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Definition and Evaluation of the Mississippian Lithic Assemblage from the Wymer-West Knoll (20 BE 132), Berrien County, Michigan

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DEFINITION AND EVALUATION OF THE MISSISSIPPIAN LITHIC ASSEMBLAGE FROM THE WYMER-WEST KNOLL (20 BE 132), BERRIEN COUNTY, MICHIGAN

by

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This thesis is dedicated to the loving memory of my Grandmother, Dorothy Brown.

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Analysis of the lithic assemblage from the Wymer-West knoll site was undertaken with the following objectives: (1) to define the lithic technology of the Mississippian occupational component of the site, (2) to compare length, width and width/length ratios of triangular projectile points from the Wymer-West knoll with other Mississippian sites to clarify the cultural affiliation of the Wymer-West knoll, and (3) to use site function, from the perspective of the overall Wymer-West knoll material culture in general and the Mississippian lithic technology in particular, as a framework to better understand the Wymer-West knoll's place in the regional culture history.

A students t-test analysis showed that the triangular points from the Wymer-West knoll were not significantly different from triangular points associated with Middle Mississippian sites. Exotic raw materials from the Mississippian component of the Wymer-West knoll indicate nearly exclusive derivation from sources in central and southern Illinois. Additional material culture comparisons, i.e. ceramics, radiocarbon dates and faunal material, suggest Middle Mississippian affiliations. It is suggested that the Mississippian component of the Wymer-West knoll represents a site unit intrusion of Middle Mississippian people from the Illinois River Valley circa A.D. 1000.

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CHAPTER I

INTRODUCTION

The question of Mississippian expansion and influence around A.D. 1000 has been discussed and speculated upon for many years and has been a prime focus of midwestern archaeology (Maher and Baerreis 1958; Hurley 1977; Harn 1980; Markman 1991; Stoltman 1991a). Numerous sites throughout the Upper Midwest, the Southeast, the Eastern Woodlands, and the Plains have been associated with and related to Middle Mississippian cultural expansion. Absent from much of this discussion has been speculation of Middle Mississippian expansion spreading north from its origin in the American Bottom into Michigan. The lack of sites exhibiting Middle Mississippian traits or influence provided no basis for such speculation. Investigations at the Wymer-West knoll, however, now support the supposition that Middle Mississippian people settled in southwest Michigan along the St. Joseph River Valley at approximately A.D. 1000.

Site Location and Description

The Wymer site (Figure 1) is located in the floodplain of the St. Joseph River Valley near the town of Berrien Springs, Michigan. The site lies on land which is leased and cultivated by Andrews University. The site consists of two distinct knolls, East and West, which are separated by a low saddle (Figure 2). Both knolls are

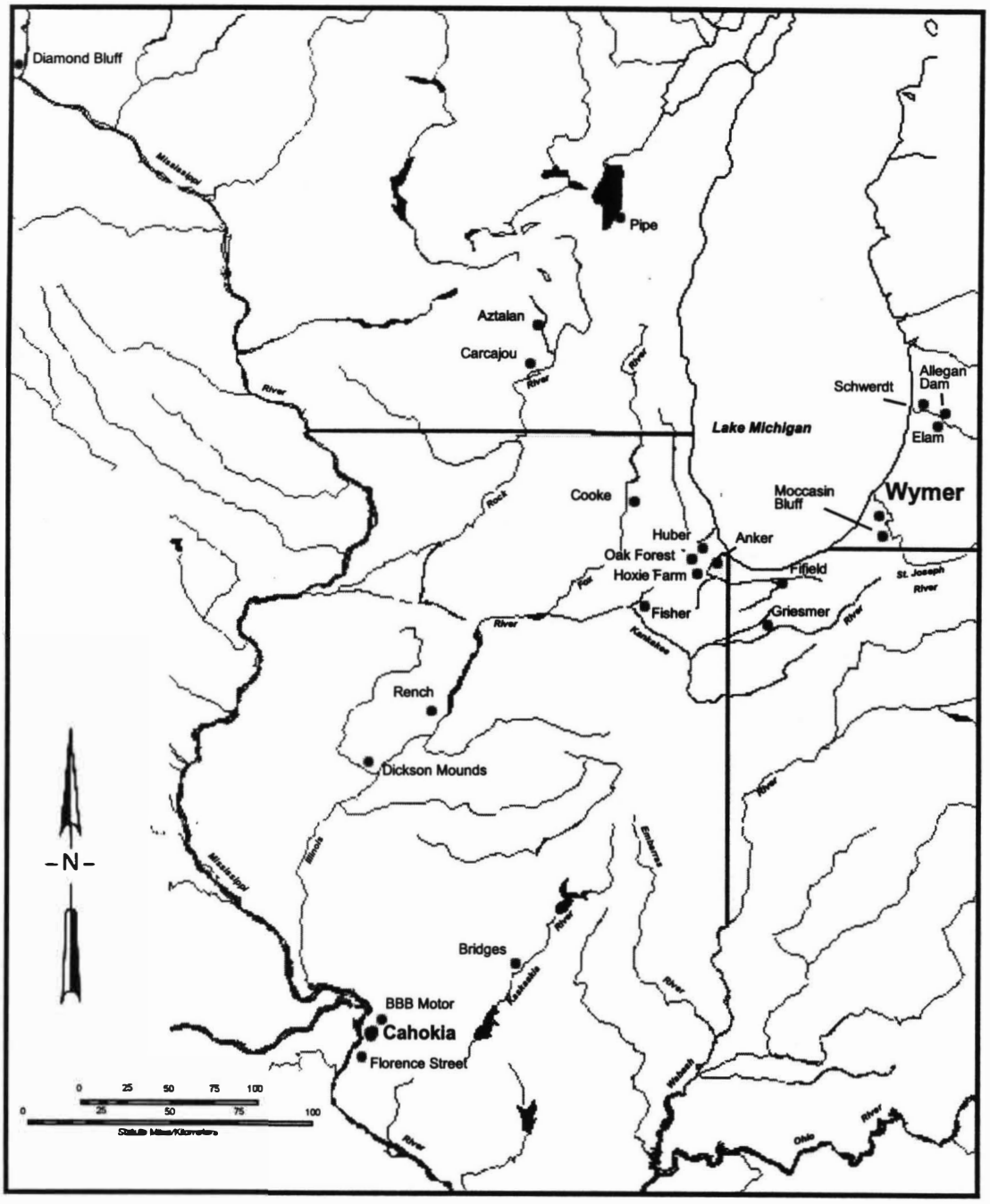

Figure 1. Locations of Sites Mentioned in the Text.

considered part of the same site which has been designated 20BE132. The right-of-way for the US-31 highway project (Garland and Man-

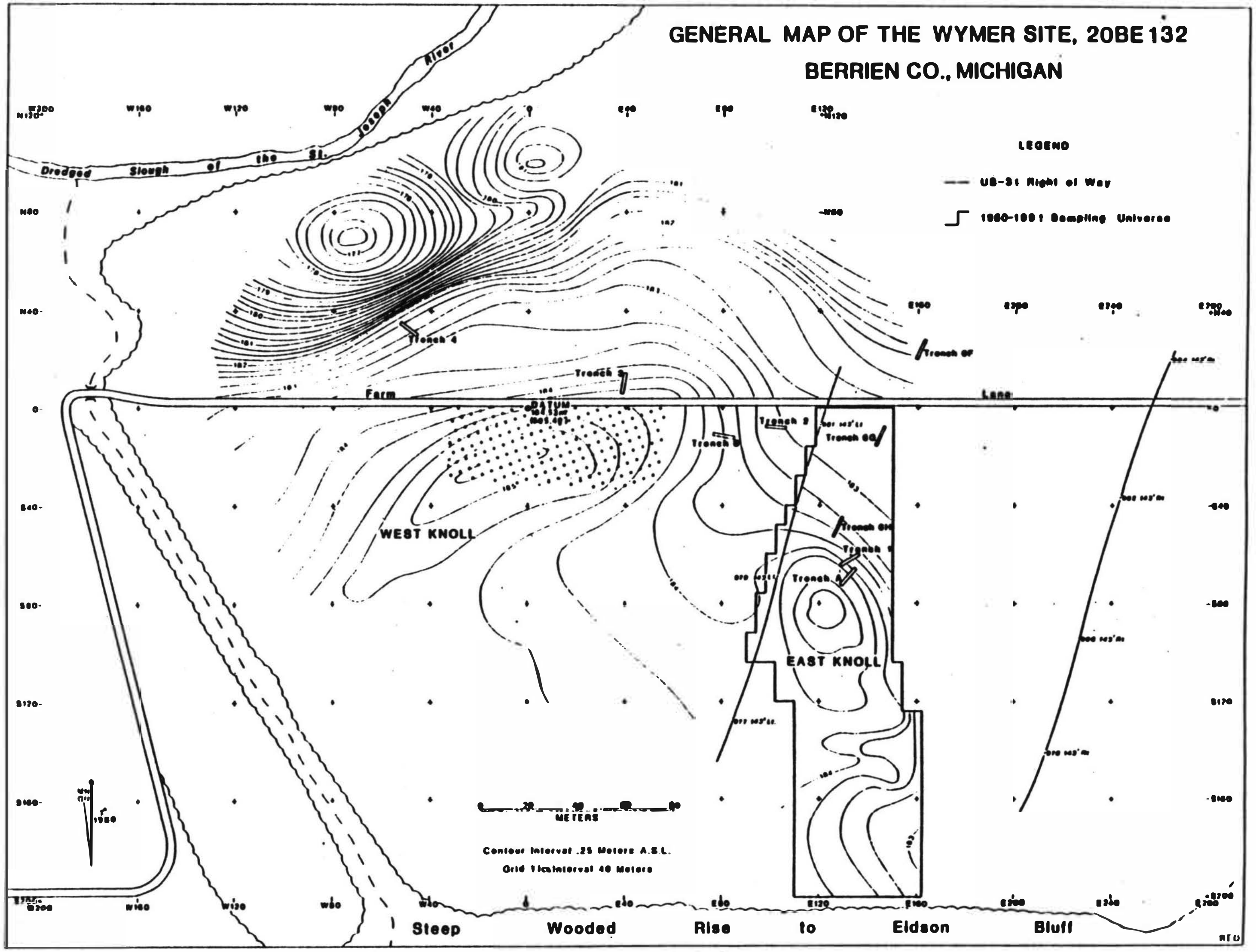

Figure 2. General Map of the Wymer Site.

gold 1980; Garland 1990) completely encompasses the Wymer-East knoll while leaving the Wymer-West knoll intact.

History of Excavation and Research

Archaeological excavations at the Wymer-West knoll were previously conducted by Andrews University in 1976 and 1979. Additional uncontrolled surface collections were also made throughout the years by Andrews. Following the 1976 excavations Andrews University left the main site area of the Wymer-West knoll fallow, cultivating around it. The site has also been, and continues to be, a prime locale for surface collection by area collectors and hobbyists.

During preliminary archaeological survey work for the US-31 highway construction, it was suggested the Wymer-West knoll may represent a "large Late Woodland village site", (Garland 1990:236). Andrews University excavations revealed what were considered to be postmolds possibly forming the outline of a prehistoric structure. The presence of such a structure would be indicative of "year-round occupation, rather than a seasonally visited site", (Garland and Mangold 1980:39).

