chopping, cutting, or some activity other than as a source of detached pieces/flakes” (Andrefsky 1998:xxii). I would add for clarity that core tools were once cores used for the removal of useful flakes.

*Cortex.* The outer rind or crust of a chert. This is what is exposed to the elements. Following Odell (1987:195), cortex is defined as “any surface which does not exhibit a break or a previous removal...[this includes] the chalky crust; the shiny...rind; and the somewhat angular surface that shows features of having existed on the outside of a nodule after its initial fracture.”

*Distal End.* The opposite of the proximal end, which indicates the termination of the path of the flake.

*Dorsal Scar* Evidence of a previously removed flake on the dorsal side of a flake. The more dorsal scars present on a flake, the further along in the reduction sequence it is.

*Dorsal Side.* The “back” of the flake that shows flake scars from previous removals of cortex. This is the side of the flake that was exposed during earlier reduction efforts and shows signs of that earlier reduction.

*Expanding Base Drill.* These artifacts exhibit a “long, narrow, rod-like form with straight sides and a straight, pointed, or rounded proximal end” (Skrivan and King 1983:151). The base expands off the shaft with shoulders without a hafted element.

*Expedient Tool.* These are “stone tools made with little or no production effort” (Andrefsky 1998:xxiii). Essentially it is a flake or piece of shatter recognized as appropriate for a certain task and used with little or no modification. cursory examination of the piece usually reveals some sort of edge damage indicating use.

*Flake Tool.* Classified as an expedient tool, this is an example of a flake that has not been modified for a specific use but which shows signs of use wear or damage from use.

*Flake Blank.* A large objective piece that would have been removed for potential further reduction to a tool.

*Formal Tool.* These are “stone tools made as a result of extra effort in their production” (Andrefsky 1998:xxiii). This extra effort takes the form of continued reduction of the piece, whether it is simply several flakes removed from an edge to make it sharper, or complete reduction of a piece into a distinguishable tool such as a drill.

*Graver.* These are flake tools with short, sharp triangular projections used for incising or engraving.

*Hoe Chip.* A flake or piece of debitage removed from a hoe distinguished by polished appearance of the dorsal side.

*Microdrill.* Microdrills are small retouched flakes, or bifacially reduced flakes, that resemble an expanding base drill. Unlike expanding base drills they usually do not have shoulders. One diagnostic that was noticed under cursory microscope examination use was damage (flake removal) at the drill tip that resembled “twisting.”

*Objective Piece.* This is the rock or artifact being modified by the removal of detached pieces. Objective pieces may be cores that are used solely as sources of raw material or they may be tools such as bifaces or flake tools” (Andrefsky 1998:xxv).

*Perforator.* According to Skrivan and King (1983:155), “this tool normally has bifacially finely retouched, short tapering triangular projections with a thinner or flatter cross section on the bit.” It is assumed to be used for poking, or as the name implies, perforating some material to make holes. In the Fitts site assemblage, perforators tended to resemble “haftless” microdrills without the retouched or “twisting” wear damage to the distal ends, and had much sharper tips.

*Platform.* The area of a core that was struck to remove a flake. It also denotes the area of the flake that was hit to remove it from the objective piece. Depending on the type or condition of the platform, reduction sequences can be inferred. For example, a cortical platform (platform with cortex) on a flake would indicate that it was one of the first flakes removed from an objective piece. As the objective piece is further reduced the platforms will change accordingly. A flat platform (with no cortex) shows that it was at least not the first removed. Complex (many facets) platforms show middle to late stage reduction.

*Platform Facets.* Areas on the platform of a flake that can be counted to show how many previous flakes removals have occurred.

*Preform I.* This is the first stage in bifacial reduction, usually thick, cortical, and either triangular or ovoid in shape amounting to an “edging” of the piece only. The edge is usually “wavy” from the large size of the flake removals and the bulbs of percussion of those flakes. This is usually attributed to hard-hammer percussion. It is without either shaping or thinning.

*Preform II.* A later stage in bifacial reduction with less cortical cover, a more regular symmetrical shape, and more flake removals along the edge, resembling some sort of tool.

*Projectile Point.* Considered a bifacial tool, a projectile point is a hafted, sharpened point that is used to throw or shoot through the air for hunting or as a weapon. These are more commonly known as darts.

*Proximal End.* This is the end of a flake that contains the platform and its facets. It is the end of the flake that was struck to remove it from the objective piece.

*Ramey Knife.* A large bifacially reduced tool specific to the American Bottom. It resembles a large projectile point, but without a hafting element.

*Retouched Flake.* This is a flake that has been intentionally modified for a specific use or set of uses. This involves smaller flakes being removed from the flake showing intent to alter the flake, if even at a low-level.

*Scraper.* This is “a generalized term used to describe a flake tool that has a retouched edge angle of approximately 60 to 90 degrees” (Andrefsky 1998:xxvi).

*Shaft Drill.* A shaft drill is a lanceolate object which has either no hafting element or, a minimal hafting element. Unlike an expanding base drill or most microdrills, it has nearly the same width dimensions from base to point (Futato 1983b).

*Shatter.* Shatter is sometimes called “blocky chunks” or “angular shatter.” It is a detached piece of stone that does not exhibit any of the characteristics of a flake. There are no discernable dorsal or ventral sides, and no platform. In essence, it is something removed by accident. Any assemblage will have shatter. No matter how skilled the knapper, some material will be unintentionally removed from the objective piece for no reason other than sheer force of impact.

*Unidentified Retouched Shatter.* This category is for those tools that are not flakes or any other identifiable piece that have been altered in some way for some intentional purpose. They are not expedient tools because they exhibit evidence that flakes were intentionally removed from them for some purpose. They are unidentified due to the fact they could not be placed into a specific tool category.

*Uniface.* This is “a flake tool modified on either the dorsal or ventral side only” (Andrefsky 1998:xxvii).

*Ventral Side.* The “front” of a flake that does not include previous flakes scars. It is basically the “inside” of the flake that was not exposed until removal.

## CHAPTER 4

### RAW MATERIAL: ORIGINS, PROPERTIES AND DESCRIPTIONS

The majority of raw materials used in chipped-stone tool technologies are a form of rock called microcrystalline or cryptocrystalline quartz. Silica, or silicon dioxide (quartz), is the main component of materials that are fine-grained enough to be used in flintknapping. There is still a debate as to whether these materials are formed by silica-secreting oceanic organisms called diatoms, or by volcanic sediments. According to Luedtke (1992:18), “unlike sedimentary rocks such as sandstone, which form by the accumulation of rock fragments, chert is a chemical sediment; that is, silica must go into solution in water and then be precipitated out again for chert to form.” Silica-secreting organisms have siliceous, or opal skeletons, which decompose after death and settle at the ocean floor and become buried in sediment. As more and more silica and sediment builds up, chemical changes occur in the mineral opal (opal-A changed to opal-CT) to transform it into microcrystalline quartz (Boggs 1995).

In any event, silica is the “binding” mineral within cryptocrystalline quartz that gives it its fine-grained, hard and brittle qualities needed for effective tool making. Most names of materials differ by region based on color, grain, and tractability, but they are all basically chemically similar. Chert, the dominant term used in this study, is the same as jasper, flint, agate, and a host of others. Chalcedony is actually slightly different because of its fibrous structural composition, but all are chemically identical (Andrefsky 1998).

Only the slight mineral changes and “impurities” give them their distinctive traits that distinguish them using macroscopic methods, even in reference to two similar materials from different sources.

There are different types of quartzes and quartzites (a metamorphic rock), with variations deriving from how the rocks were formed. Of the two types of quartzites, metaquartzites and orthoquartzites, orthoquartzites and fine-grained metaquartzites are the ones most suitable for stone tools. Both types originate from sandstone, but orthoquartzites are made up of individual sandstone particles cemented together as opposed to metaquartzites, which involve large quartz particles that have been metamorphosed (Andrefsky 1998:56).

Heat treatment or thermal alteration can improve the flaking qualities of some cherts and materials. Burying the material under a layer of sand or soil to shield it from direct flame and starting a fire over it prehistorically accomplished this. Different materials react differently to varying degrees of heat and the time needed to heat them. There are many changes that occur in chert as a result of being heated. Geochemically, water evaporates from the material, and then impurities, such as fossils, vugs (quartz inclusions), and other inclusions are altered or removed, most commonly through oxidation. As a result, some heated material tends to appear “burned out” in appearance (Luedtke 1992). Mechanically, the fracture planes of cherts are altered so that fractures will pass through grains instead of fracturing around them, resulting in more predictable flaking. The cause of this alteration of fracture planes is not yet completely understood, but two theoretical models exist: (a) the silica fusion model, whereby silica or quartz microcrystals present in a material move around in the heat, and once cooling takes place



are more closely organized and connected to form improved fracture planes, and (b) the “crack” model, whereby “heating increases the number of microflaws in cherts and/or distributes them more evenly” (Luettke 1992:96). The results are better control when flaking.

According to Ensor (1981:19) the goals and effects of intentionally heat-treating cherts resulted in “(1) providing an easy method of reducing cobbles; (2) reducing the tensile strength to make secondary reduction easier; (3) producing sharper edges on flakes, and (4) eliminating internal flaws.” This process is especially evident in materials of poor quality like Tuscaloosa Gravel. While this procedure eases the process of reducing the material, its tendency to make material more brittle can be a detriment to certain tools. Tractability is improved, but heat-treating materials will cause a tool to lose its working edge more rapidly than non-heated cherts. As stated by Lafferty and Solis (1980:258), “It seems logical that tools which need fine controlled flaking applied to them would most likely be heated, while (crude) heavy duty tools, such as choppers, would tend to remain unheated.” Heat treatment is recognized macroscopically through the known changes in color, grain, and luster of a material. In many cases, I used the comparative collections, and the conclusions of Van King and Eugene Futato, to assist me in the identification of different heated materials.

Herein, the descriptions of raw materials are primarily derived from the analyses of previous researchers and from a macroscopic comparative collection assembled by Van King and myself. Mr. King is a local expert flintknapper and has collected many chert material types from their primary and secondary sources. In addition, the comparative collection and the expertise of Eugene Futato at the University of Alabama,

Office of Archaeological Research in Moundville, Alabama were utilized for identification of some of the non-local cherts, especially those recovered from the Mound Q context. My descriptions include the geographic origins, color, luster, grain, tractability, and where possible, the effects of heat treatment on the raw materials. Since Mound Q and the Fitts Site (1Tu876) are within four river kilometers of each other and both are located in the same geographic area of the Black Warrior River Valley, the materials identified as “local” and “non-local” are the same for each site. The terms “local” and “non-local” are simply defined here as what material resources are available, and what material resources are not available within the Black Warrior Valley. The materials identified and described here may have additional variations (i.e., colors, fossils, etc.), but this section will be limited to those materials that have been found and identified within the sample context.