In 1991 the Western Michigan University field school, under the direction of Dr. Elizabeth Garland, performed additional excavations at the Wymer-West knoll in an attempt to further elucidate the nature of the late prehistoric occupation at the site. Using the original datum established by Andrews University, two trenches were excavated adjacent to the original Andrews excavation block where the

postmolds were noted. It was hoped that further evidence of structures would be observed in these adjacent units which might confirm the presence of a sedentary village.

In an effort to locate pit features in the adjacent plowed field, an area of approximately 1700 square meters surrounding the Andrews and Western Michigan University excavation units was probed at two meter intervals. Ten features were located and excavated within the probed area (Figure 3). The location of three additional possible features was noted but they were not excavated due to time constraints.

A preliminary examination of the faunal material excavated during the 1991 Western Michigan University excavations revealed an abundance of sturgeon, channel catfish, whitetail deer, and various small mammals. Botanical material from the West knoll was analyzed by Kathryn Parker (1991). The occurrence of maize was noted in six pit features. Other botanical specimens observed included acorn, hickory and walnut nutshell, and wood charcoal from maple, beech, ash and oak. Parker concluded that inhabitants of the Wymer-West knoll were participating in a "mixed economy based on the exploitation of localized resources" (Parker 1991:18).

Ceramics are a significant aspect of the Wymer-West knoll artifact assemblage. The presence of shell tempered ceramics at the site has long been known (Garland and Mangold 1980; Garland 1990; Garland 1991). Initial impressions were that the West knoll may have been temporally related to the Berrien phase (A.D. 1400 - 1600,

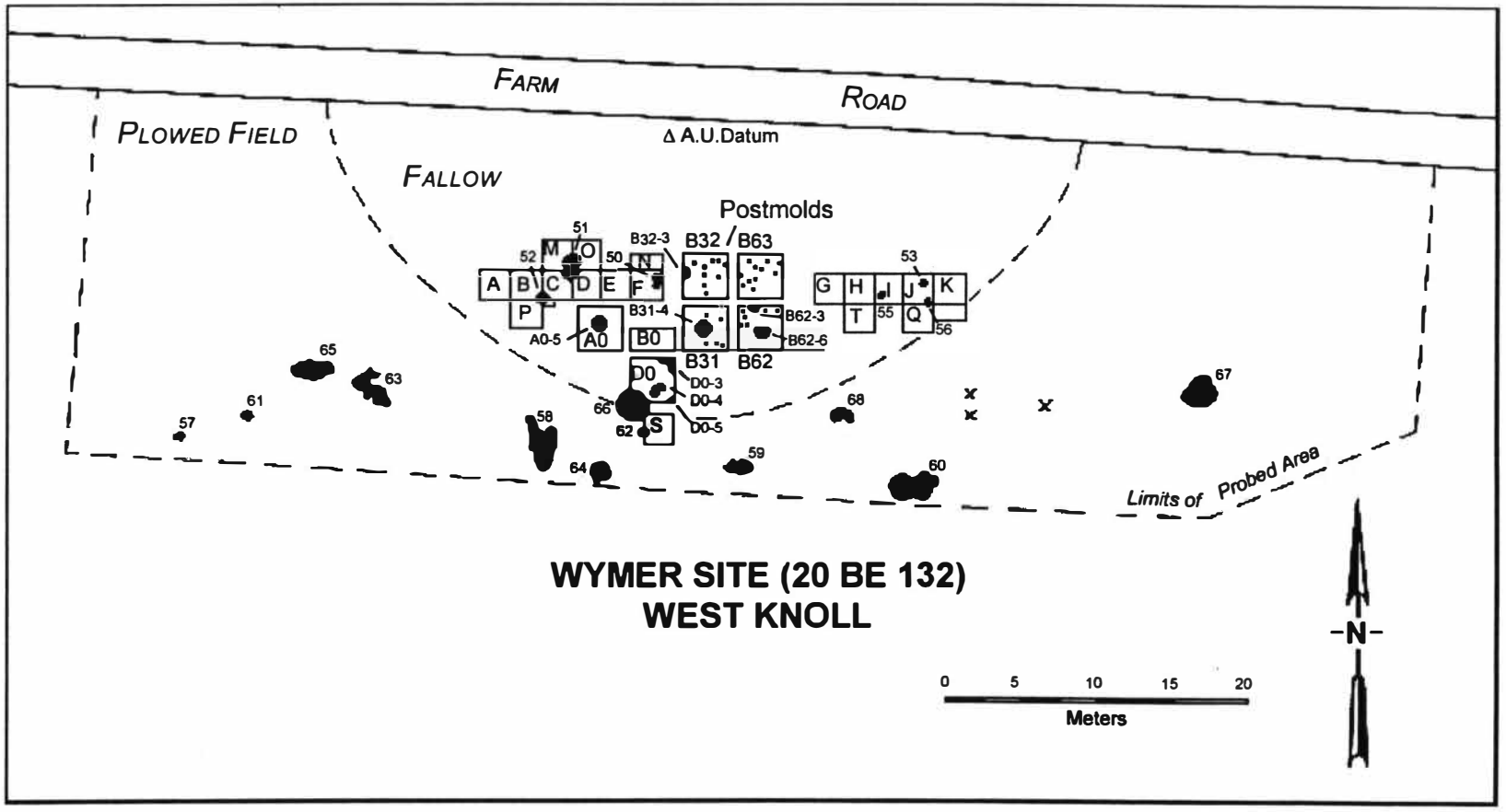

Figure 3. Locations of Units and Features.

Bettarel and Smith 1973) at the Moccasin Bluff site, located on the St. Joseph river approximately 9 miles south of Wymer (Garland and Mangold 1980:28).

Subsequent to the 1991 excavations, four radiocarbon dates were obtained suggesting occupation prior to the Berrien phase (Table 1). Two dates help to place the major occupation of the Wymer-West knoll during the Lohmann and Stirling Phases at Cahokia circa A.D. 1000 - 1150 (Bareis and Porter 1984). This period represents the time of the greatest expansion and growth of the Middle Mississippian culture.

Research Objectives

The lithic analysis conducted in this thesis concerns itself with answering the following research questions. Can the lithic assemblage from the Wymer-West knoll help to clarify the cultural affiliation of the inhabitants of the Wymer-West knoll? Do the lithics suggest Mississippian cultural origin, and if so, can they be identified as Middle Mississippian, Upper Mississippian, Oneota, or Fort Ancient?

In order to answer these questions, this analysis has three interrelated components. The first is to thoroughly describe the lithic material from the Wymer-West knoll, thus defining the Mississippian component of the site. The second component is to further clarify the cultural affiliation of the Wymer-West knoll through statistical comparisons of the triangular points from the site with

Table 1

Wymer-West Knoll Radiocarbon Dates

Sample	Uncorrected	Calibrated (Stuiver & Reimer 1993)
Beta - 46414 1060±80 B.P. Feature 91-66	A.D. 890±80 (Garland 1991)	A.D. 1000
Beta - 46413 930±80 B.P. Feature 91-51B	A.D. 1020±80 (Garland 1991)	A.D. 1070, 1090, 1120, 1140, 1150
ISGS - 2264 570±70 B.P. Feature 91-62	A.D. 1380±70	A.D. 1410
ISGS - 2265 2280±120 B.P. Feature 91-58	330±120 B.C.	389 B.C.

triangular points from other Mississippian sites throughout the upper midwest. The third is to draw broader comparisons with regional Upper Mississippian sites in an attempt to further evaluate site function and Wymer-West knoll cultural affiliations.

The significance of research describing the expansion of the Mississippian cultural phenomenon is illustrated by the amount of literature dedicated to the subject. Mississippian interaction outside of the main tributaries to the Mississippi River is not well understood. It is expected that the conclusions drawn in this thesis will help to facilitate further discussion and research regarding the presence of Mississippian groups in southwest Michigan.

CHAPTER II

DEFINITION OF THE MISSISSIPPIAN LITHIC COMPONENT

Introduction

The Wymer-West knoll is a multi-component site with evidence to suggest recurrent occupations from late Paleo-indian to early historic periods. Lithic, ceramic, botanical and radiocarbon dating evidence indicate that the major occupation at the Wymer-West knoll did not occur until the Mississippian period from A.D. 1000 - 1150. By contrast the Wymer-East knoll, 100 meters to the southeast, lacks any substantial evidence of this late occupation. The objective of this section is to define what constitutes the lithic material culture of the Mississippian component at the Wymer-West knoll.

This section relies heavily on the lithic analysis performed by Caven Clark for the US 31 highway project (Clark 1990). His section on the lithic assemblage of the Wymer-East knoll was valuable in providing a perspective on the Archaic and Woodland occupations of the Wymer site as a whole.

Methodology for Distinguishing Occupational Components

In order to clearly define the Mississippian component of the Wymer-West knoll it was necessary to make assumptions regarding the cultural association of features and activity areas at the site. Since the major component of the Wymer-West knoll was identified as

Mississippian (Garland 1991), features were assumed to be associated with this component unless the recovered cultural material or the feature function suggested an alternate cultural association.

Many of the features on the Wymer-West knoll contained shell-tempered ceramics (Greve-Brown 1997) and maize (Parker 1991), two cornerstones of Mississippian material culture. Many of these features also contained small triangular projectile points, another hallmark of late sites. It was felt that the presence of these diagnostic materials within features provided sufficient justification for assuming Mississippian origin. In contrast to the West knoll, the major occupation of the East knoll occurred during the Archaic/Woodland transition period (Garland, et al 1990:290).

As with any multi-component site, there is always the possibility of cultural material being intermixed between the various habitations. While other occupations are in evidence on the West knoll the preponderance of cultural material indicates Mississippian origin.

Projectile Point Variations Between West and East Knolls

The excavations conducted at the Wymer-West knoll by Andrews University and Western Michigan University provided a dataset consisting of 138 projectile points. Metric attributes, raw material types and morphological attributes were recorded for each projectile. Point identifications are summarized in Table 2. Reference materials used in the projectile point typology include original site reports defining specific point types (Table 2), Justice's study on typologies

Table 2

Projectile Point Totals From
the Wymer Site

Point Type (Original Reference)	West Knoll N	West Knoll %	East Knoll* N	East Knoll* %
Hi-Lo (Fitting 1963)	1	1	-	-
Thebes (Winters 1963)	2	2	2	3
Charleston CN (Broyles 1971)	-	-	1	2
Kirk CN (Coe 1964)	2	2	-	-
Bifurcate (Chapman 1975)	2	2	3	5
Raddatz SN (Wittry 1959)	1	1	-	-
Matanzas SN (Munson and Harn 1966)	7	7	-	-
Three Oaks SN (Clark 1990)	4	4	5	8
Type 8 (Clark 1990)	-	-	1	2
Eidson (Clark 1990)	1	1	2	3
Lamoka/Dustin (Ritchie 1932)	1	1	-	-
Berrien (Clark 1990)	2	2	21	34
Genesee (Ritchie 1961)	-	-	2	3

Table 2 -- Continued

Point Type	West Knoll N	West Knoll %N	East Knoll* N	East Knoll* %N
Kramer (Munson 1966)	-	-	3	5
Wymer, variant A (Clark 1990)	-	-	2	3
Wymer, variant B (Clark 1990)	-	-	4	6
Oronoko (Clark %w90)	1	1	1	2
Sodus Expanding Stem (Clark 1990)	-	-	1	2
Motley/King (Ford, Phillips and Haag 1955; Clark 1990)	3	3	-	-
Affinis Snyders (Winters 1962)	5	5	-	-
Snyders (Scully 1951)	-	-	3	5
Affinis Ansell (Clark 1990)	1	1	-	-
Pipestone CN (Clark 1990)	1	1	2	3
Jacks Reef (Ritchie 1961)	2	2	-	-
Stover (Clark 1990)	-	-	2	3
Triangular (Ritchie 1961)	61	62	7	11

Table 2 -- Continued

Point Type	West Knoll N	West Knoll %N	East Knoll* N	East Knoll* %N
Nodena Banks (Perino 1966)	2	2	-	-
Totals	99	-	62	-

* (Clark 1990:263)

of the Eastern Woodlands (Justice 1987), Clark's research in Southwest Michigan (Clark 1990), and type sets from collections stored at the Department of Anthropology, Western Michigan University.

The comparison of projectile point types between the East knoll and the West knoll is important for understanding the relationship between the two knolls through time. Table 3 represents a generalized chronological breakdown of the East and West knolls based on projectile points. It shows that at certain periods there was concurrent occupation of both knolls. Comparable numbers of Eidson Side-notched, Thebes, Bifurcate, Three Oaks, Oronoko, Pipestone and Snyders between the two sites (Table 2) help to confirm a shared occupational past from Early Archaic through Middle Woodland periods. The divergence, however, occurs during the Mississippian period when habitation is centered on the West knoll.

Nearly twice as many diagnostic projectile points were recovered from the West knoll as were recovered from the East knoll. Table 2 shows that 62 percent of the identified points from the West

Table 3

Chronological Distribution of Projectile Points Between East and West Knolls by Gross Temporal-Cultural Units

Cultural Period	West Knoll N	West Knoll %	East Knoll* N	East Knoll* %
Late Paleo - Late Archaic	8	8	6	10
Late Archaic - Early Woodland	18	18	23	37
Late Archaic - Middle Woodland (Berrien Corner Notched)	2	2	21	34
Middle Woodland	6	6	3	5
Late Woodland	2	2	9	15
Mississippian	61	62	-	-
Late Mississippian - Historic	2	2	-	-
Totals	99		62	

* (Clark 1990:262)

knoll were triangular points versus 11 percent for the East knoll. In contrast, the most numerous point type observed on the Wymer-East knoll is the Berrien Corner Notched type (Clark 1990:68). According to Clark (1990:68) the Berrien type probably dates to the Late Archaic/Early Woodland transition period.

The triangular points recovered from the Wymer-West knoll closely resemble the Madison type (Scully 1951; Ritchie 1961). Originally defined as the Mississippi Triangular Point (Ritchie 1961:33), the name was later changed to the Madison Point. Throughout the east-

ern woodlands the Madison type eventually supplanted the Levanna type, an earlier and larger triangular form, becoming the dominant projectile point.

The Madison point has been associated with a wide variety of Mississippian and Late Woodland cultures dating from about A.D. 800 to the Historic period (Ritchie 1961:34; Justice 1987:224-226). This broad spectrum cultural association has resulted in a %wgh degree of morphological variability. This variability will be investigated further in the next chapter.

In southwest Michigan, Madison points were thought not to occur until about A.D. 1200 (Clark 1990:76). The association of triangular points with shell-tempered ceramics (Greve-Brown 1997), maize (Parker 1991), and radiocarbon dates circa A.D. 1000 suggest that at the Wymer-West knoll, triangular points resembling the Madison type were present well before A.D. 1200.

Tool Definitions

Table 4 shows the lithic tools recovered from Mississippian context on the Wymer-West knoll. In all, 877 chipped-stone artifacts were recorded from both the Andrews and Western Michigan University excavations, including 138 projectile points discussed in the previous section. Formal classification of the remaining 739 tools was carried out using a classification scheme partially based on one developed by Rochelle Lurie and Robert Jeske (1990; Jeske 1987) in their analyses of Upper Mississippian sites in northern Illinois. It

Table 4

Lithic Tool Types From the Mississippian Component of the Wymer-West Knoll

Tool Type	N	%
CORES:		
Amorphous Core	170	19
Bipolar Core	132	15
Prepared Core	1	<1
BIFACES:		
Diagnostic Projectile Points	61	7
Hafted Scraper	4	<1
Humpback Scraper	6	1
Preform	12	1
Drill	19	2
Unhafted or Bifacial Fragments	58	7
UNIFACES:		
Uniface	62	7
Hafted Uniface	1	<1
OTHER TOOLS:		
Blade	37	4
Graver	4	<1
Utilized Flake	310	35
Total	877	

was hoped that using this method of tool classification would allow more useful comparisons to be drawn to these Upper Mississippian sites and provide support for or against the association of the Wymer-West knoll with Upper Mississippian.

Cores (n=303)

Cores from the Wymer-West knoll site were divided into three categories based on morphology and manufacturing technique (Figures 4 and 5). Prepared cores are characteristic of a curated tool technology where the emphasis is on formal standardized tool manufacture (Koldehoff 1986; Johnson 1989) in the context of a highly mobile settlement pattern (Parry and Kelly 1986). These cores are intentionally shaped for maximum tool potential. Only one example of a prepared core was observed at the Wymer-West knoll site. This item is a small blade core made of Moline chert, an exotic raw material from west-central Illinois (Goatley 1993:44).

Amorphous cores and bipolar cores are characteristic of an expedient core technology where,

> First, the flaking techniques are not intended to control the form of the resulting flakes. Cores are not preformed or prepared in any way...Second, no explicit distinction is made between 'tools' and 'waste.' Every piece is regarded as a potential tool...Third, the tools are seldom modified, (Parry and Kelly 1986:287).

Amorphous and bipolar cores are distinguished by the manufacturing technique used on them. Amorphous cores result from a traditional freehand percussion technique where the core is held in the hand and the blow is focused on one spot on the core. Bipolar cores

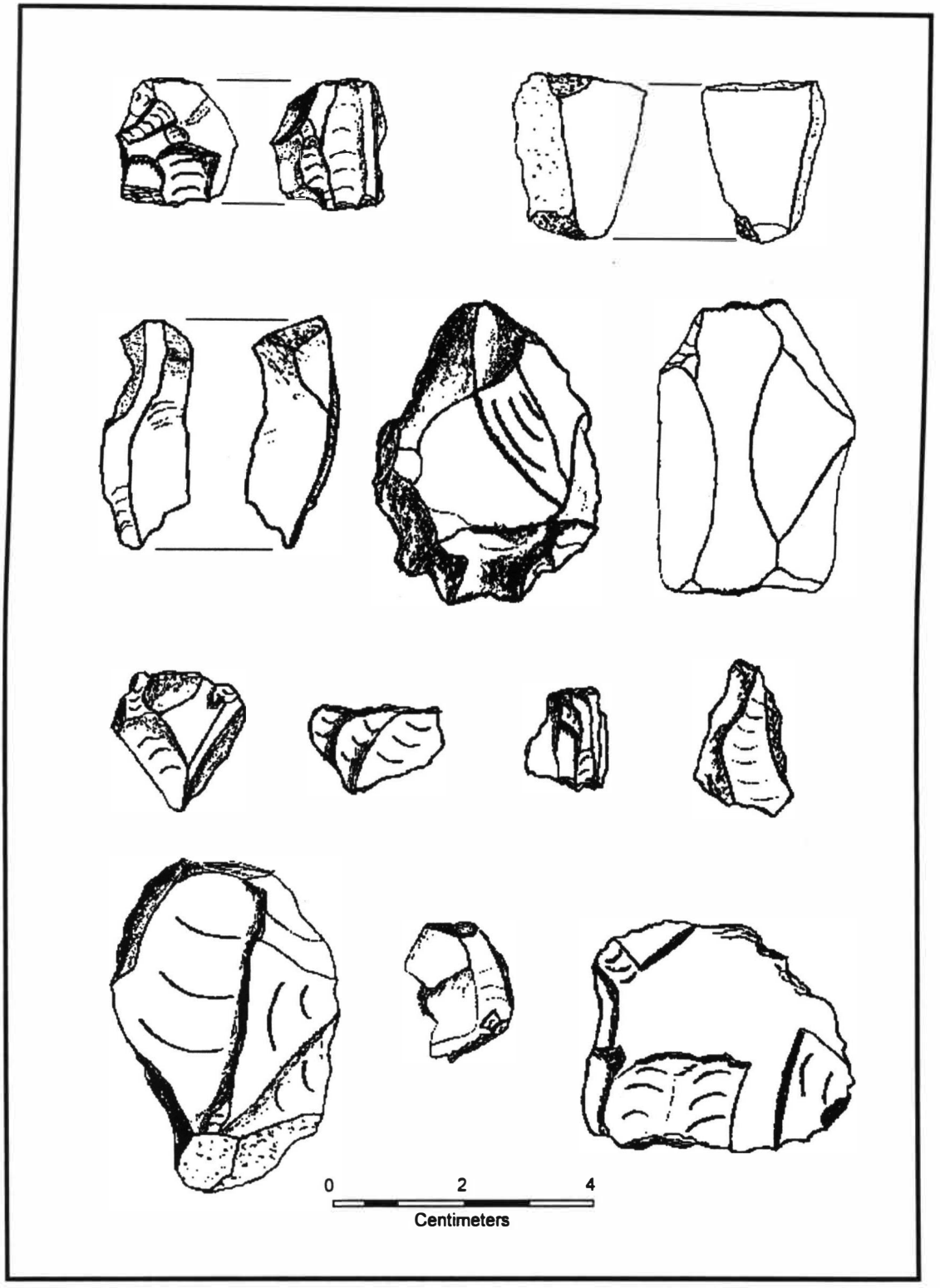

Figure 4. Representative Samples of Bipolar Cores.