Raw materials are classified based on combination of characteristics and qualities. Even separate types of cherts can have similar distinctive traits. Conversely, variations of the same chert from the same outcrop can have dramatically different qualities. When relying on macroscopic analysis and classification of materials, researchers must combine a number of characteristics to make identifications. Color, grain texture, luster, translucency, tractability, and to some extent the effects of heat treatment are all used in conjunction to determine the type of raw material in hand. In some cases this can be difficult, and a large and varied comparative collection along with written descriptions are needed.

Color simply pertains to the colors present within the chert and how they may change throughout the rock. This usually involves differing shades and variations of

color, their mixtures (i.e., pinkish-blue), bands, and mottles. Banding occurs when two colors occur next to each other without mixing. Mottling describes the presence of one or more colors within another color. Mottled colors, unlike bands, have no structure or pattern, resulting in an unpatterned blending of color. In many cases of heat treatment, colors are the most altered macroscopic quality of the chert. This will be dealt with in the individual cases to follow.

Grain is the texture of the material and how it feels to the touch. A very granular chert is coarse or sugary. Fine grained cherts are smooth, almost glass-like. The grain size of the material is sometimes related to the quality of cherts. Fine grained cherts are usually high quality, easily workable materials, while more granular, lower quality cherts with a very coarse feel are too brittle and have a tendency to break unpredictably.

Luster describes the “glossiness” of the material. This feature is again related to the grain of cherts. The higher the luster of cherts, the finer the grain will be. Also altered by heat treatment luster changes along with color. Depending on the material involved heat treatment could produce a higher luster material to become dull or visa versa.

Translucency refers to the ability of light to pass through the material. Translucency does not imply quality, but it is an important diagnostic, notable between certain types of cherts that otherwise are very similar. Ft. Payne and Bangor cherts can sometimes be easily confused with one another, but may be distinguished by the presence or absence of translucency. Bangor is translucent while Ft. Payne is not. This is not an infallible diagnostic in distinguishing different cherts from each other and should only be taken into consideration along with other qualities, but it is still an important diagnostic.

Tractability is the flaking quality of the material in question. In certain cases this can only be assessed if the researcher has prior knowledge of material types and experience in lithic analysis. In some ways tractability is determined by the previous traits. If a chert is fine grained, has a high luster, and is translucent, then there is a high probability that the material is good for removing flakes or reducing into a tool. Although this trait is subjective due to its high variability among different raw materials and even within the same material category, it is included to give an idea of “usefulness” or “quality” of certain materials.

Heat Treatment, or thermal alteration, as stated above occurs when a material is heated, whether intentionally or accidentally. When it is intentionally heated it can improve the tractability of the chert. This may or may not be evident in changes in color and/or luster.

#### *Local Materials*

*Tuscaloosa Gravel.* Tuscaloosa Gravel (sometimes identified as Red Jasper or Yellow Jasper) is part of the Tuscaloosa formation. As it washed down river and creek systems in the form of pebbles and cobbles, it spread across much of the western portion of the state of Alabama. Its easy procurement from the Black Warrior River and its tributaries make it a local resource. Although Tuscaloosa Gravel is labeled a local resource, it does occur outside of the Black Warrior Valley, washing down the Black Warrior River from the north. Therefore there are areas where it can be procured that are considered non-local. It was included in the “local” category due to the fact that is very abundant at sites in the Moundville chiefdom and easily procured locally. The color of the gravels is typically white, yellow, brownish yellow, tan, yellow tan and red (Skrivan

and King 1983:99). The red color occurs naturally due to high iron content, but this is also commonly associated with the heat treatment of the chert. Heat treated Tuscaloosa Gravel usually has a coarse grain. There are few or no inclusions or mottling in Tuscaloosa Gravel. When heated, the material takes on colors ranging from dark yellow to orange to red. Whether heated or not, there is little or no banding or mottling in the chert. The tractability or flaking quality of Tuscaloosa Gravel “ranges from poor in coarse grained samples to good in fine grained samples” (Skrivan and King 1983:99). The act of heat treatment increases its tractability significantly in most examples, together with giving it a higher luster than untreated samples. Its grain or texture ranges from a coarse, “sugary” surface in lower quality specimens to a fine, smooth surface in higher quality or heat-treated specimens.

*Camden.* Camden cherts form a larger portion of the Tuscaloosa formation than Tuscaloosa Gravel, and often resemble the latter. Like Tuscaloosa Gravel they are found in local riverbeds and streams. The colors are similar with a range of white, yellow, olive-yellow, tan, light gray, and gray-blue (Skrivan and King 1983:98). The differences between them are due to inclusions and the predominance of color mottling in Camden. Although Camden and Tuscaloosa Gravel cherts are very similar and originate in the same formation, they were distinguished to allow for a possible comparison in usage between the two at each site. The inclusions are usually vugs or quartz that occurs in patches or streaks within the chert. These inclusions lower its tractability because of their tendency to cause unwanted and/or unpredictable fractures during reduction. Heated Camden resembles heated Tuscaloosa Gravel, with the mottling that was present in unheated samples made more obvious. The colors of heated Camden range from white,

pinkish-white to pink, orange, dark gray, gray-pinkish-red, or brilliant orange-red mixed throughout the material (Skrivan and King 1983:98). The tractability of heated Camden is increased as the vugs, inclusions, and mottling no longer cause severe breakage during reduction. The grain of Camden is very similar to Tuscaloosa Gravel except that it tends to be finer in most circumstances and is improved even more with heat treatment.

It should be noted that in smaller material specimens it is difficult to distinguish between Tuscaloosa Gravel and Camden cherts. Their general similarities in color, luster, and tractability contribute to the difficulty in separating them. As stated above, the appearance of vugs or quartz inclusions and/or color mottling is one of the best diagnostics between the two, especially in heated samples. This proves difficult to recognize with small pieces of flakes or shatter, which may not include either diagnostic. When this vagary occurred, the material was assigned to the “unknown local material #2” category described below.

*Unknown Local Material #1.* This material is similar in appearance to both of the Tuscaloosa formation materials: Tuscaloosa Gravel and Camden, but has slightly different qualities. The colors exhibited are similar, ranging from light beige to tan, gray, brown, and light orange. It has both banding and mottling. The material is translucent in most instances except in the case of cream-colored areas that remain opaque and small areas with quartz-like inclusions. Very little of this material was heat treated at the Fitts site, but it does take on the characteristics of heated materials from the Tuscaloosa formation. It should be noted that it is difficult to specifically state whether or not this materials was from that formation or not. Heated samples are very brilliant red with even finer grain and high luster while seemingly producing better flakes.

At first I believed this material to be some type of agate because of its “cloudy” translucent appearance and smooth grain, but further investigation suggested it may actually be a very fine quartzite of some kind (Eugene Futato, personal communication)

*Unknown Local Material #2.* This category is simply a “catch-all” for materials that exhibit characteristics of both Tuscaloosa Gravel and Camden, but are different in appearance than unidentified material #1, in that the latter is usually very translucent as opposed to unknown local material #2 which is not. It cannot be distinguished further because of the small size of the debitage, or simply because of the inherent similarities in materials from the same formation.

*Quartzite.* Quartzite is usually found as pebbles or larger cobbles in the Tuscaloosa formation. It has exceptionally poor tractability. According to Skrivan and King (1983:100), “Local quartzite is a very hard, clear white, yellow, rose, or grayish black highly cemented and metamorphosed coarse grained silica material which exhibits a medium to high luster on a fresh break.” In the case of this sample context, it was not normally found in flake form and was probably more often used for hammerstones and hearth rock.

*Quartz.* Although occurring in other parts of the state, for this study area quartz can be traced primarily to the Tuscaloosa formation in northwestern Alabama in the form of pebbles and cobbles in stream and riverbeds. A few flakes and other debitage having distinctive characteristics can be traced to southern Talladega County in the Piedmont of eastern Alabama. According to Skrivan and King (1983:100), “Quartz is a clear to white or yellow crystalline material that has a high luster on a freshly broken surface.”

### *Non-local Materials*

There is great variability in the Ft. Payne and Bangor cherts. Here I have the Ft. Payne and Bangor cherts divided by their most common characteristics into variations that are found in the study area. As stated above, there are many more variations found in other parts of the Southeast, but for our purposes of identifying what was found in the sample context it is unnecessary to review them all.

Ft. Payne cherts derive from the Lower Mississippian formation, which sporadically outcrops in the Middle South from the coastal plains of the Carolinas through northwestern Georgia, Tennessee, Kentucky, northern Alabama, northeastern Mississippi, and even into southern Illinois. The principal sources of this material for the Moundville chiefdom are the primary and secondary outcrops in northern Alabama, southern Tennessee, and northeastern Mississippi along the Tennessee Valley (Johnson 1985; Johnson and Meeks 1994; Lafferty and Solis 1980). Either the characteristics of the material or the areas of their known origin identify the varieties of these cherts. Those materials with varieties in parenthesis are known to come from a general area such as a county or town.

*Blue-Gray Ft. Payne.* Blue-Gray Ft. Payne chert outcrops north of the Bear Creek watershed in the Tennessee Valley of northern Alabama, with surface exposure on the north side of the Tennessee River close to Wilson Dam, in the upper portion of the Flint River drainage, as well as near Mussel Shoals and Colbert Shoals (Johnson 1985; Johnson and Meeks 1994). Its main color scheme includes an opaque gray or gray-blue to black. The gray colors exhibit a low to medium luster while the light blue to dark blue mottles have a high luster and may also be translucent. Often the chert includes a small



quantity of fossils or fossilized material as specks of white to gray without exhibiting the same characteristics as Fossiliferous Ft. Payne. The grain is usually of a medium texture while the mottles are finer than the surrounding material. Blue-Gray Ft. Payne naturally has a workable tractability and appears not to be greatly altered in color, grain or tractability by heat treatment (Lafferty and Solis 1980).

*Ft. Payne (Florence County, Alabama).* As the name implies, this variety of Ft. Payne chert originates in Florence County, Alabama. The colors range from dark gray to black with light blue semi-translucent mottling. Also present, unlike blue-gray Ft. Payne, is a darker, non-translucent mottling that resembles spots. These appear to be contained within slightly larger light blue spots. This variant of Ft. Payne may resemble blue-gray Bangor, as it is also fine grained with a high luster and seems to be of a decent quality and tractability. This resulting classification is based on specimens in a comparative collection at the University of Alabama, Office of Archaeological Research.

*Ft. Payne Dover.* This Ft. Payne material originates near the Waverly/Nashville, Tennessee area. It has a light gray to light beige-tan color with dark gray and light gray “streaking” or “banded” mottling, which resembles tiger stripes. The quality of the material can be deduced by the contrast of the color. Darker variations of the material have a higher tractability, with the nearly black Ft. Payne Dover having excellent tractability that does not need enhancement by heat alteration. It has a very coarse granular surface with a sugary texture for a high quality material. As with Ft. Payne (Florence County), the resulting classification is based on a variety of materials in a comparative collection at the University of Alabama, Office of Archaeological Research and in consultation with Van King.

*Ft. Payne (Jefferson County, Alabama).* Ft. Payne (Jefferson County) is found in the upper Black Warrior River region in the Birmingham, Alabama area. It was most likely washed downstream from northern Alabama where the Ft. Payne formation is located. By the time it reached Jefferson County it was severely weathered and can only be found in small pebbles. The color scheme of this chert is a mottled light brown and white, with beige being the dominant color. The surface of the material is surprisingly fine textured for the amount of weathering the material must have undergone. Its luster is dull, perhaps due to the heat treatment that was necessary because of its remarkably poor tractability (Van King, personal communication 2003). This material is distinguished from Tuscaloosa Gravel and Camden by the lighter coloring, smoother grain, and mottling.

*Ft. Payne (Tupelo, Mississippi).* This variation of Ft. Payne occurs in northeastern Mississippi in the area surrounding Tupelo. It has a light beige to light tan color scheme with a “cream” appearance. Slight gray mottling is interspersed throughout the tan area. It even appears to have some banding, which is unusual for Ft. Payne, but the form and sizes of the specimens (one expended/broken core and one bifacial tool) of this material in the sample make it difficult to be certain. It has a dull, but present luster. This is possible evidence of heat treatment. Again, as with the Ft. Payne (Jefferson County, Alabama) chert, this material has a fine texture even though it is a poor quality chert. This material (among others) is sometimes called “other” Ft. Payne cherts, because it is part of a larger group of Ft. Payne that originates in the Yellow Creek area of northeastern Mississippi (Johnson 1980; Van King; personal communication 2003).

*Fossiliferous Ft. Payne.* Fossiliferous Ft. Payne chert is accessible in the vicinity of Yellow Creek in northeast Mississippi and some parts of northwestern Alabama. It ranges in color from light gray to blue-gray, white, tan, cream-colored or brown. As the name implies, the chert is identified by the fossils that are present in the material. Most fossils present within the chert are of the crinoid variety, although brachiopods, *Spirifer logani* and *Spirifer crawfordsvillensis*, can also be present (Skrivan and King 1983). The grain and tractability are largely determined by the size and extent of the fossils present in the chert. For the most part tractability ranges from fair to good, but only when the material is heated and it takes on a glossy appearance (Skrivan and King 1983, Van King: pers. comm. 2003). The color and grain usually coincide with fossil size. Darker varieties have smaller sized fossils and fine textures, while lighter shades exhibit larger fossils with coarser grains.

*Bangor.* The Bangor formation is located in north Alabama near the Tennessee River. Specifically, the blue-gray or blue-green Bangor cherts are located in the middle portion of the Tennessee Valley in Alabama (Futato 1983b:156). The colors present are light blues and greens with varying levels of gray slightly altering the shades of each color. Bangor is distinctive because of its banded appearance, colors, and translucency. The material closest to the cortex is sometimes white to tan. It often shows a band of red near the cortex before showing signs of its predominant color pattern. Another characteristic of Bangor chert is that it tends to be translucent as opposed to the tendency of Ft. Payne to be opaque. Also, unlike Ft. Payne, mottling is rarely present. Bangor's tractability is usually excellent. Heat treatment does not seem to have been frequently practiced on this chert type. When it is heated, however, the heating usually is not

uniform throughout the cobble or objective piece, resulting in an inconsistent red band. Because of its high luster and fine-grained texture, it is very difficult to tell whether or not heat treatment took place. Some researchers lament the fact that this variety of Bangor and higher quality specimens of blue-gray Ft. Payne are so similar (Ensor 1981). As it can be very difficult to tell the difference between the two, the best solution was to have extensive comparative collections on hand together with their written descriptions.

*Knox.* Although there are many different varieties of Knox chert, the one that seems to have been in primary use by the indigenous flintknappers in Alabama is from the Knox formation in eastern Coosa Valley (Little et. al.1997:10). The materials probable source was the Tallapoosa River in Alabama (Van King; personal communication 2003). Knox cherts can sometimes be very difficult to identify. The range of color schemes, luster, texture, and tractability varies widely from outcrop to outcrop. “Red Knox” is comparable in color to a higher quality heated Tuscaloosa Gravel, but its texture is finer, its luster higher and it includes quartz inclusions, sometimes as a band throughout the chert. A “Black/Gray Knox” is dark gray to black in color with translucent gray mottling. There is also a Black Gray Knox that is non-translucent with a mottling of the two colors. This form of Knox can be likened to Black Bangor but lacks the translucency, and can be both mottled and banded (unlike Bangor). Tractability is fair to good, provided that the inclusions do not engage a fracture plane. These descriptions are based on comparative collection provided by Van King. Even more varieties exist, but as they do not occur in the study sample contexts, they are not included here.

*Pickwick.* Pickwick cherts originate in the Ft. Payne formation in northern Alabama in the vicinity of the Pickwick Dam and Savannah, Tennessee (Futato 1983a:120). They can, however, also be found in the Tuscaloosa formation as secondary deposits in smaller, more rounded cobbles. The distinctive colors in the banding of Pickwick includes, “from cortex to cobble center...1) blue black to dark gray or gray, 2) yellow tan to yellow or whitish yellow, and 3) pink red or red to brick red” with a dull luster (Skrivan and King 1983:99). Their tractability is variable from poor to good. The texture is usually of a medium coarseness. No information is available on the qualities of heat treated Pickwick chert.

*Mill Creek.* Mill Creek chert is found in the Ullin limestone formation in southern Illinois near the town of Mill Creek. The color of the chert has a range of white, grayish-white, gray, grayish-brown, yellow, grayish-orange, reddish-brown, orangish-white, pale blue or black and includes some banding concentric to the surface of the nodules (Billings 1984:21-22). The texture is very coarse, grainy, and rough, especially when fossiliferous. Mill Creek chert is well known as the primary raw material for Mississippian hoes. There are two main reasons for this. The chert can be found as large cobbles or lenticular shapes, which with minimal edge trimming and cortical removal, easily serve as a preform or biface of substantial size. In addition, due to its composition, it is physically durable for tasks that would destroy most other cherts (Cobb 2000:52).

#### *Other Materials of Unknown Origin*

*Chalcedony.* Only one small broken flake of an unknown type of chalcedony was found at the Fitts site. It has a cloudy white to beige tint and is semi-translucent. It could be derived from the Bangor formation, but more likely it is a variant of some material

sometimes found in the Tuscaloosa group (Eugene Futato: personal communication).

Due to the apparent high quality of this material, the tractability seems to be good, although this assessment is intuitive because of the small sample.

*Unidentifiable Materials.* This category was included for those materials that do not conform to any known or readily identifiable material. For many of the cases this was due to extensive burning from either heat treatment or natural processes. These specimens cannot be classified as either local or non-local.

## **CHAPTER 5:**

### **PROJECT DESIGN AND METHODOLOGY**

In order to examine the activities at Mound Q at Moundville and the Fitts Site, there were three goals in this research project: (a) compare the differences or similarities in local versus non-local lithic raw material usage, local vs. non-local; (b) determine in what form lithics entered each site; and (c) compare tool usage at the two sites.

To categorize the raw material types and sources of the artifact assemblages from both sites, a comparative collection was assembled with the help of Van King. Mr. King is a local flintknapper and expert in Alabama's chert materials from his collecting of materials at primary and secondary sources for use in knapping. Mr. Eugene Futato also made accessible the comparative collection from the Office of Archaeological Research at the University of Alabama, and assisted in the identification of raw materials, especially with respect to the non-local materials from Mound Q. The comparative collections were essential in understanding the wide variability of the materials under study. Most of the raw material samples contained within the comparative collection conformed to the "classic" characteristics of that chert, but there were a number that did not. The comparative collections provided by Van King and Eugene Futato possessed these "classic" cherts and a wide array of variations that can occur within a specific formation.

Chipped stone tools and flake debris were assigned to a category by macroscopic analysis using characteristics such as color, texture, inclusions, luster, translucency, changes from heat alteration, and tractability observed on materials from the comparative collections, and the material's descriptions in written reports (Billings 1984; Cobb 2000; Futato 1983a; Futato 1983b; Johnson 1985; Johnson and Meeks 1994; Lafferty and Solis 1980; Little et. al. 1997; Skrivan and King 1983).

Certain unidentifiable categories were created for materials that could not be otherwise typed, due to overlap in defining characteristics, and due to the small size of the artifacts which made the macroscopic identification of defining characteristics difficult (<1/4" screen and >1/4"-<1/2" screen). Two categories were created for unidentifiable local materials. The first category was for material that could have been classified as either Tuscaloosa Gravel or Camden chert. Both of these materials originate from the same source, the Tuscaloosa formation, and have very similar characteristics. The second unidentified local material category was for chipped stone tools and flake debris of a chert that resembled local materials, but was still different from either Tuscaloosa Gravel or Camden chert. There were only a few instances where no identification could be made, and so the unknown/unidentified categories were created to accommodate these. I determined it was better to create multiple unidentified categories even if unidentified materials held some similar characteristics to known materials, than to assume they were actually of the same origin and, thus, biasing the data. The "unknown non-local" category was for materials that have no similarities to local materials and have characteristics closest to materials found in the Ft. Payne or Bangor formations. The final unidentifiable category was simply for materials that could not be



identified from the comparative collection or from written reports. All of the unknown or unidentifiable categories were created when no consensus could be reached after consultation with Van King and Eugene Futato.

Tool types were identified through the use of written descriptions (Andrefsky 1998; Skrivan and King 1983) and a small comparative collection of tools previously identified from Mound Q. Since the majority of this project involved macroscopic analysis, the tool classifications involved morphological identification and not functional identification.

In addition to the classification of raw material types and tool types, this study also asks the question. At what stage in the reduction sequence was the lithic raw material brought into a site, and was it further worked? Following Bradbury and Carr (1995) and Carr and Koldehoff (1994), this study uses multiple lines of evidence, employing aspects of both individual flake analysis and mass analysis to bolster the information available from the assemblages. Combining the two approaches can reinforce conclusions made about an assemblage or assemblages. Using platform and dorsal characteristics from individual flake analysis to determine early versus late stage reduction can be verified using the information available from cortical percentages and size grades.

Previous analyses of lithic assemblages have used a multitude of methods and classifications to determine the technological composition of a flake debris assemblage. The most conventional of these classifications is individual flake analysis. The Primary/Secondary/Tertiary typology (PST) has been the most commonly used method of determining stages for individual flake debris. In it, each complete flake is individually

analyzed and the data recorded (Magne 1985; White 1963). Simply stated, individual flake analysis uses the logical premise that “progressively decreasing amounts of cortex distinguish the three flake categories, with primary flakes having the greatest and tertiary flakes the least” (Sullivan and Rozen 1985:756). For this study, the terms primary, secondary, and tertiary are replaced by early stage, middle stage and late stage. Primary reduction flakes have a dorsal side that is nearly completely covered in cortex. They are thought to originate in the initial stage of reduction of an objective piece. Secondary reduction flakes are only partially covered with cortex on their dorsal side. Tertiary reduction flakes are devoid or almost devoid of cortex and, depending on the definitions used, pertain to core reduction or tool reduction.