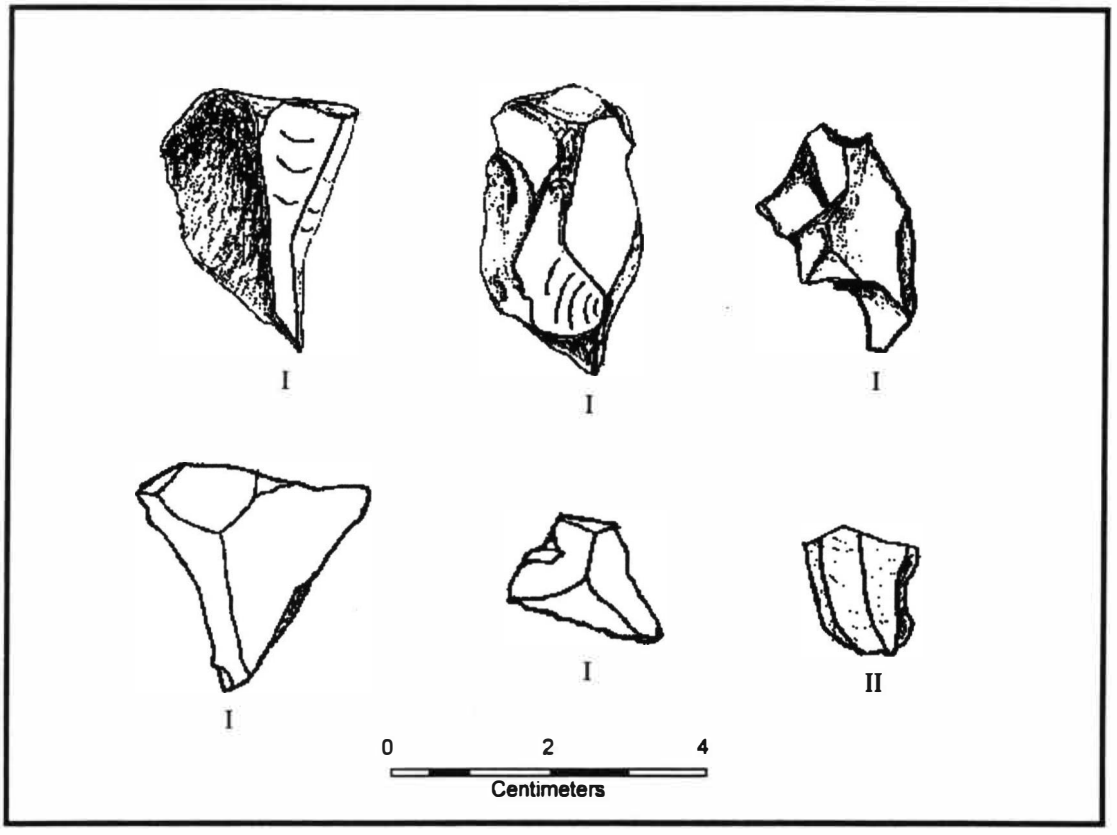

Figure 5. Representative Samples of Amorphous (I) and Prepared (II) Cores.

(Binford and Quimby 1963) result from placing the core on a hard surface (anvil) and then striking a blow to the core. The blow is focused on two ends of the core and a flake is removed. Some of these flakes will exhibit two bulbs of percussion resulting from the pressure at both ends of the core.

Bifacial Tools (n=160)

> Bifaces are defined as those tools where,
>
> both faces of the piece have been shaped. There must be at least one flake scar that does not originate on the edge of the piece on both sides of the piece, (Lurie and Jeske 1990:285).

Bifaces account for 18 percent of the Mississippian tool assemblage at the West knoll. Nearly half of these (n=61) are Mississippian Triangular projectile points which will be discussed in greater detail in the following section. Several distinct morphological categories of bifaces were observed during the analysis. These categories include drills, hafted bifaces, bifacial preforms, humpback bifaces, bifacial fragments, and projectile points .

Hafted Bifaces (N=4)

Four hafted bifaces were observed during the lithic analysis. All appear to be broken corner-notched projectile points which recycled for use as hafted end-scrapers. The overall morphology of these four hafted end-scrapers is very similar. One shows signs of basal grinding while another shows haft wear, possibly from long use. Two are pristine while the other two have been broken. The end functional units on all four are blunt and extremely convex forming an arc from shoulder to shoulder. Edge angles are variable with one item measuring less than 45 degrees, one item measuring 46 to 75 degrees, and two items measuring greater than 76 degrees. Three of the hafted end-scrapers were recovered from feature context while the other was a general surface find collected by Andrews University.

Bifacial Preforms (n=12)

Bifacial preforms (Figure 6) are distinguished by their ovate or trianguloid shape, recognizable proximal and distal ends, and nearly

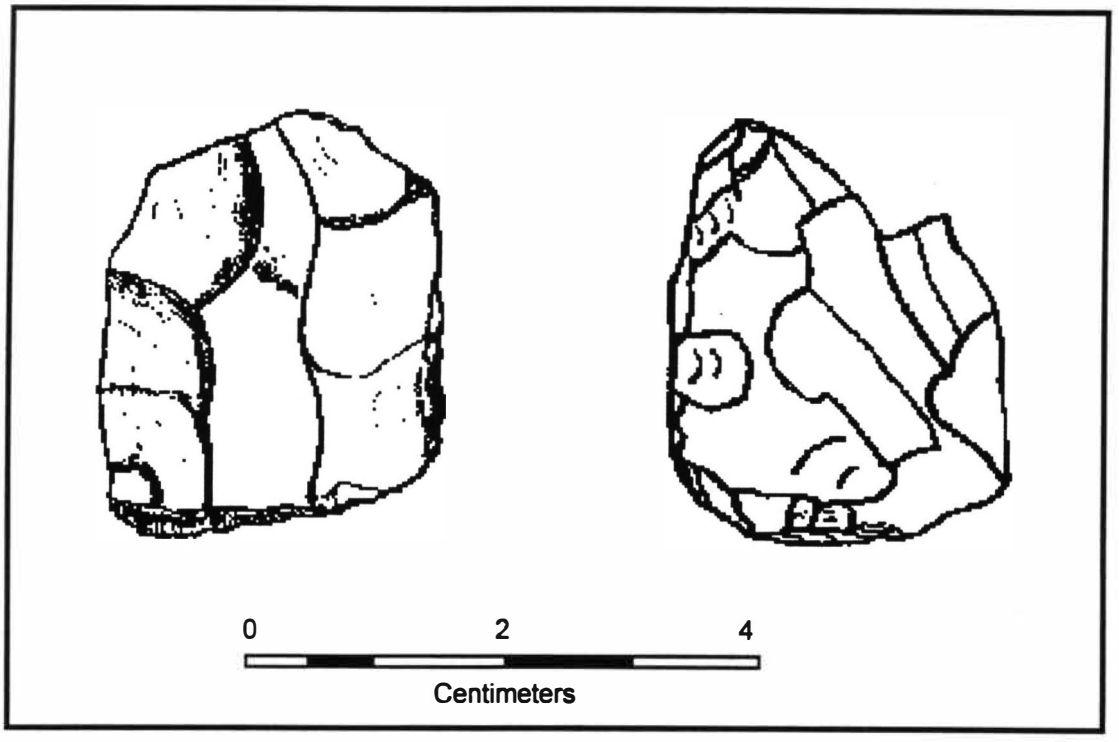

Figure 6. Representative Sample of Bifacial Preforms.

uniform lack of utilized edges. Those items that do show evidence of utilization appear to have been broken at some point during reduction leaving a bifacial remnant. Preform morphologies vary greatly and do not appear to adhere to a standard pattern.

Drills (n=19)

Drills represent two percent of the tool assemblage associated with the Mississippian occupation of the Wymer-West knoll (Figure 7). All 19 items are fragmentary. Five of the tools retain portions of the base. Hafting elements on these five items fall into three general morphological categories; straight sided (n=1), expanding stem (n=2), and T-shaped (n=2). Bettarel and Smith (1973:121) indicate similar

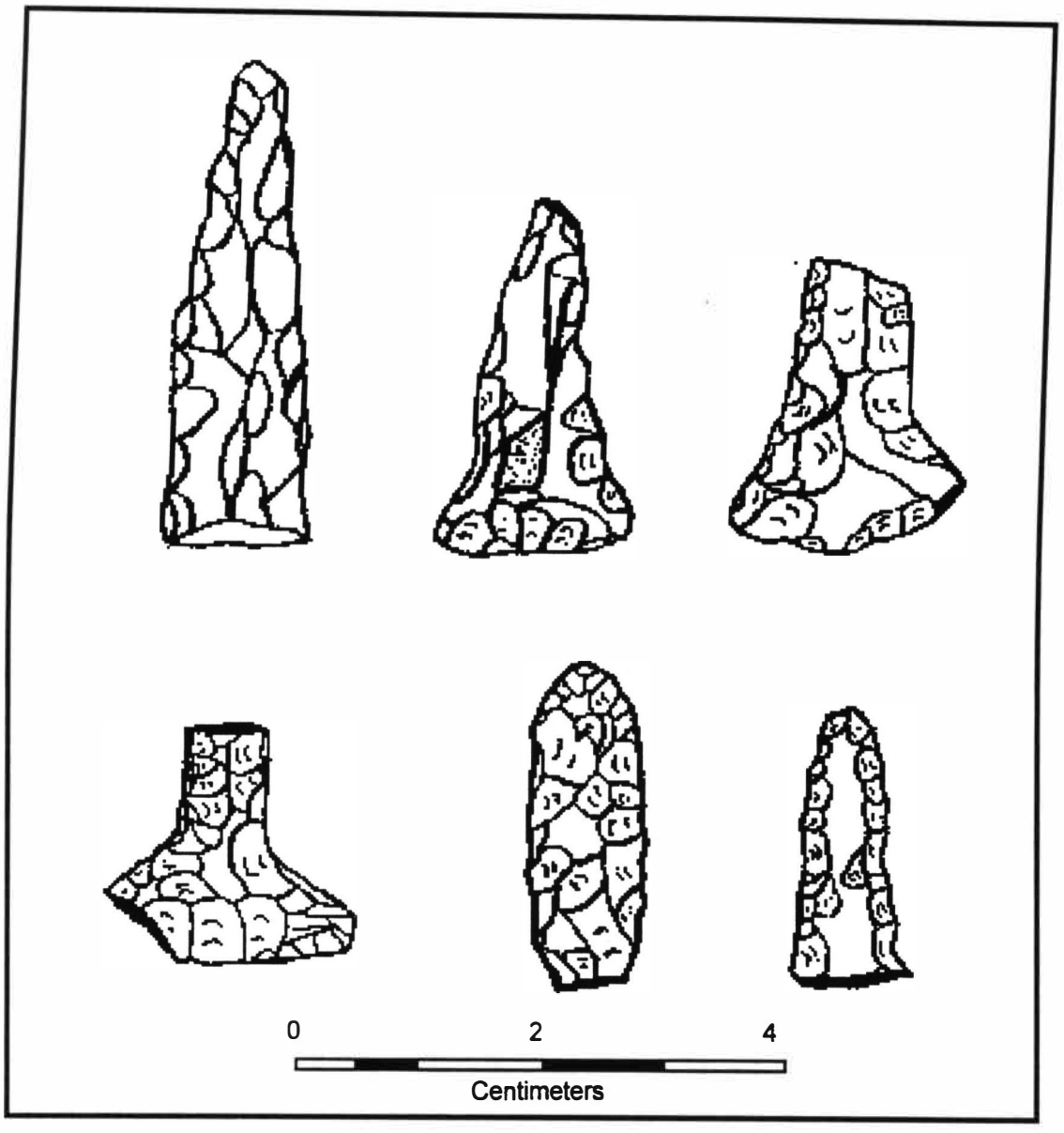

Figure 7. Representative Sample of Drills.

morphologies at the Moccasin Bluff site. They also note the rarity of T-shaped drills on Oneota sites.

None of the tools are notched. Three items possess a glossy sheen on the tip and disto-lateral margins, indicative of extensive use. All items are bifacially retouched. All of the drills, with one ex-

ception, are manufactured from local raw materials. One is made from Attica chert, an exotic raw material from west-central Indiana (Goatley 1993:40). This item retains only the distal half which appears to be very finely crafted with precise pressure flaking.

Humpback Bifaces (n=6)

There were six so-called humpback bifaces observed at the West knoll (Figure 8). These diagnostic tools have been observed and noted in the literature for many years (Brown 1961; Bluhm and Liss 1961:114,116; Faulkner 1972:89; Bettarel and Smith 1973:43,121; Jeske 1990:229) but as yet are poorly understood. They have alternately been called "scrapers" (Brown 1961:54) and "knives" (Munson and Munson 1972). They are quite common on Upper Mississippian sites but also occur in smaller numbers on Middle Mississippian sites (Jeske 1992).

Humpbacks from the Wymer-West knoll site are similar to those described elsewhere (Jeske 1992:470; Lurie 1990:231). They are bifacially worked, generally triangular in shape, with varying degrees of refinement, and a pronounced hump in the center of the tool. All are made from poor quality locally available cherts. Only two of the Wymer examples show step-fracturing, an indication of difficulty in bifacial thinning during the reduction sequence.

Lurie (1990) performed use-wear analysis on five humpback bifaces from the Upper Mississippian Oak Forest site in northern Illinois. She found "unidentifiable abrasion and striations...on a few

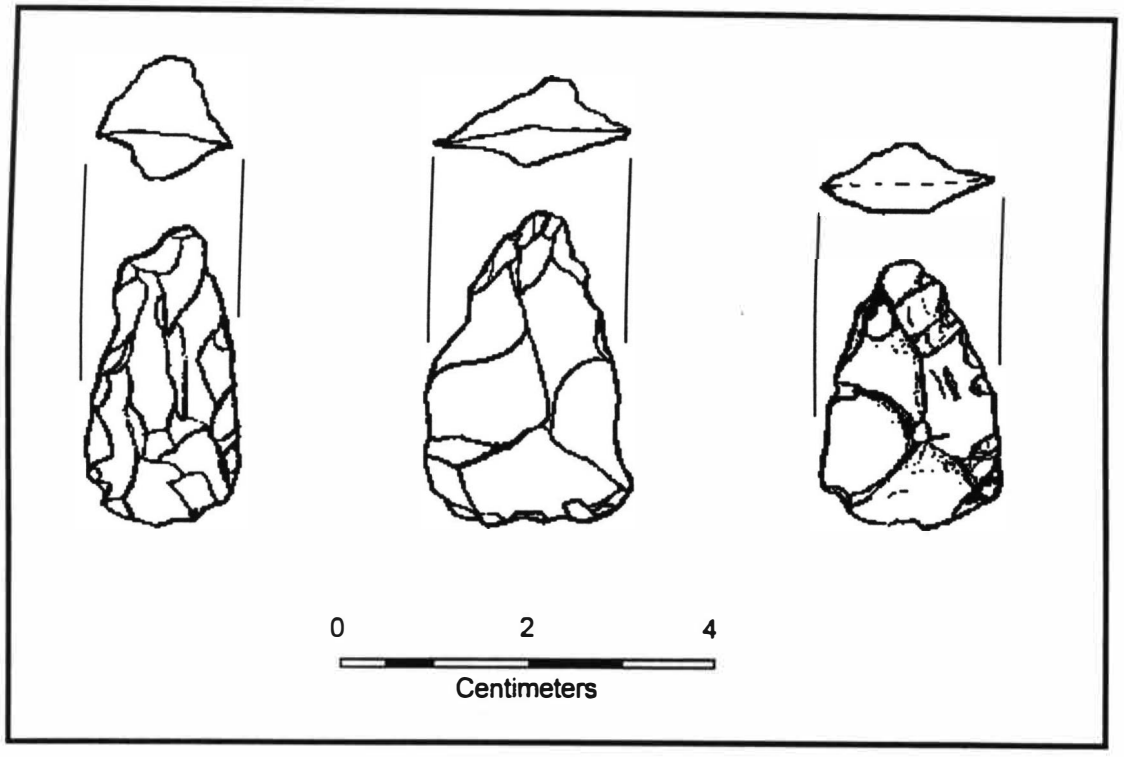

Figure 8. Representative Sample of Humpback Bifaces.

of the humps" (Lurie 1990:231) but no definite indication of haft wear. She suggests analysis on a larger sample of tools to obtain more conclusive results.

Jeske, on the other hand, suggests that humpback bifaces are not a "functional class" at all but a "manufacturing type" (Jeske 1992:471). His interpretation is that these bifaces "are the result of bipolar manufacture using poor-quality material and are not an intentional end product" (Jeske 1992:471).

There is evidence for bipolar lithic manufacture at the Wymer-West knoll. Jeske (1992:471) suggests that,

> [humpback bifaces] can best be understood as a result of the need for Upper Mississippian knappers to make do

with poor quality or insufficient supplies of chert for artifact manufacture.

It is suggested that the inhabitants of the Wymer-West knoll were in the same situation with regard to the availability of good quality cherts. Using a bipolar technique on the materials they had available to them produced similar, though unintentional, results.

Unhafted or Bifacial Fragments (n=58)

Unhafted bifaces (Figure 9 and Table 4) are those which do not fall into any of the aforementioned diagnostic biface categories. These tools may include those that show evidence of bifacial modification but which may be too fragmentary for formal identification. Unhafted bifaces account for seven percent of the Mississippian tool population from the West knoll. Most of these tools were recovered from plow zone contexts.

Unifacial Tools (n=63)

Unifacial tools (Figure 10) were defined as those where the "body of the piece has been shaped on one side. There must be at least one flake scar that does not originate on the edge on the shaped face" (Lurie and Jeske 1990:285). Using this definition it was possible to isolate and identify those tools which, under traditional classification schemes, might be classified as bifaces due to bifacial edge retouch, or utilized flakes due to the presence of a utilized edge on an otherwise unmodified flake. Most of the tools classified as

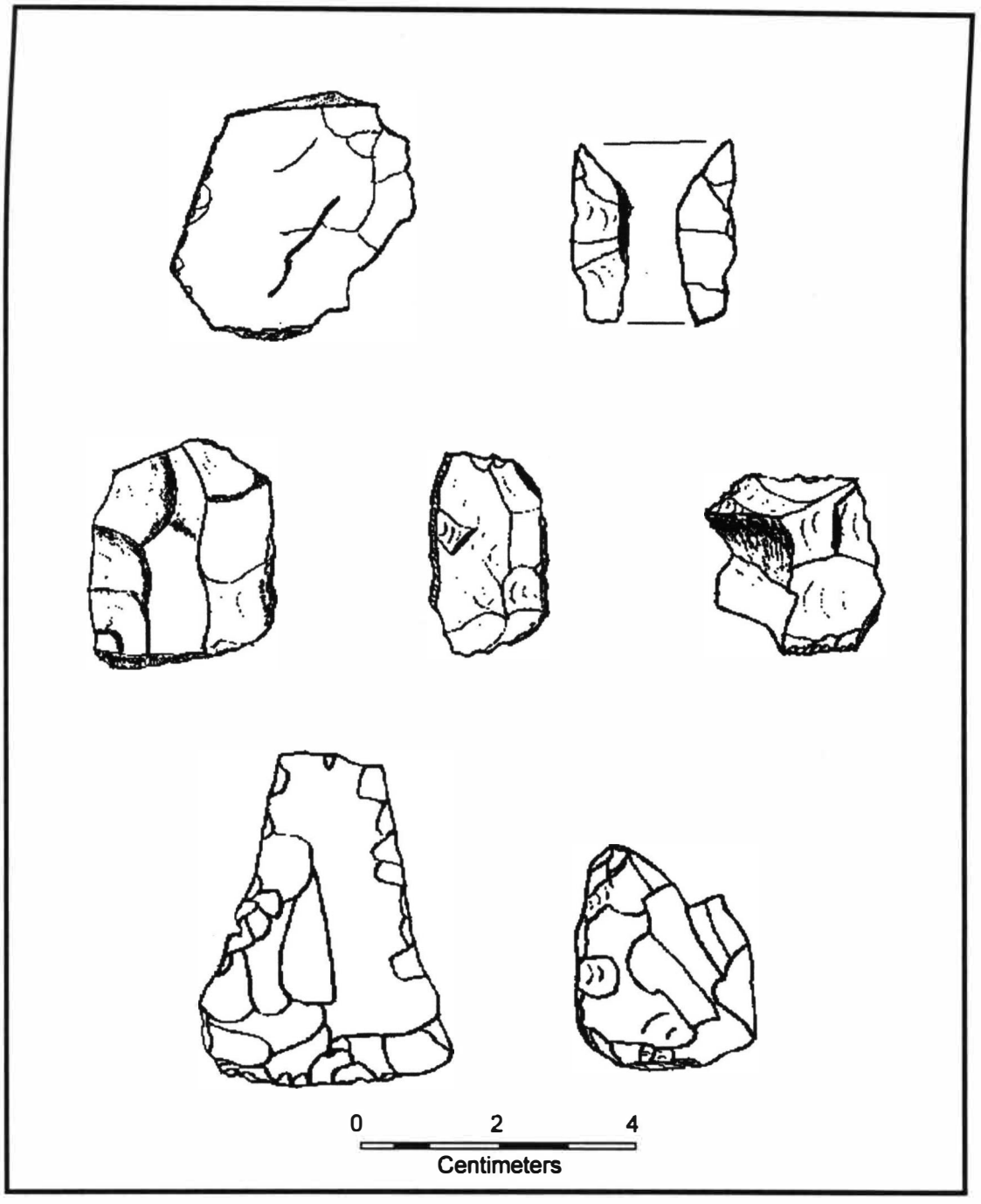

Figure 9. Representative Samples of Unhafted and Bifacial Fragments.

unifaces are less formal diagnostic tools than they are opportunistic flakes and fragments which have been further modified to produce a