The amount of cortex present on a flake is thus the determining factor governing the category to which a flake will be assigned. The amount of cortex present on the dorsal surface of a flake can be recorded in many different ways. Some studies have used interval percentages of 100%, 99%-50%, 49%-1%, and 0% to record the different amounts of cortex present on the dorsal side of a flake. My study simplified this procedure by only recording the presence or absence of cortex (Ahler 1989a; Shott 1994). This is an attempt to remove bias or inaccuracies from observer error and the “close-calls” of the interval method where, for example, it can be difficult to distinguish between 49% and 51%. The determination of percentages method of individual flake analysis is tedious and time consuming, but can produce a large amount of useable data. Some researchers have suggested that, in any event, cortex is not the best indicator for discriminating reduction stages because of either inter-observer error or because cortex can and will be present at any stage in the reduction sequence.

Bradbury and Carr (1995) note that the recording of cortex coverage and its definitions are unstandardized, that it may only be useful for complete flakes, and that several modes of reduction can produce similar results.

Sullivan and Rozen (1985) criticize the use of reduction stages because they see the reduction sequence as a continuum. They state that many factors result in the amount of cortex present on a flake and that there is no true relationship between primary, secondary and tertiary stages. Therefore, it would be erroneous “to use it exclusively to describe prehistoric technology” (Sullivan and Rozen 1985:756). Although this critique may be justified, their problems with the PST, or any stage typology, are focused on the differences between core and tool reduction. This study, in contrast, does not intend to show whether or not core reduction or biface reduction was the primary activity taking place at these sites. It merely intends to determine at what stage the material was initially being reduced at each site. Another critique of individual flake typologies by Sullivan and Rozen is that the subjective standards that have been used to assign flakes and debitage not only cause errors in the analysis, but inter-study comparisons cannot be undertaken. They propose that an “interpretation free” dichotomous hierarchical key be used to increase objectivity and reliability (Sullivan and Rozen 1985:758). This key was used in this study to quickly assign lithic debitage to categories: debris (in this study called shatter), flake fragment and broken flake (incomplete flakes), and complete flakes. Since both flake fragments and broken flakes can not accurately be measured for cortical coverage and platform characteristics, they were combined into “incomplete flakes” for simplicity.

In an effort to bolster the information gained using the above methods, other attributes were recorded for complete flakes. Following Magne (1985), Carr and Koldehoff (1994:53) used dorsal flake scars as a measure of reduction stage for flakes lacking an intact platform. The present study only used complete flakes with intact platforms for individual flake analysis, but the same methods can be used here. Dorsal scars were counted on the flake as: 0-1 scars = early stage, 2 scars = middle stage, and 3 or more scars = late stage. Platform configuration can also be utilized to determine the reduction stage in which the flake was removed from the objective piece (Odell 1989:176). Platform configuration describes the type of platform present on a flake, whether it is cortical, flat, complex, or abraded. Primary stages will have little or no evidence of prior strikes and preparation while later stages have multiple facets (3 or more) or platform preparation in the form of grinding or abrading. The facets were counted on the platform as: 0-1 facets = early stage, 2 facets = middle stage, 3 or more facets = late stage (Carr and Koldehoff 1994:53).

The other method of flake analysis employed here is aggregate analysis or mass analysis. According to Ahler (1989a:87), "In flake aggregate analysis, attention shifts from the individual object to observations on a batch or some subset of the complete batch of debris from a single context." This is achieved by sifting the lithic material through a series of screens or sieves that become progressively smaller, much like the reduction sequence itself. The advantage of mass analysis to individual flake analysis is its relative ease of data collection using large quantities of debitage, in addition to its ability to observe the patterns in these large assemblages (Ahler 1989a, 1989b). Once the different raw material's debitage has been size graded, it is weighed and counted for each

size grade, as well as the number of cortical flakes counted. Size grades are compared and contrasted by count and by the presence or absence of cortex on all flakes, complete and broken, in relation to other size grades (Ahler 1989b:203). Mass analysis has many other uses: determining biface versus core reduction, percussion versus pressure flaking, and so forth. This study however, only intends to compare the distribution of reduction stages by site. Larger flakes (by size and weight) will have a higher occurrence of cortex on their dorsal side than smaller, more numerous, less cortical flakes. If a cobble of chert was brought into a site and reduced in situ, then we would expect large cortical flakes to be recovered. As the process continues, smaller more numerous flakes would be removed and these would possess less and less cortex. If a non-local material was acquired somewhere outside of the normal local setting, then, most likely, it was partially or fully reduced prior to entering the local context. Fewer large flakes containing cortex in an assemblage would represent late stage reduction in a secondary setting. In mass analysis, emphasis is on the group or assemblage, not individual flake attributes or variables.

In the study completed here, four home-made, nested, wire-mesh screens were used. Each were square screens with openings in the mesh at  $\frac{1}{4}$ ",  $\frac{1}{2}$ ",  $\frac{3}{4}$ ", and 1". The fifth "screen size" consisted of all materials that passed through the  $\frac{1}{4}$ " screen. These were recorded as size grade 1 through 5 from smallest to largest ( $1 = < \frac{1}{4}$ " and  $5 = > 1$ "). These screen sizes were chosen for their similarity to field recovery techniques, where  $\frac{1}{4}$ " screen is used, as well as the simplicity of quarter-inch intervals. The high-end cutoff point of 1" was used due to the fact that most material appeared to be much smaller than this size before the analysis began. Other researchers have also found larger screen sizes

to be both ineffective and inefficient (Ahler 1989a; Stahle and Dunn 1984). The lithic materials were both shaken and hand manipulated through the screens to ensure that all material that could pass through did. Hand manipulation is necessary for debitage that is much longer than it is wide. The debitage may not pass through a screen from one particular angle, but will from another. This is not to say that any material was “forced” through the screens. Any debitage that gave the slightest amount of resistance when attempting to pass it through a screen was left in the larger screen. Aside from skewing the data and possibly damaging the screens, such action could have damaged the debitage and created false tool-use wear thus corrupting promising future analyses.

After the assemblages were size graded, the raw materials identified, and the tools/cores removed, each category was further separated by the presence/absence of cortex, and, if pertinent, whether heat alteration had taken place. All complete flakes were weighed and counted for mass analysis, and then individual flake analysis data was collected by measuring for metric dimensions as well as coded for raw material, heat treatment (yes/no), cortex (presence/absence), platform configuration, platform facet count, dorsal scar count, and size grade. Incomplete, or broken, flakes were counted, weighed, size graded, coded for raw material, cortex, and heat treatment. Shatter, on the other hand, was only size graded, weighed, and coded for raw material, heat treatment and cortex. Because of the nature of shatter, this study does not include it in some of the analyses. Shatter, by definition, cannot be categorized with flakes because it has no distinguishable dorsal or ventral surfaces or platforms, as well as the fact that relatively small pieces of shatter can be detached from an objective piece at any stage of reduction. It is a byproduct of the reductive sequence whereby due to amount of force, impurities in

the material, or any number of factors, the knapper unintentionally removes some of the material. Not that it is completely devoid of information; on the contrary, it still gives us a weight for raw materials, materials heat treated, and cortex. Further, it is the only flake type employed by Sullivan and Rozen to be consistently associated with a reduction stage. In controlled flintknapping experiments, a high percentage of shatter is associated with core reduction (Bradbury and Carr 1995). Broken flakes can be used for the same information and they can also still be used for counts. Even though they are broken, which distorts the true count (if the flake was broken during removal), a true count needs to be determined. Size grade, probable cortex cover, and metric measurements, can still allow for general measurements of the reduction sequence using weight. As Ahler (1989a:90) states, "Because individual large flakes weigh a great deal more than any individual small flake, a size distribution expressed as a proportion of total weight according to size grades can be expected to show a much more distinct graphic depiction of the size differences than may be apparent in flake count data."

After analysis was completed and data entered into Microsoft Excel spreadsheets; counts, weights and individual attributes were converted into percentages for comparisons. Where appropriate, chi-square statistics on counts were employed to determine the significance of differences in proportions.

The material collected from the nested screens was counted and weighed, with the exception of shatter, which was only weighed. The material was weighed on a digital scale to the nearest tenth of a gram. Where needed, a lighted table magnifier lamp and/or a binocular microscope were used to assess characteristics of raw materials, debitage, and tools.

## CHAPTER 6

### LITHIC RAW MATERIAL USAGE IN THE MOUNDVILLE CHIEFDOM

Lithic raw material usage in the Black Warrior River Valley of west-central Alabama plays an important role in addressing the larger question of the political economy of the Moundville chiefdom during the late Moundville II through early Moundville III phase. First, raw materials types and the amount of each type identified in the mound Q at Moundville and the outlying non-mound site of Fitts (1Tu876) assemblages will be compared. This will include grouping the raw materials into three categories: (a) local materials, (b) non-local materials and (c) unknown or unidentifiable materials. It should be reiterated that since both sites are within a few river miles of each other, the raw materials deemed local and non-local are the same for both sites. The non-local raw class is further subdivided into groups based on the geographical areas from which the materials originated. This is done in order to establish whether or not there are differences between the sites regarding where they were procuring their non-local raw materials.

Second, this study will compare and contrast the tools employed at each site and determine if there are similarities or differences in tool use between Moundville's

Mound Q and the Fitts site. This analysis will aid in our understanding of possible activities taking place at each site. In addition, as in the raw material comparisons, differences and similarities of raw materials used for tool



production will be compared. This will include a comparison for differences in local versus non-local raw material procurement as seen in the tools. Finally, a discussion of core versus biface reduction will be examined through multiple lines of evidence using both individual flake analysis and mass analysis for the Fitts site, in conjunction with the analysis of tools from the Fitts assemblage.

Since the two sites analyzed have vastly different total sample sizes, for all artifact categories, the data presented here are given in raw form as weights and/or counts. These data are converted into percentages by weight or by count for standardized comparisons. In addition, where applicable, chi-square statistics will be employed to test whether differences between the two sites are significant.

#### *Lithic Raw Material Usage*

The raw materials for each site have been classified using a comparative collection according to chert type, implying geological origins and local versus non-local provenance. The total sample weight of lithic raw material analyzed is 478.4 g for Mound Q and 6,662.5g for the Fitts site (Table 6.1). It is important to state that the materials for Mound Q are a subsample of all Mound Q lithics, which is a much larger set. These materials are from midden and feature fill contexts well dated to Late Moundville II-Early Moundville III phase. The Fitts sample is only from the 2002 season, although there have been other seasons of work. These weights include all material from every size grade, <1/4" to 1", and all artifacts including complete flakes, broken flakes, shatter, cores, and tools. A total count for all raw materials is not available, because shatter was merely weighed, and not counted. However, counts are available for all other artifacts and will be used when assessing reduction stages of the

materials at each site, and in the analysis of tools. This lack of recorded counts for shatter does not affect the composition of the lithic raw material by site because weight can be a better measure. Counts can be easily affected by outliers (i.e., many small flakes or one large objective piece), either misleadingly inflating or diminishing the abundance of a raw material, whereas weights convey a more accurate total amount of a material regardless of the amount of breakage at a site.