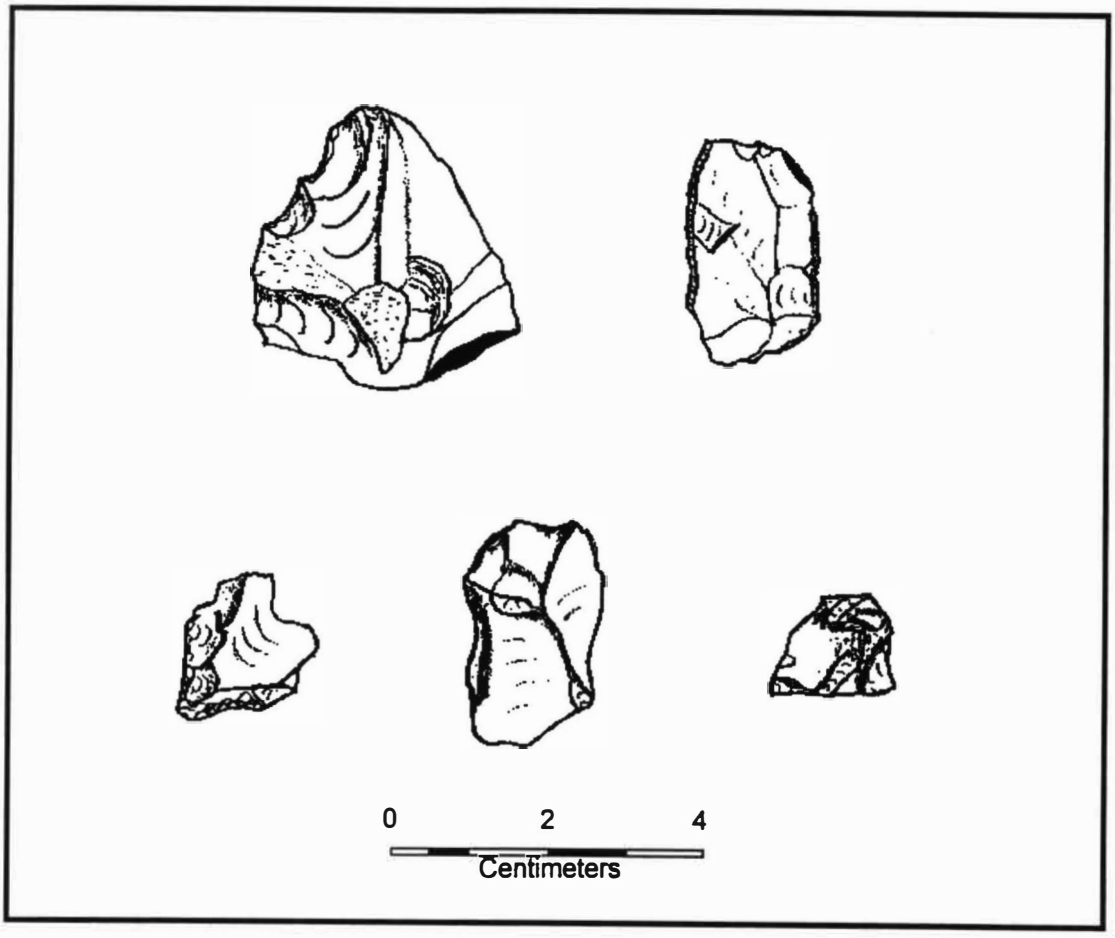

Figure 10. Representative Sample of Unifaces.

usable tool. Four of these tools possessed graver facets useful for scoring and engraving wood and bone.

Blades (n=37)

Blades (Figure 11) are a prominent tool type found in features at the Wymer-West knoll site. Blades were defined as "flake(s) with parallel edges and at least one ridge running the length of the dorsal surface of the piece" (Lurie and Jeske 1990:285). Any working of the surface was usually done prior to removal from the core. It must be

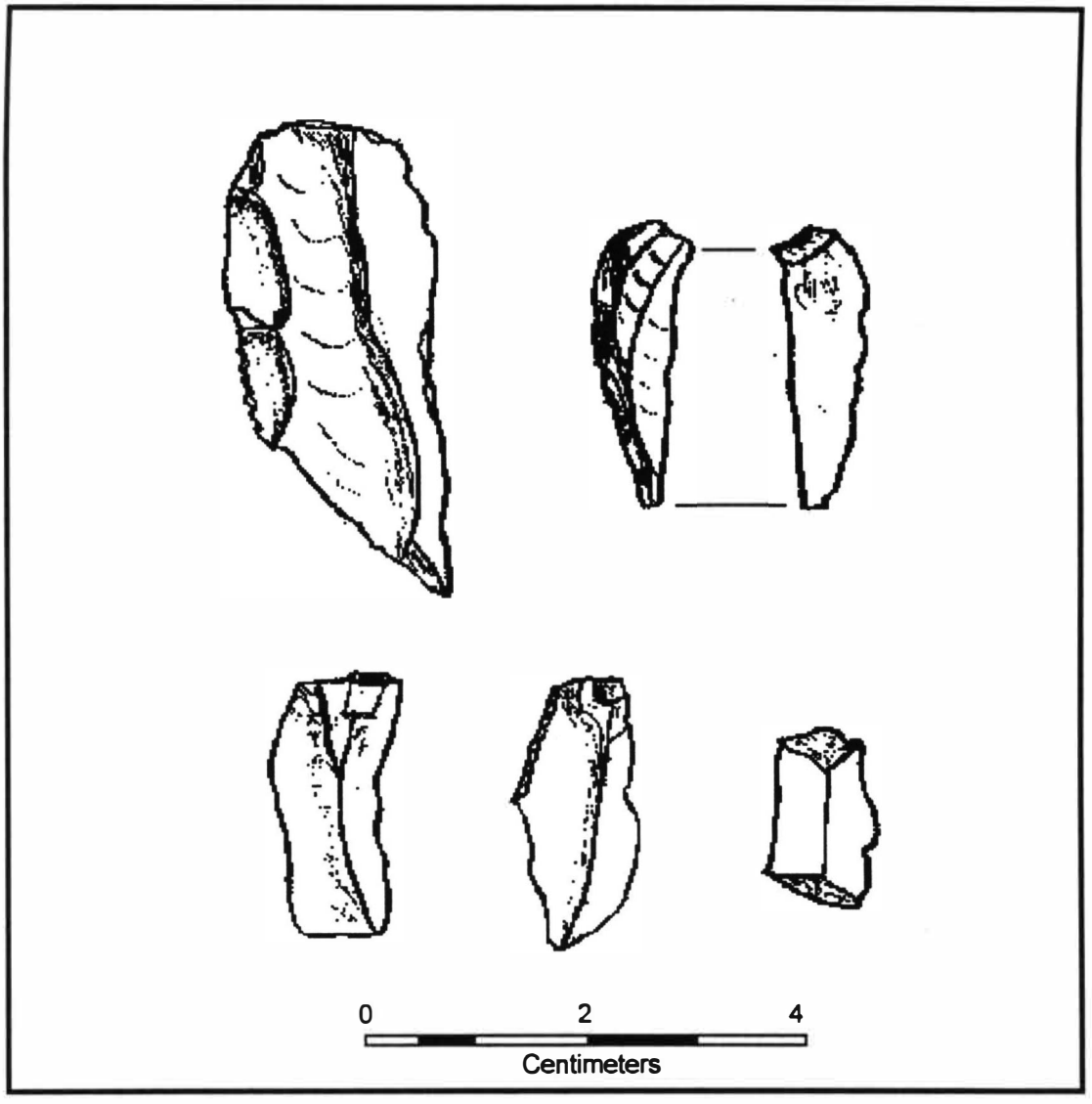

Figure 11. Representative sample of Blades.

noted that no formal prismatic blade cores were observed at the Wymer-West knoll site. It is suspected that the blades observed in the excavations at the West knoll were removed from opportunistic cores during core reduction and tool manufacture.

The blade definition used in this thesis is markedly different from Clark's (1990:12) definition which requires evidence of

"deliberate core-platform preparation and the removal of successive blades." This definition may be useful in discerning the presence of a formalized blade industry, like those observed in Hopewell contexts in the Midwest. In the absence of a formal blade industry, however, a more generalized definition was favored.

In discussing the mortuary offerings at the Norton Mounds (Griffin, et al. 1970), Clark (1990:12) suggests that "our perceptions of what constitutes a tool or potential tool are perhaps more stringent than is apparent from the assortment of functionally equivalent forms," found in these mortuary contexts. The implication is that while there have been many attempts to singularly define what constitutes a blade (Sanger 1970; Fairchild 1977; Lurie and Jeske 1990), from a functional perspective, the technology used to produce the tool is less important than the end product.

Blades, as defined above, are prominent throughout the Mississippian area of the Wymer-West knoll. Each feature where blades were recovered (Table 5) also contains faunal material supporting the interpretation of these tools as cutting and slicing implements. Of the 37 blades recovered from excavations at the West knoll, only 13 show macroscopic signs of use wear and/or flaking modification. Seven of these show evidence of more than one functional edge. While this may indicate that fewer blades were actually used than have been identified in the West knoll collection, the identification of blades was based on distinct morphological criteria. Since a usewear analysis

Table 5

Content of Features Excavated by Western Michigan University

Fea#	FCR/ Wt g	Tools/N	Non-Local Chert Debitage/N	Fauna/ Wt g	Nutshell/ Wt g*	Seeds & Tubers/N*	Pottery/ Wt g**	C-14 Dates
50	6/0.4				Qusp/0.03			
51a		AC/1 BPC/1 UTF/1				Maize cupule/1 UI Tuber/2	GT/39.4 ST/6.0	
51b				UI Bone/0.1	Juni/0.01	UI Tuber/7	ST/10.9	1040, 1095 1119, 1140 1151 A.D.
52	1/0.01							
55		UTF/1				Monocot Stem/1		
56					Casp/0.04			
58	30/1.5	AC/5	BL/8	Deer/32.85	Juni	Maize cob/2	ST/83.2	389 B.C.

Table 5 -- Continued

Fea#	FCR/ Wt g	Tools/N	Non-Local Chert/N	Fauna/ Wt g	Nutshell/ Wt g*	Seeds & Tubers/N*	Pottery/ Wt g**	C-14 Dates
58, cont.		UTF/5 BPC/3 BFC/2 BLD/2 Thebes/1 Three Oaks/1 Triangular/1	BP/3 ML/5 HT BL/2	Sturgeon/1.25 UI Bone/27.95	Juci Casp/6.2	Maize kernel/1 UI Tuber/1		
59a	5/1.0	BLD/2	ML/2	Turtle				
59b	4/0.2	DRL/1	BL/1	Shell/0.4			b;ST/11.7	
			UI	Shell/0.1				
61	3/0.2				Ju/0.01		ST/13.5	
62				Turtle Shell/0.1	Casp Juni Ju/ 19.64	Maize cupules/6		1332, 1343 1394 A.D.

Table 5 -- Continued

Fea#	FCR/ Wt g	Tools/N	Non-Local Chert/N	Fauna/ Wt g	Nutshell/ Wt g*	Seeds & Tubers/N*	Pottery/ Wt g**	C-14 Dates
63a & 63b		BPC/6 UTF/5 GVR/1 HUFC/1 BFC/1		UI shell UI bone	63a; Juni/0.03 Juci/0.19	Maize cob/1 Maize kernel/1	ST/2.9 SP/0.6	
63c	6/0.3	BPC/4 UTF/4			Qusp/3.08 Ju		ST/4.6	
64	28/1.4	BLD/4 UTF/4 UFC/3 AC/2 BPC/2 PC/1 BFC/1 BPFRM/1 Bifurcate/1 Triangular/1	ML/12 BL/6 WC/4 HT BL/3 FR/3 BP/2	Mammal/246.2 Fish/121.15 Reptile/30.6 Bird/0.45 UI/98.45	Juci/2.05 Ju/0.19 Casp/0.14 Juni/0.1	Maize cupule/3 Maize kernel/16 Maize embryo/1 Chenopod/1	ST/118.8 SP/1.8 SGT/0.9 GT/21.6	

Table 5 -- Continued

Fea#	FCR/ Wt g	Tools/N	Non-Local Chert/N	Fauna/ Wt g	Nutshell/ Wt g*	Seeds & Tubers/N*	Pottery/ Wt g**	C-14 Dates
65	49/3.1	UTF/2 BFC/1 BLD/1 Triangular/1		Sturgeon/11.4 Mammal/1.8	Juci/1.84 Ju/0.03 UI/0.1	Maize kernel/10	ST/129.8 SP/3.4	
66	14/2.8	Triangular/1	BL/1			Maize kernel/3	ST/218.9	985 A.D.
67		BPC/5 HT UTF/5 AC/3 UFC/1 DRL/1	BL/2	Mammal/3.2 UI/0.1	Juni/0.24 Qusp/0.17 Casp Ju Juni Qusp/ 14.66	UI Tuber/2 UI Seed//2	ST/2.5	
68	7/0.9	AC/1 BPC/1 UTF/1 Triangular/1		UI/0.25	Qusp/1.14	UI seed/1		

* Parker (1991)

** Greve-Brown (1997)

Key

Lithics	Non-Local Cherts	Nutshell	Pottery
AC = Amorphous Core	BL = Burlington	Casp = Hickory	GT = Grit Tempered
BFC = Biface Fragment	HT BL = Heat Treated BL	Ju = Walnut/Hickory	SGT = Shell/Grit Tempered
BLD = Blade	BP = Bayport	Juci = Butternut	SP = Sandy Paste
BPC = Bipolar Core	FR = Flint Ridge	Juni = Black Walnut	ST = Shell Tempered
DRL = Drill	ML = Moline	Qusp = Acorn	
GVR = Graver	WC = Wyandotte/Cobden	UI = Unidentified	
HUFC = Hafted Uniface			
PC = Prepared Core			
UTF = Utilized Flake			

was not the focus of this thesis, it was felt that the identification of blades based on morphology was appropriate.