As can be seen in Table 6.1, Moundville Mound Q has a much more evenly distributed and diverse assortment of lithic raw material than Fitts. Tuscaloosa gravel, Camden, and the category called unknown local material #2 comprise 18%, 24%, and 21% by weight, respectively and are the most abundant raw materials in the Moundville sample. Although non-local materials such as Ft. Payne, Bangor, Mill Creek, Knox, and Pickwick are found in relatively low percentages in comparison to the local materials, they contribute a full 20% by weight of the Mound Q assemblage.

This is in stark contrast to the Fitts site. The Fitts site predominantly depends on the local Tuscaloosa gravel, with that material contributing 77% by weight of the lithic assemblage. There is a secondary dependence on local Camden material contributing 15%, distinctly followed by quartzite at 4% by weight. All of these raw materials originate in the Tuscaloosa Formation and are considered to be from the same geological source (Skrivan and King 1983). In contrast to Moundville, only 2% of the Fitts site sample is made up of non-local material.

Material Type	Mound Q, Moundville		Fitts site	
	weight (g)	percent (%)	weight (g)	percent (%)
Tuscaloosa Gravel	84.4	18	5136.6	77
Ft. Payne	36.7	8	2.5	0
Ft. Payne var. Dover	.2	0	2.3	0
Fossiliferous Ft. Payne	.2	0	.4	0
Knox	10.6	2	60.5	1
Camden	116.7	24	982.0	15
Mill Creek	18.9	4	8.8	0
Bangor	10.7	2	6.5	0
conglomerate, Tuscaloosa formation	2.8	1	.2	0
quartz (S. Talladega Co., AL)	5.4	1	.4	0
quartzite	23.8	5	236.4	4
unknown local #1	1.0	0	68.5	1
Pickwick	6.9	1	2.4	0
unknown local #2	98.3	21	80.9	1
unknown non-local	5.0	1	.0	0
Ft. Payne (Florence Co., AL)	.9	0	.0	0
Ft. Payne (Jefferson Co., AL)	.0	0	37.6	1
chalcedony	.0	0	.2	0
Ft. Payne (Tupelo, MS)	.0	0	16.2	0
unidentified	55.9	12	20.1	0
Total	478.4	100	6662.5	100

Table 6.1. Raw Materials Compared by Site, by Weight and Percent.

When the raw materials from these two sites are assigned to more general local or non-local classes a more definitive statement can be made. Based on their geological origins and distances from the two sites under analysis, each raw material was categorized as either local, non-local, or in the case of the unidentified materials, unknown. This produces a much clearer picture of the nature of raw material

procurement at each site. As expressed in Table 6.2 and Figure 6.1, Mound Q's total raw material dependence is 68% local, 20% non-local and 12% unidentifiable by weight. In contrast, the Fitts site has 98% reliance on local materials, with a scant 2% of non-local materials contributing to its assemblage.

	Mound Q, Moundville		Fitts site	
	weight (g)	percent (%)	weight (g)	percent (%)
local	327.0	68	6504.8	98
non-local	95.5	20	137.6	2
unknown	55.9	12	20.1	0
Total	478.4	100	6662.5	100

Table 6.2. Raw Materials Compared by Local, Non-local and Unknown Provenance, by Weights and Percent.

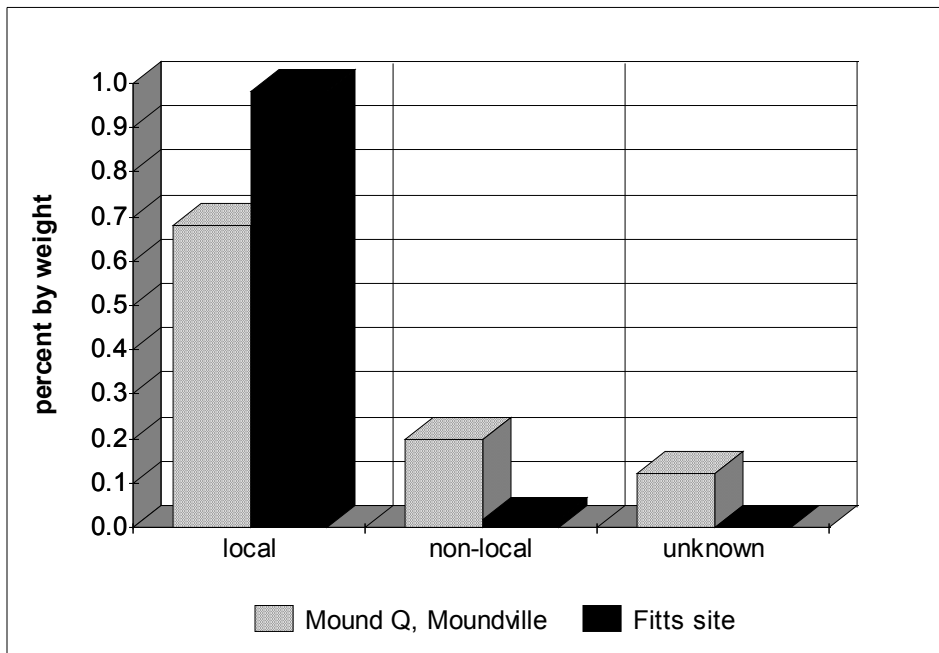


Figure 6.1. Proportion by weight of local versus non-local materials, compared by site.

A chi-square test of the local versus non-local materials was conducted to determine whether or not the difference between the sample contexts is significant, with the unknown materials combined with the non-local material for Mound Q to create a 2x2 table. This is an acceptable approach since the addition of the unknown material to the non-local material of Mound Q results in lowering an already extreme chi-square. In other words, whether the unknown material is added or not, the test would show a high level of significance. The resulting  $\chi^2=31.90$  (df=1,  $p<.01$ ) reveals that the difference between sites in local versus non-local raw material procurement is statistically significant.

When the local and non-local materials are examined separately, additional observations can be made. Local materials used by Mound Q and the Fitts site inhabitants are shown in Table 6.3. Both assemblages have high proportions of Tuscaloosa Gravel and Camden cherts, while Mound Q also has a high amount of

Material Type	Mound Q, Moundville		Fitts site	
	weight (g)	percent (%)	weight (g)	percent (%)
Tuscaloosa Gravel	84.4	26	5136.6	79
Camden	116.7	36	982.0	15
conglomerate, Tuscaloosa formation	2.8	1	.2	0
quartzite	23.8	7	236.4	4
unknown local #1	1.0	0	68.5	1
unknown local #2	98.3	30	80.9	1
chalcedony	.0	0	.2	0
Total	327.0	100	6504.8	100

Table 6.3: Local Raw Materials by Weight and Percent.

unknown local material #2, which, as stated in Chapter 4, is suspected to be from the same formation and procurement area as Tuscaloosa gravel and Camden cherts. This is not surprising since these materials are abundant and easily procured from local stream beds. Local quartzite is also present in small amounts at Mound Q and the Fitts site at 7% and 4% by weight respectively.

The two sites in question also show differing relative proportions of non-local materials (Table 6.4). Mound Q predominantly has Ft. Payne cherts at 38%, both Bangor and Knox at 11% each, and Mill Creek at 20% by weight, although the relative proportion of Mill Creek chert is somewhat deceiving. Mill Creek is represented by merely one large fragment of a Ramey knife. Its weight represents 18.9g of the total 95.5g for non-local materials from Mound Q. The remainder of non-local materials at Mound Q are 7% Pickwick, 6% quartz from south Talladega County, Alabama, 5% unknown non-local material, and 1% Ft Payne from the Florence County, Alabama area.

Material Type	Mound Q, Moundville		Fitts site	
	weight (g)	percent (%)	weight (g)	percent (%)
Ft. Payne	36.7	38	2.5	2
Ft. Payne var. Dover	.2	0	2.3	2
Fossiliferous Ft. Payne	.2	0	.4	0
Knox	10.6	11	60.5	44
Mill Creek	18.9	20	8.8	6
Bangor	10.7	11	6.5	5
quartz (S. Talladega Co., AL)	5.4	6	.4	0
Pickwick	6.9	7	2.4	2
unknown non-local	5.0	5	.0	0
Ft. Payne (Florence Co., AL)	.9	1	.0	0
Ft. Payne (Jefferson Co., AL)	.0	0	37.6	27
Ft. Payne (Tupelo, MS)	.0	0	16.2	12
<b>Total</b>	<b>95.5</b>	<b>100</b>	<b>137.6</b>	<b>100</b>

Table 6.4. Non-local Raw Materials by Weight and Percent.

In contrast, the Fitts site non-local material is largely comprised of Knox chert at 44% by weight. The next two largest components of non-local material at Fitts are Ft Payne from Jefferson County, Alabama making up 27%, and Ft. Payne from the Tupelo, Mississippi area at 12% by weight. The remainder of non-local materials all fall lower than 10% by weight, with Mill Creek represented by a single hoe chip comprising 6%, Bangor chert at 5%, and Pickwick, Ft. Payne, and Ft. Payne var. Dover all at 2%.

It should be noted that other materials, both local and non-local, are also present in the assemblages, but their frequency falls below 1% by weight, and are thus not discussed above. These include a local chalcedony and Fossiliferous Ft. Payne chert. From the evidence presented on raw material usage between the two sites, there is a definite reliance on local materials. There is a difference evident in two areas, however.

First, Mound Q has a significantly higher representation of non-local materials compared to the Fitts site, which is not surprising. Second, from the non-local materials present at each site it would appear that residents of Moundville Mound Q were acquiring materials primarily from the north, while residents of Fitts procured most of their non-local material from the east.

Of the non-local materials recovered at Mound Q, 57% by weight is from northern Alabama in the Tennessee Valley (Ft. Payne=38%, Bangor=11%, Pickwick=7%, Ft. Payne (Florence County, Alabama=1%; Table 6.4). In addition, 17% of the materials (Knox=11% and quartz (S. Talladega County, Alabama=6%) originated from east of the Moundville chiefdom. As stated earlier, Mill Creek may account for 20% by weight of the non-local raw materials, but this consists of a single artifact. This artifact is still of some significance. It is definitely the most distant of any raw material found at both sites and demonstrates some form of exchange, whether direct or down-the-line, with the Southern Illinois area.

	Mound Q, Moundville		Fitts site	
	weight (g)	percent (%)	weight (g)	percent (%)
north	55.6	58	30.3	22
east	16.0	17	98.5	72
Cahokia region	18.9	20	8.8	6
unknown	5.0	5	.0	0
<b>Total</b>	<b>95.5</b>	<b>100</b>	<b>137.6</b>	<b>100</b>

Table 6.5. Non-local Raw Materials by Region of Procurement

The Fitts site residents acquired the majority of their non-local materials from the east in the Coosa Valley and the northeast in the Upper Black Warrior drainage. The varieties of



Knox chert found in the sample, originating in the Coosa Valley, make up 44% by weight of the non-local material at Fitts. The variety of Ft. Payne that is found in the streambeds of Jefferson County, Alabama comprises 27% of the non-local materials at Fitts. These two raw materials together comprise 71% by weight of the Fitts site non-local raw material. Other materials of non-local origin present at Fitts include Ft. Payne from the Tupelo, Mississippi area (12%), Bangor (5%), Pickwick (2%), and both Ft. Payne and Ft. Payne var. Dover each at 2%. These northern raw materials comprise 23% by weight of Fitts site non-local assemblage. Again, Mill Creek chert represents 6% of the total non-local materials, but this is simply one large hoe chip weighing 8.8g of a total 137.6g for non-local raw materials.

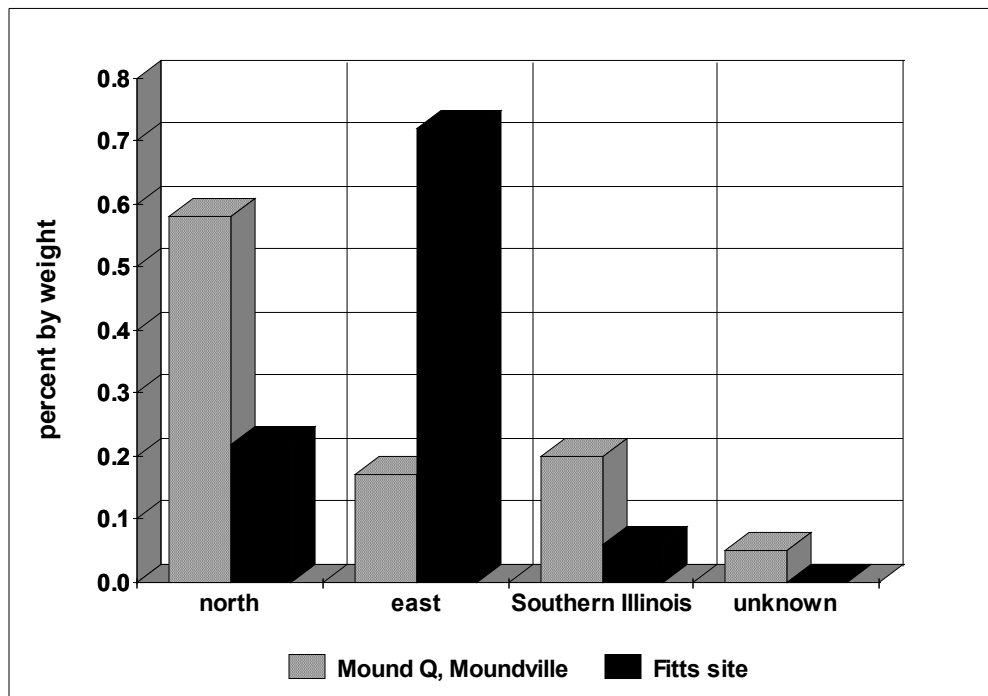


Figure 6.2. Non-local raw materials by region of procurement.

## **CHAPTER 7**

### **TOOL TYPES AT MOUND Q AND THE FITTS SITE**

The types and frequencies of tools discarded at Mound Q and the Fitts site differ dramatically. This probably is not surprising given the striking differences in site contexts. Previous models of the nature of chipped stone production and use in Mississippian chiefdoms are rooted in the idea that Moundville, as the paramount center in the chiefdom, would have had privileged access to non-local raw materials for the production of tools while the outlying sites did not (Welch 1991:159). After we review the tool assemblages from each site, the raw materials used for their production will also be examined to determine whether or not there was a preference for local or non-local materials, as well as the region of procurement for tool raw material.

In comparing the chipped stone tools from Mound Q and the Fitts site (Table 7.1) there is one type of tool that stands out in its high abundance. Microdrills comprise nearly 50% of the chipped stone tools at the Fitts site, compared to a mere 4% for Mound Q. Even with the differences of total artifact count and weight between the sites, the Fitts sample has a surprising 47 microdrills compared to one in the Mound Q sample. The only other tool types at Fitts that even come close to this number are bifaces (n=17, 18%)

and cores (n=13, 13%). All other tool types occur at 5% or less. These include 5 flake tools, 3 perforators, 1 scraper, 1 hoe chip, 1 core tool, 2 drills, 1 graver, 1 retouched shatter tool, 2 flake blanks, and 3 bifacial tools.

In the Mound Q sample, nothing really stands out as prolific. Retouched flakes are the dominant tool type, in addition to 2 scrapers, 2 flake blanks, and 1 flake tool, together suggesting a core industry. Bifacial tools at Mound Q consist of 4 Madison projectile points, 3 preforms, 1 drill, and 1 Ramey knife fragment. The microdrill and perforator from Mound Q most likely originated as flakes derived from a core from which they were bifacially reduced.

The differences between the two sites are indicative of different activities of each site. With the low quantities of debitage and few processing tools at Moundville Mound Q, it would seem that the occupants of Mound Q during the late Moundville II/Early Moundville III phase were not processing much food or making the tools necessary for craft production with chipped stone tools at this time, at least on or around the mound. The tool types of Mound Q and the single core present in the assemblage imply that the people on the mound employed a basic expedient tool technology to sustain their needs. A single flake tool, 7 retouched flakes, two scrapers, and two flake blanks suggest a “need and knap” basis for their flaked tool industry. The only formal bifacial tools from the Mound Q sample consist of the four Madison projectile points, one Ramey knife, and 3 preforms.

The Fitts site residents would seem to have been relying on both an expedient core-flake tool industry and a formal tool production. The large number of microdrills

suggests that small flakes were removed from a core and then semi-bifacially reduced to their characteristic morphological shape.

Tool Type	Mound Q, Moundville		Fitts Site	
	count	percent (%)	count	percent (%)
flake tool	1	4	5	5
biface	0	0	17	18
projectile point	4	17	0	0
microdrill	1	4	47	48
perforator	1	4	3	3
core	1	4	13	13
scraper	2	8	1	1
hoe chip	0	0	1	1
perform I	1	4	0	0
perform II	2	8	0	0
core tool	0	0	1	1
drill	1	4	2	2
graver	0	0	1	1
retouched flake	7	29	0	0
retouched shatter	0	0	1	1
flake blank	2	8	2	2
Ramey knife	1	4	0	0
bifacial tool	0	0	3	3
Total	24	100	97	100

Table 7.1. Tool Types Compared by Site.

Data also lending to this interpretation are 13 cores, 1 core tool and 17 bifaces at Fitts.

For expedient tool production there are 5 flake tools, a scraper and a large amount of lithic debitage. Evidence of formal tool production at Fitts is also abundant, with 47 microdrills, 3 perforators, 2 drills, 1 graver, and 3 bifacial tools.

	Mound Q, Moundville		Fitts site	
	count	percent (%)	count	percent (%)
expedient	13	54	23	24
formal	11	46	74	76
Total	24	100	97	100

Table 7.2. Expedient Versus Formal Tools.

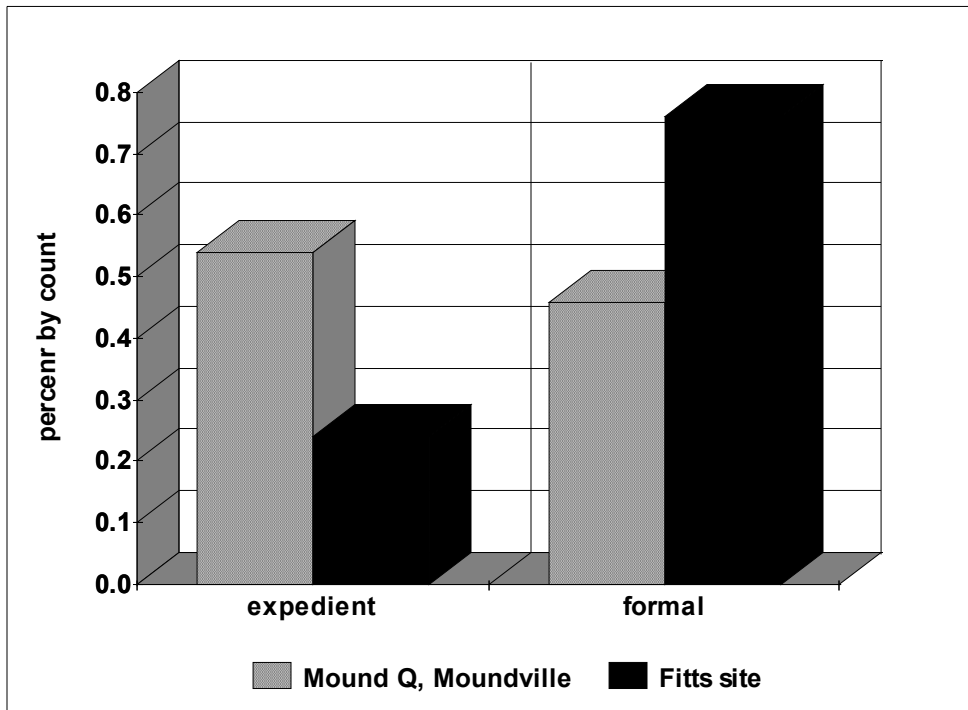


Figure 7.1. Expedient versus formal tools.

Relative proportions of expedient versus formal tools in the two contexts are compared in Table 7.2 and Figure 7.1. A chi-square test shows that the differences are statistically significant ( $\chi^2=18.92$ ,  $df=1$ ,  $p<.001$ ). What is most noteworthy is the fact that the Fitts site shows the dominant use of formal tools, when one would expect Mound Q at

Moundville to have more abundant, sophisticated tools because of the higher likelihood of craft production having taken place there.

*Tools and the Lithic Raw Materials Used to Create Them*

The raw materials used in the production of the tools from the two sites are shown in Table 7.3.

Raw Material Type	Mound Q, Moundville		Fitts site	
	count	percent (%)	count	percent (%)
Tuscaloosa gravel	5	21	71	73
Ft. Payne	11	46	0	0
Knox	0	0	6	6
Camden	2	8	8	8
Mill Creek	1	4	1	1
Bangor	1	4	0	0
Quartzite	0	0	2	2
unknown local #1	0	0	3	3
Pickwick	1	4	1	1
unknown local #2	1	4	1	1
Ft. Payne Jefferson Co, AL	0	0	1	1
Ft. Payne Tupelo, MS	0	0	3	3
unidentified	2	8	0	0
Total	24	100	97	100

Table 7.3. Raw Materials Used in Tool Production at Mound Q and the Fitts Site.