Blades from both the Andrews and Western Michigan University excavations units were analyzed together. Though no faunal material was collected during the Andrews University excavations, the presence of blades throughout the Mississippian habitation area indicates food processing activities occurred throughout the site. Harn (1980:90) observed similar tools at the Dickson Mounds which he called "flake blades." Though few were noted, he defined them as "General Utility Tools", a classification which seems appropriate for the Wymer-West knoll as well.

Utilized Flakes (n=310)

Edge-modified-only or utilized flakes account for 33 percent of the total Mississippian chipped-stone tool assemblage from the Wymer-West knoll site. Edge modification was noted as nibbling or stepping along an edge margin. This patterning was created through intentional flaking and retouch, through battering and chopping, or through use as a tool (Lurie 1990:219, 227).

Ground Stone

Numerous ground stone fragments were noted during the excavations at the Wymer-West knoll. Fragments consisted of possible hammerstones, grinding stones and miscellaneous pitted cobbles. The fragmentary nature of the collection makes it difficult to determine

exact numbers of artifacts. All ground stone objects were observed in the plow zone and plow damage was the major factor in reducing the integrity of the cobbles themselves. Cobblestones are a valuable resource providing a durable tool with many uses. It is probably accurate to suggest that ground stone was used for many tasks on the Wymer-West knoll.

Tools made from ground stone take many forms. Hammerstones have a characteristic pitting along the edges resulting from striking the tools against other objects (Herold, O'Brien, and Wenner 1990:64). Hammerstones usage may include primary and secondary chert reduction, cracking nutshells, and breaking up bones for marrow extraction. While it is likely that hammerstones were used at the Wymer-West knoll, no complete specimens were observed in the lithic analysis.

Manos are waterworn cobbles with a flat side resulting from use in grinding (Bluhm 1961). Two ground stone tools from the Wymer-West knoll (Units A and P) could possibly have been used as manos. Both exhibit flat, worn surfaces probably due to grinding. Neither exhibit signs of pecking or pitting along the edges indicating they were probably not used as hammerstones. The presence of maize horticulture at the site (Parker 1991) also indicates that ground stone was probably being used in food processing. Greve-Brown (1996b) speculates that one of these tools (from Unit A) may have been used in the manufacture of pottery at the site. The piece fits nicely in the hand and could be used in combination with a paddle to help

flatten the walls on new ceramic vessels (Greve-Brown 1996a). Another tool (Unit N), made of a dark grey basalt appears to also have been used as a mano or metate. This artifact, though fragmentary, has obvious smoothing and worn areas indicating prolonged use, possibly for grinding maize.

The fourth piece of ground stone is a smoothed piece of very fine grained sandstone recovered during the Andrews University excavations in the plowzone of Unit B32. The surfaces of the tool are very rounded and a hole is drilled in one end possibly to hang the tool from a thong for easy accessibility. One surface is more smoothed than the rest and appears slightly concave with narrow striations. This appears to have been the utilized surface of the tool. The tool does not show any indications of use as an abrader, common on Mississippian sites (Herold, O'Brien, and Wenner 1990:70; Harn 1980:94). Suspecting that the piece was also used in the manufacture of pottery, Greve-Brown (1996b) experimented using the tool to smooth leather-hard clay and then examined the markings. What remained on the clay after using the tool closely resembled smoothing marks left on many of the ceramic vessel rims recovered from the site.

While it is clear that ground stone was being used in various aspects of food processing, it also appears that it had other uses at the Wymer-West knoll as well. Assuming ground stone was used as described above, it provides additional evidence that pottery was being manufactured on site at the Wymer-West knoll (Greve-Brown 1997).

Debitage

Lithic debitage is the by-product of the tool manufacturing process. The intent in analyzing the debitage was to better understand the process of lithic reduction used by the inhabitants of the Wymer-West knoll. Lithic debitage from Mississippian feature content was categorized according to core reduction stage (Table 6). Seven stages of core reduction are defined and used in this analysis. The reduction stage definitions used in this analysis are partially based upon the classifications of Caven Clark (1990:8) and Theresa Hoffman (1976). Hoffman's addition of a bifacial thinning flake category is incorporated into this analysis to help develop a clearer picture of the later stages of the lithic reduction sequence. The condition of the dorsal surface was used as the primary criteria for classifying a flakes placement in the reduction sequence. Like Clark, it was felt that the small size of the local pebble cherts would unnecessarily bias the analysis towards a classification based on size rather on technology if size was used as a criteria.

Block Shatter (n=188)

Block debitage are angular chunks of raw material which lack definite flaking platforms, bulbs of percussion or easily recognizable scars from flake detachment. They are a by-product of initial reduction and testing, resulting from fracturing along freeze planes and natural flaws in the raw material (Clark 1990:9). Block debitage is

Table 6

Distribution of Debitage on the Wymer-West Knoll by Feature

Provenience	SHTR	PDF	SDF	BPF	TER	BTF	FRG	N	Wt/g
91-51a				1	3	2	1	7	3.9
91-51b			1	3				4	1.8
91-52					1	1	1	3	.9
91-54			1	1				2	1.0
91-56					1			1	.3
91-58	18	17	50	12	88	54	29	268	214.75
91-59	2		2		2	2		8	11.7
91-59a	4	2	4	2	8	8	3	31	21.5
91-59b		1						1	.7
91-61			1	1				2	1.6
91-63a	1	4	2	5	3	4	1	20	28.85
91-63abc		2	1	3		5		11	9.65
91-64	15	11	29	7	101	74	16	255	136.3
91-65	6	5	2	12	7	3	2	37	36.5
91-66		1	1		9	1	1	13	14.7
91-67	16	14	16	10	28	13	14	111	142.8
91-68			1	5	4		1	11	27.4
92-69			1		2	3		6	1.9
A0-5	9	28	56	4	141	80	14	332	148.2
B31-3				1	3			4	8.5

Table 6 -- Continued

Provenience	SHTR	PDF	SDF	BPF	TER	BTF	FRG	N	Wt/g
B31-4	1				2	5		8	3.4
B32-3	4		7	1	19	10	4	45	21.7
B32-4			1	1	1			3	3.9
B32-5			1					1	1.1
B32-7	9	13	26	6	66	39	13	172	85.6
B32-8	4		8		29	18	9	68	31.7
B62-3	10	8	24	3	59	59	13	176	88.5
D0-5	16	13	34	3	80	66	28	240	81.1
D0-6	1	4	4		14	7	1	31	9.3

Key to Abbreviations:

SHTR = Block Shatter
PDF = Primary Decortication Flake
SDF = Secondary Decortication Flake
BPF = Bipolar Flake
TER = Tertiary Flake
BTF = Bifacial Thinning Flake
FRG = Fragment

characteristic of the very early stages of the core reduction process and accounts for roughly seven percent of the debitage recovered from Mississippian feature context.

Primary Decortication (n=175)

Primary decortication flakes are also characteristic of the initial stages of core reduction. These flakes have 90 to 100 percent un-

modified cortical rind on the dorsal surface of the flake. For the purposes of this study, cortical rind is any surface which lacks evidence of human fabrication. Examples would be those pieces of debitage that are water-worn and patinated. These flakes lack platform development but often exhibit well defined bulbs of percussion. These observations indicate that the manufacturing technique at this stage of the reduction process is typically hard hammer percussion. Primary decortication debitage makes up six percent of the Mississippian feature debitage from the West knoll.

Secondary Decortication (n=474)

Secondary decortication is the next stage in the process of removing the cortex from the core. These flakes have 50 to 90 percent cortex on the dorsal surface of the flake. Scarring from previous flake detachment is evident in most cases. They are typically smaller than primary decortication flakes as a function of the more advanced stage in the reduction sequence. This, however, was not a criteria used in their classification. Platform development is still minimal or absent completely. Bulbs of percussion are common on the ventral surface and the manufacturing technique is alternatively hard or soft hammer percussion. Like primary decortication debitage, local cherts are characteristic at this stage in the reduction sequence. Exotic cherts such as Moline, Flint Ridge, and Wyandotte/Cobden, are also represented, albeit in limited numbers. Secondary decortication

flakes make up 15 percent of debitage recovered from Mississippian features.

Bipolar (n=98)

Bipolar debitage results from a bipolar percussion technique described by Binford and Quimby (1963). This technique involves resting a core upon an anvil and striking it with a hammerstone. A bipolar technology is often used in the reduction of cores which are too small to be held comfortably while being held in the hand. Due to the bi-directional force involved in bipolar percussion, flakes are often broken and fragmented. Those flakes which remain whole frequently exhibit two bulbs of percussion, one slightly larger and more prominent than the other. Bipolar flakes are predominately made from local raw materials. Exotic cherts are also observed where a bipolar technique is used in the reduction of exhausted bifaces. Bipolar flakes account for five percent of the feature related debitage.

Tertiary (n=1112)

Tertiary flakes are by far the most prevalent form of debitage observed in the Mississippian component of the West knoll. These flakes have zero to less than 50 percent cortex present on the dorsal surface (Hoffman 1976:107). Numerous dorsal flake scars are typical. Bulbs of percussion are present though not as well defined as decortication flakes. Flake terminations are often feathered and platforms

are unprepared. The manufacturing technique is probably a combination of soft and hard hammer percussion.

Exotic raw materials are well represented as tertiary flakes, accounting for roughly seven percent of the flake category by number (Table 7). Tertiary flakes account for 34 percent of the Mississippian feature related debitage.

Tertiary flakes may represent the early stages in the flake tool production sequence (Hoffman 1976:107). Flake tools at Wymer include utilized flakes, unhafted unifaces, and triangular projectile points.

Bifacial Thinning (n=796)

As the name would suggest, these flakes are the by-product of bifacial thinning and retouch. They normally have numerous dorsal flake scars and are very thin in crossection. A lip at the proximal end of the flake is diagnostic of this stage of reduction and is the characteristic striking platform in the thinning process. This lip is the remnant of the bifacial edge. Distal ends are typically feathered and can be translucent depending on the source material. Bulbs of percussion are minimal and diffuse. These characteristics indicate the use of soft hammer percussion or pressure flaking in the thinning process.