Between site differences exist on many different levels. From the point of view of local versus non-local materials, the sites could hardly be more different. Mound Q residents used non-local raw materials for 58% of their tools compared to 12% of tools from Fitts (Table 7.4 and Figure 7.2). Despite the abundant availability of Tuscaloosa gravel and Camden chert in the Moundville chiefdom, the sample shows that occupants of Mound Q predominantly chose to use the higher quality materials from north Alabama and northeast Mississippi while ignoring non-local materials to the east. The Fitts site, as

expected, used local materials for tool production overwhelmingly, with 88% made from local materials and only 12% from non-local materials. The unidentified category of raw materials is small for tool use at Mound Q, at just 8%. The Fitts site had no tools made from a lithic raw material that could not be identified.

	Mound Q, Moundville		Fitts site	
	count	percent (%)	count	percent (%)
local	8	33	85	88
non-local	14	58	12	12
unidentified	2	8	0	0
Total	24	100	97	100

Table 7.4. Local Versus Non-local Materials for Tool Use.

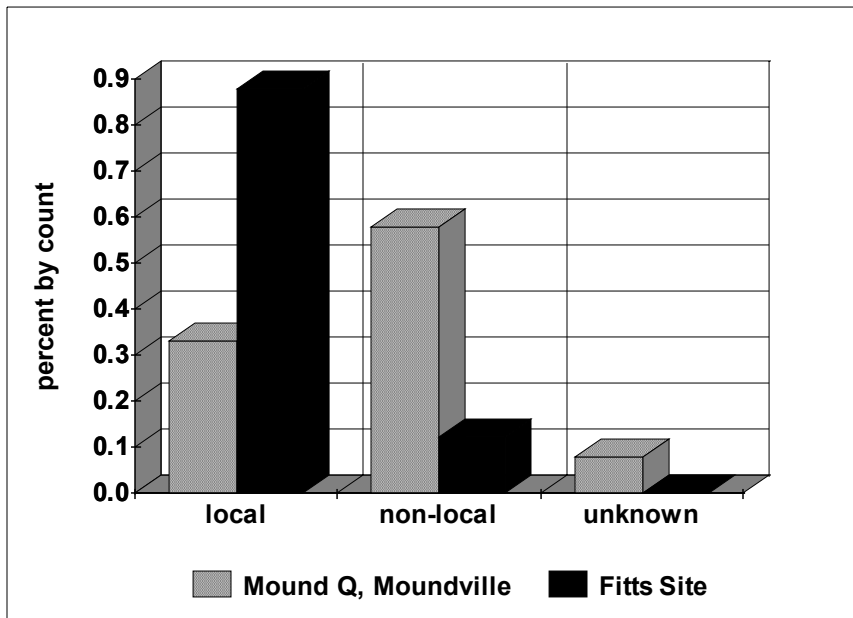


Figure 7.2. Local versus non-local material use and tools.

Assuming that the unidentified materials at Mound Q can be added to the non-local materials, we can reduce the data to a 2x2 contingency table and perform a chi-square test of the significance of these differences.

Such a test comparing proportions of local versus non-local materials for tool use between Mound Q and the Fitts site

( $\chi^2=31.89$ ,  $df=1$ ,  $p<.001$ ) reveals that there is a significant difference between the two sites in proportions of local and non-local materials for tool use.

Of the non-local materials used at both sites, not only were the proportions of local to non-local materials different, the regions that these non-local materials originated from were also different (Table 7.5). Mound Q residents used Ft. Payne, Bangor, and Pickwick cherts for 13 of 14 tools made from non-local materials. All three of these chert types are from northern Alabama in the Tennessee Valley.

Region of Origin	Mound Q, Moundville		Fitts site	
	count	percent (%)	count	percent (%)
North	13	93	4	33
East	0	0	7	58
Southern Illinois	1	7	1	8
Total	14	100	12	100

Table 7.5. Region of Origin for Non-local Materials Used in Tool Production.

Residents of the Fitts site, in contrast, predominantly used non-local materials from the east of their area. Eastern materials comprised 58% of the tools made from non-local



materials at Fitts compared to just 33% made from the northern material. In addition, each site sample had one exotic tool of Mill Creek chert from the Southern Illinois area in its assemblage.

### *Stages of Reduction*

The production stage at which these raw materials were imported into the sites is also important in assessing how the materials were used. Determining the predominant stages of reduction evident will clarify the picture already developed for raw material usage and tool usage at each site. Early stages of reduction are marked by larger flakes and higher cortical percentages for flakes and debitage, and also indicate core reduction as a primary activity. In contrast, late stage reduction is distinctive in that it generates a larger quantity of flakes with lower percentages of cortex or no cortex at all. Late stage reduction marks biface production and/or tool recycling. Using multiple lines of evidence with mass analysis and individual flake analysis (Bradbury and Carr 1995; Carr and Koldehoff 1994), this aspect of the study was intended to address potential differences in activities at the sites in question, in conjunction with the analyses already discussed.

This study was designed to compare two sites according to the lithic raw materials present at each. This comparison proved difficult due to dramatically different sample sizes of the two sites. Not only is there very little debitage in the Mound Q sample (296.7g), most of the debitage is either shatter or broken flakes. As this study was designed, shatter was weighed but not counted, so an accurate comparison of counts and weights in size grades is not currently possible. Mass analysis is usually employed on

large and extensive assemblages, as indicated by its name. Using the technique with such a small sample of material may not adequately characterize the activities at a site.

In addition to the lack of usable data for mass analysis, the Mound Q sample does not supply the necessary amount of data for individual flake analysis. When the study was being designed I decided to use only complete flakes to reduce possible bias.

Because of the variables used in individual flake analysis, broken flakes are not useful in providing accurate data. A broken flake may not yield an accurate count of dorsal scars, since this number may be reduced when a flake is partially missing. Likewise, flakes missing platforms, in whole or in part, will also reduce available data for facet count and platform configuration or type. Only a scant 18 complete flakes were recorded in the Mound Q sample. This sample does not provide enough data to make a viable statement about reduction stages at Mound Q based on individual flakes and their attributes.

Magne (1989:22) states that when raw materials are sparse, “then flake size cannot be used to reconstruct reduction stages with any confidence.” While I do not suspect that the occupants of Mound Q had any problem getting raw materials when they wanted, they still did not use much chipped stone material during the late Moundville II and early Moundville III phase occupations. This leaves little data from debitage to make inferences regarding the reduction stages of the Mound Q assemblage.

The Fitts sample is dramatically larger, but still only provided 113 complete flakes. While this sample is six times larger than that from Mound Q, it still does not have an adequate quantity to adequately characterize activities at Fitts. Most studies involve hundreds, if not thousands, of flakes for an accurate description of site activity through lithic reduction stages (Ahler 1986; Baumler and Downum 1989; Bradbury and

Carr 1995; Carr and Koldehoff 1994; Odell 1989; Tomka 1989). While many of these studies include broken flakes, this study did not, due to the anticipation that the materials from each site would provide much more complete flake data.

As stated, the omission of broken flakes was an attempt to remove bias of lower dorsal scar counts and inaccurate platform data.

However, some of the debitage analysis data from Fitts are still viable enough to use as a supplement to what we already know through analysis of the tool assemblage. Data from the mass analysis method employed on the debitage from Fitts is incomplete, but it gives us an idea of the relative activities taking place there. Using the pooled weights from each size grade we can make an assessment of how the local and non-local materials differed in their reduction. Figure 7.3 depicts non-local debitage at Fitts by site grade. From these data, we see that non-local raw materials brought into the Fitts site probably were not large cobbles due to the lack of large debitage found. This could also indicate that only small flakes were being removed from the non-local objective piece. Whether that represents late stage biface reduction or merely using the material sparingly is unclear. As opposed to the non-local raw materials, local raw materials at the Fitts site span all size grades (Figure 7.4). This indicates that local materials, predominantly Tuscaloosa Gravel and Camden cherts, were being reduced in one place after procurement. The locally available material, while of a lower quality than the non-local materials, is abundant and was, therefore, used much more often. The larger size grades also possibly indicate that core reduction was more frequent using the local material. This is not surprising since the non-local materials would probably have been used

sparingly at Fitts as either bifacial tools, or small bit-tools semi-bifacially reduced after a flake was struck from a core or biface.

This study had originally intended to determine the difference in local versus non-local material use through individual flake analysis as well. With the design flaw of only using complete flakes, there are not enough flakes to attempt this study. Of the 113 complete flakes in the Fitts sample, merely two of them are from non-local materials. This creates the problem of having to combine the local and non-local material to assess the general trend at the site. This will no doubt blur the view of production activities using non-local raw materials due to the dominance of local raw material.

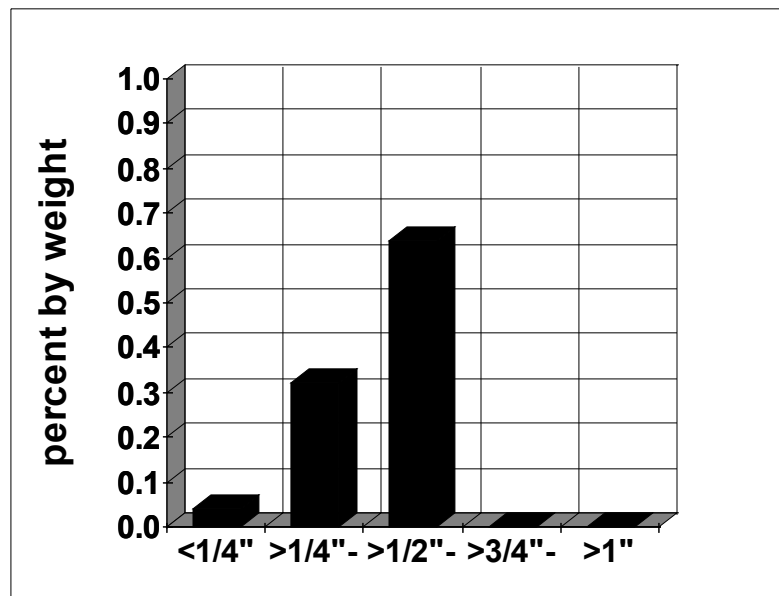


Figure 7.3. Non-local debitage by weight within each size grade (Fitts site).

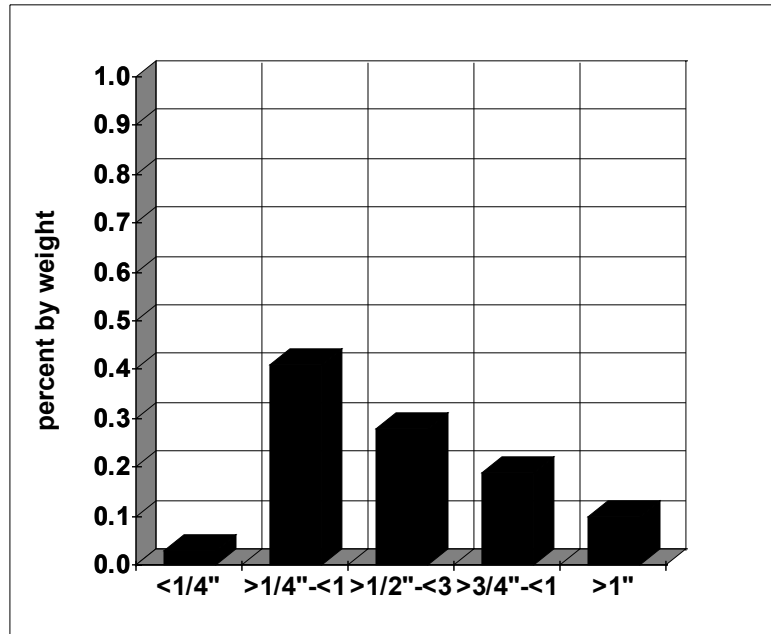


Figure 7.4. Local debitage by weight within each size grade (Fitts site).

The information in Tables 7.6, 7.7, and 7.8 indicates an early stage reduction (probable core technology) that dominates the Fitts site. Cortical and flat platforms are indicative of core reduction (Philip J. Carr, personal communication 2003), and the low 0-1 counts for both platform facets and dorsal scarring indicate early reduction stage activity (Carr and Koldehoff 1994). From this information, 50%-80% of the Fitts site debitage indicates early stage reduction. Data indicating later stage reduction is significantly more scant, but still present. Complex platform configurations, and counts of 3 or more on platform facets and dorsal scarring indicate later stage reduction.

Platform configuration	count	percent (%)
cortical	37	33
flat	53	47
complex	18	16
abraded	5	4
Total	113	100

Table 7.6. Platform Configuration on Complete Flakes (Fitts Site).

Platform facet count	count	percent (%)
0-1	83	73
2	20	18
3+	10	9
Total	113	100

Table 7.7. Platform Facet Count on Complete Flakes (Fitts Site).

Dorsal scar count	count	percent (%)
0-1	56	49
2	30	27
3+	27	24
Total	113	100

Table 7.8. Dorsal Scar Count on Complete Flakes (Fitts Site).

As stated earlier, the flake data at best should only be used as an informal supplement, compared to the better documented analyses, due to the low number of

complete flakes available for comparison. Additionally, the nearly total lack of complete flakes of non-local raw materials in the Fitts sample also skews these data toward local raw material uses. It is suspected that had there been more complete flakes of non-local raw material, the data would suggest that they would have shown less early stage reduction, indicating that the material was probably reduced prior to having been introduced into the Fitts site. This can be hypothesized based on the preliminary data presented in the mass analysis portion of the study for non-local raw materials. No large flakes exist above the  $\frac{3}{4}$  inch size grade, suggesting that the material came into the site previously reduced for easier transport from the area of procurement.

## CHAPTER 8

### DISCUSSION

Combining all these data will allow us to characterize the differences in material use between Mound Q and the Fitts site in the Moundville chiefdom during the late Moundville II and early Moundville III phases. From what we have seen, local materials are dominant in both contexts. However, Mound Q residents used non-local materials much more frequently than those of the Fitts site. Of the non-local materials at each site, residents of Mound Q used raw materials almost exclusively from north Alabama in the Tennessee Valley. The Fitts site's non-local raw materials, however, are mainly from east of the chiefdom in the Coosa Valley, although the occupants of the Fitts site did use materials from the Tennessee Valley as well.

What can be concluded from this information? Different physical qualities of the non-local raw materials can be addressed from the perspective of the regions they originate. The northern raw materials from the Tennessee Valley are of higher quality because of their better tractability, or flaking quality, and these are predominantly seen at Mound Q in Moundville. The eastern non-local raw materials are not necessarily of higher quality. While Knox from the Coosa Valley is a better chert than Tuscaloosa Gravel or Camden, it is still inferior to Bangor or Ft. Payne. The Ft. Payne chert that originated from the streambeds in Jefferson County, Alabama is possibly of a higher aesthetic quality than Tuscaloosa gravel and Camden chert, but its tractability is not superior to either of the local materials. The differences in the procurement of non-local



materials between the two sites may be more attributable to kinship ties or the elite's ability to foster exchange from remote areas than to any form of direct control over the materials or the regions from which they originate.

The tool industries at each site were dramatically different as well. Although the expedient versus formal tool comparison for Mound Q shows a nearly even balance, it seems that residents of Mound Q relied primarily on core technology for the activities taking place there. The majority of its tools were flake tools and retouched flakes that require little or no preparation before use. This is suggestive of an expedient "need and knap" industry where flakes were removed from a core and directly put into use without further reduction. There are formal tools present at Mound Q as well. Four projectile points were present in the sample, as well as three preforms, a microdrill, a perforator, and a Ramey knife. A microdrill and perforator were likely to have been originally flakes removed from a core which were semi-bifacially reduced to create hafting elements and shafts. Though probably resulting from a core technology, they exhibit formal tool characteristics.

The Fitts site, in contrast, has a predominantly formal tool assemblage. Although there were thirteen cores recovered in the Fitts sample, which would suggest primarily an expedient tool assemblage, Fitts has a large quantity of microdrills present on the site. As stated above, microdrills most likely originated as flakes struck from a core, further prepared for specialized use. Bifacial tools from Fitts add to the formal tool category with seventeen unfinished bifaces, two drills, and three bifacial tools. While we do not know what specific activities were taking place, it would seem that some sort of craft industry was going on there, however intensive. Microdrills are frequently associated

with shell bead drilling, but no other evidence of shell bead manufacture was present in the excavations there, possibly due to the acidic quality of the soil (Myer 2003). Fitts site residents seem not to have relied so much on expedient technology for their tool needs. This may be due in part to the nature of the materials used at the site. Non-local raw materials may have been easier to work, but the difficulty in obtaining them may have contributed to their low frequency at Fitts. While abundant, the local materials were of a lower quality and, therefore, less tractable. This would have forced the occupants of Fitts to produce tools that could be used repeatedly without having to re-supply their tool kits on a constant basis with material that was difficult to knap.

The raw material used for tool production at each site it is telling as well. The only non-local raw material used by Mound Q residents for tool production originated from north Alabama, while Fitts site residents, when using non-local raw materials, used a mixture of northern materials (33%) and eastern materials (58%) for their tools. While it is difficult to interpret this distinction, it raises another question for possible future study. The reasons for the preference of the residents Mound Q, and possibly other elite contexts, for northern materials from the Tennessee Valley should be studied in order to clarify this topic. It is possible that, although better than the local Tuscaloosa Gravels and Camden cherts, the eastern raw materials did not measure up to the perceived quality of the Ft. Payne and Bangor cherts from the north. The use of the eastern materials at Fitts may have simply been a substitute for northern materials that were more difficult for them to procure.

Although it is doubtful that any form of actual control was established over lithic materials used in the chiefdom, this manifestation of different materials in each context is

likely to have stemmed from the greater ability of the occupants of Mound Q to exchange with other, more distant groups due to their social standing or central location in an exchange network.

Finally, my informal discussion of reduction stages at Fitts, in conjunction with the data provided by the tool study, reveals that the use of non-local materials at this site was restricted to later stage reduction. The mass analysis data, while based on an admittedly inadequate sample, hint that non-local materials were primarily reduced before introduction into the Fitts assemblage. This is suggested by the small size of the non-local materials. Local use of material was represented in all size grades, highlighting their ubiquitous use in both biface and core reduction. Although limited to local material usage at Fitts, individual flake analysis revealed that core reduction was dominant, with bifacial reduction occurring less frequently. This information is best interpreted with the documented tools in mind. From the high frequency of microdrills at Fitts we know that core reduction was employed to remove flakes followed by additional reduction to shape the tool into a formal, hafted, semi-bifacial implement. In addition to the thirteen cores in the sample, the microdrill production alone accounts for the high signature of early stage core reduction, together with some biface reduction at Fitts.

From the evidence presented in this study, some observations can be made concerning the political economy of the Moundville chiefdom. As discussed in Chapter 2, Welch proposed that the paramount center of Moundville held a form of control over most, if not all, craft production and the non-local materials used to create them. While the vast majority of the raw materials for chipped stone tool production at Fitts is local, there is still present a small amount of material originating from outside the chiefdom.

This finding does not disconfirm the position that Moundville controlled non-local materials, since these materials could have been redistributed from the top of the hierarchy to the bottom. What is surprisingly suggestive of a lack of control, however, is the types of tools present at the Fitts site and the large number of them. Forty-seven microdrills, a dozen or so cores and bifaces, and various other small-bit tools dominate the tool assemblage studied. Together with the ground stone artifacts discussed in the Fitts site description, there would definitely seem to be evidence of some form of craft production taking place at a so-called farmstead dating to the Moundville III phase. The microdrills especially are interesting, since elsewhere they are usually associated with shell bead drilling (Yerkes 1983). Unfortunately the soil on which the Fitts site is located is highly acidic, and the only evidence of shell was in the surface collections. None was found in the excavations.

As far as craft production on Mound Q is concerned, there is ample evidence as described in Chapter 2. What is unforeseen in that context is the lack of a dependence on formal tools from a chipped stone industry to make these crafts. Mound Q residents used expedient and formal tools almost equally. I would have assumed prior to this study that such an elite context would have yielded a majority of hafted formal tools, as against a low number of expedient core and flake tools. This is the opposite of my expectation for the two site contexts, and yet the reality is just that. It would be hard to ignore the evidence that something special was taking place at Fitts, a non-elite context. What is also uncommon about the Mound Q sample compared to the Fitts site is that the abundance of lithic material at Fitts was excavated in one season over eight weeks. The

much smaller Mound Q sample, conversely, was recovered over six seasons of excavation and yielded only a fraction of the Fitts sample.

Muller (1997:384) argues that Mississippian chiefdoms were socially and hierarchically complex, but that the degree of their centralization has been exaggerated. From the evidence presented here it would seem he is correct, but he also keeps the door open, regarding the possibility of such control. By stating that previous theoretical claims concerning Moundville elites' control over commoners are premature, given the disparity in what is understood between mound sites and non-mound sites, the possibility still exists that there were extreme differences between non-mound sites and their activities in relation to each other and the paramount center. These differences could include semi-specialized activities at each site, co-opted by the elite at Moundville. I actually rather doubt that true specialization existed, but the point needs to be made that we still know very little about non-mound sites and their relationships among one another, to secondary mound centers, and Moundville itself.

### *Recommendations for Future Work*

The easiest recommendation one could make based on this and other research is obvious. More outlying non-mound sites need to be excavated to understand their diversity. A little more than a dozen have been scientifically examined in a region that is estimated to contain at least hundreds of such sites. As more and more of the so-called "farmsteads" are studied, differences from what was previously thought about the relationships between them, as well as, to the paramount center, are becoming apparent. Additional future research on exchange patterns in the Moundville chiefdom would benefit from an attempt to examine raw material differences among outlying non-mound

sites located in different areas of the chiefdom. Will they exhibit differences based on their relative proximity to non-local sources, or are the differences based on social variables? Such investigations would aid in answering the question addressed in this study of why residents of the Fitts site predominantly used eastern non-local lithic raw materials as opposed to better-quality northern cherts routinely obtained by mound-dwelling elites at Moundville.

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