Like tertiary flakes, exotic raw materials are commonly represented as bifacial thinning flakes. Eight percent of bifacial thinning flakes are made from exotic cherts. Bifacial thinning flakes account for 25 percent of feature related debitage.

Table 7

Mississippian Feature Debitage From the Wymer-West Knoll
by Reduction Stage and Raw Material Type

Raw Material	SHTR	PDF	SDF	BPF	TER	BTF	FRG	N	%N*	Wt/g	%Wt*
WC			4	1	16	23	5	49	25	20.6	27
BL			1	2	27	19	3	52	26	18.75	24
ML		2	3		10	14	2	31	16	17.5	23
FR		1	2	1	12	19	2	37	19	9.1	12
AT	1				2			3	2	3.8	5
HT BL	1				4	10		15	7	2.5	3
BP					3	2		5	3	2.5	3
UM	2				1	6		9	5	2.5	3
LGX	184	172	464	94	1037	703	252	2888		1591.3	
N	188	175	474	98	1112	796	266	3088		1668.55	
%N*	3	1	5	2	37	45	7				

* Percentages based on non-local raw materials (N=200, Wt/g=77.25)

Key to Abbreviations

Raw Material

AT = Attica
BL = Burlington
BP = Bayport
FR = Flint Ridge
HT BL = Heat Treated BL
ML = Moline
UM = Upper Mercer
WC = Wyandotte/Cobden
LGX = Local Glacial Till

Reduction Stage

SHTR = Block Shatter
PDF = Primary Decortication Flake
SDF = Secondary Decortication Flake
BPF = Bipolar Flake
TER = Tertiary Flake
BTF = Bifacial Thinning Flake
FRG = Fragment

Fragment (n=266)

Fragments are those pieces of debitage which are broken, lacking the identifiable attributes which would allow them to be placed at a particular stage in the reduction sequence. These flakes are usually small and probably represent fragments of tertiary and bifacial thinning flakes. Fragments represent nine percent of the feature related debitage.

Definition of the Mississippian Lithic Component

The ubiquitous presence and on-site manufacture of Mississippian shell tempered pottery (Garland 1991; Greve-Brown 1997) and presence of maize horticulture (Parker 1991) provides strong evidence for a major Mississippian occupational component on the Wymer-West knoll. Point typology indicates additional minor components dating from the late Paleo-indian period through the Middle Woodland.

The Mississippians at the Wymer-West knoll were utilizing mostly locally derived raw materials (Tables 7 and 8), however, exotic raw materials were also being obtained and used. Burlington and Moline chert, two of the three most common exotic raw materials at the West knoll, account for 42 percent of the exotic raw materials by count and 39 percent by weight (Table 8). Both of these raw materials originate in west-central Illinois (Figure 12) and are common raw materials at many Emergent and Middle Mississippian sites (Emerson, Milner and Jackson 1983; Emerson and Jackson 1984; Harn 1980). The most likely

Table 8

Summary of Raw Materials
for Mississippian Tools

Tool Type	BL	WC	FR	ML	MS	AT	UM	KP	BP	LGX	N
CORES:											
Amorphous	1	1	2	1	1					164	170
Bipolar	2					1				129	132
Prepared				1							1
BIFACES:											
Triangular Points	2					1	1		1	56	61
Hafted								1		3	4
Humpback										6	6
Preform						1				11	12
Drill						1				18	19
Biface	1	2	1		2		1			51	58
UNIFACES:											
Uniface	4		2	1						55	62
Hafted										1	1
OTHER:											
Blade		3	2							32	37
Graver		1	1							2	4
Utilized Flake	4	4		2					1	299	310
TOTAL	14	11	8	5	3	4	2	1	2	827	877

Table 8 -- Continued

Key to Abbreviations

Raw Material

AT = Attica
BL = Burlington
HT BL = Heat Treated Burlington
BP = Bayport
FR = Flint Ridge
ML = Moline
UM = Upper Mercer
WC = Wyandotte/Cobden
LGX = Local Glacial Till

route for the arrival of these two raw materials into southwest Michigan would be by way of the Kankakee River in Illinois (Figure 1). The most prevalent exotic raw material, Wyandotte/Cobden, derives from southern Illinois and southern Indiana (Goatley 1993) and was probably arriving at the site by way of the Wabash River.

Data from the feature debitage (Table 7) suggests an emphasis on late stage tool reduction for Wyandotte/Cobden, Burlington, Moline and Flint Ridge chert. Bifaces, unifaces and triangular points were all manufactured from these exotic raw materials. However, the presence of cores and early stage reduction debitage from these four exotic raw materials in the absence of blanks and bifacial preforms suggests that unfinished, unworked raw material was being imported to the Wymer-West knoll as well. It appears that these exotic raw materials were being brought to the site and subsequently reduced into finished tools and flakes for ready utilization. In contrast, Attica chert is represented by a number of finished tools (Table 8) but very little debitage (Table 7) and no utilized flakes. This suggests that

Figure 12. Locations for Exotic Chert Sources (Goatley 1993:39).

Attica chert was brought to the site in the form of finished tools rather than as core material from which tools could be manufactured.

The nature of exchange is unclear though speculation centers on the Wymer-West knoll acting as a node in an interregional trade network through which Eastern Eight Row maize was being transmitted to the west (Parker 1991:22). The prominence of exotic lithic raw materials from Illinois is suggestive of interactive relationships with groups in that area. In contrast there is a relative lack of exotic raw material originating from Ohio, eastern Indiana, Ontario and eastern Michigan. The association of utilized flakes made from exotic and local raw materials with extensive faunal remains (Table 5) suggests that these flakes were used for the cutting and slicing of hides and meat.

Biface production was projected towards the manufacture of small, bifacially worked flake tools, particularly triangular projectile points. These points were the predominant diagnostic lithic artifact on the Wymer-West knoll (Table 4). The suggestion that triangular points were used as projectiles is reinforced by the fact that 85 percent of the items found at the Wymer-West knoll exhibited breaks at the distal end.

Utilized flakes are common at the Wymer-West knoll (Table 4). Production of these flakes is predominately from the use of amorphous and bipolar cores. The greater number of amorphous cores suggests that the Mississippian occupants preferred the use of freehand percussion. However, the small size of the locally available raw materials also dictated the use of a bipolar technique resulting in a number of bipolar cores as well (Table 4).

Activity Areas and Lithic Concentrations

Excavation strategies differed between Andrews and Western Michigan University excavators. While Andrews University excavated units that were three meters square, Western Michigan University excavated units that were two meters square. The density maps used in this thesis correct for this difference by depicting concentrations per square meter. Andrews excavators revealed 11 identifiable pit features. The term "locus" was used by Andrews excavators to identify most objects within the excavation units including the plow zone, excavation levels, postmolds, pit features and unidentified disturbances. Notes from the Andrews excavations made it possible to distinguish pit features from other loci within the excavation units. The 11 Andrews features and the 18 Western Michigan University features were analyzed together for the following section.

Evidence suggests that the main area of habitation on the West knoll was at the crest of the knoll in the area excavated by Andrews University. These excavations revealed a postmold pattern within a 36 square meter excavation block suggesting the former presence of a structure. The postmold pattern, shown in Figure 13, indicates that the structure was centered within unit B32 with small portions extending into the other three units of the excavation block. It is reasonable to assume that flint knapping debris would be minimal within the perimeter of the structure. Figures 13 and 14 suggest that initial and final stage lithic reduction may be largely confined to

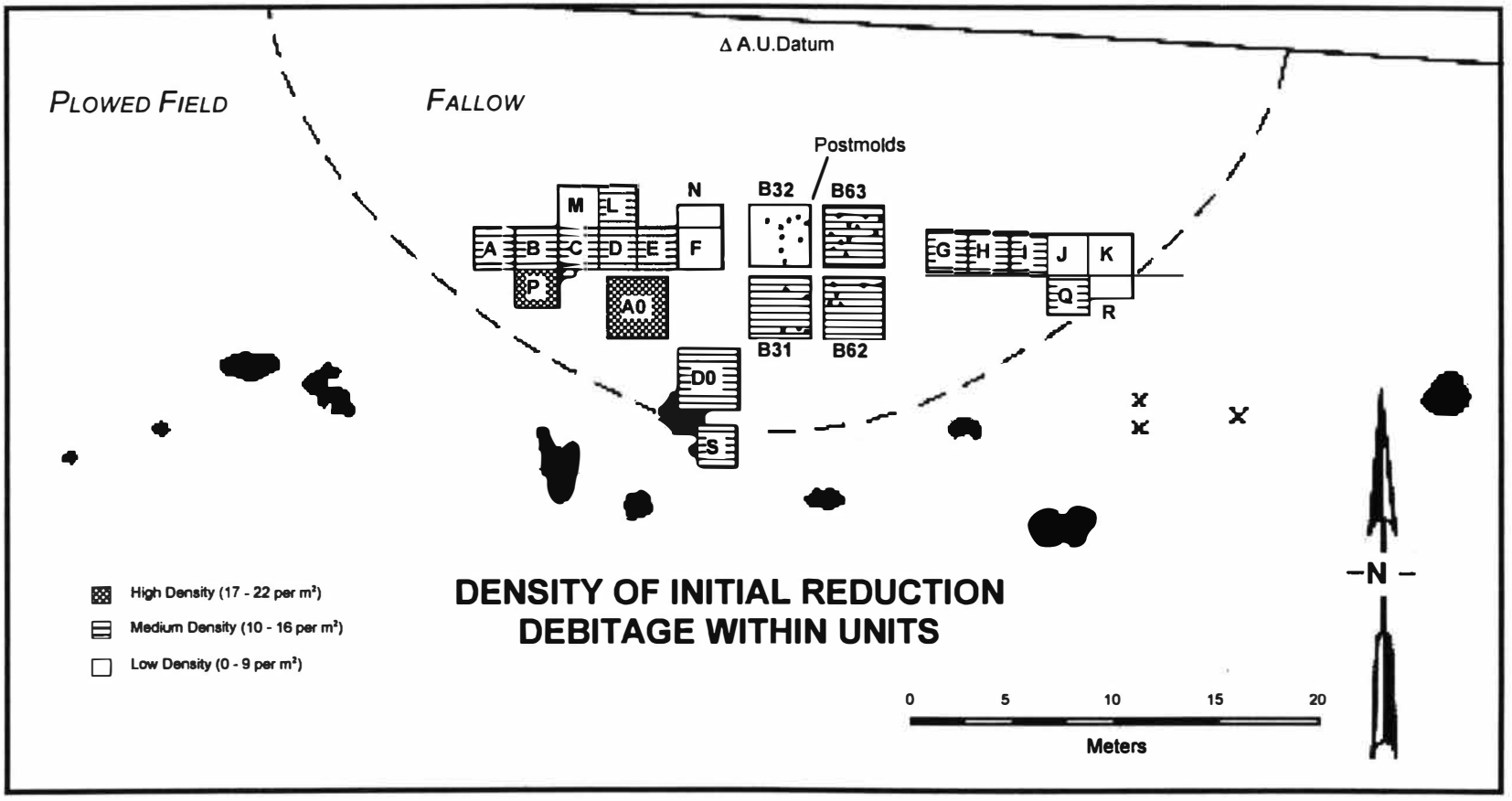

Figure 13. Density of Initial Reduction Debitage Within Units.

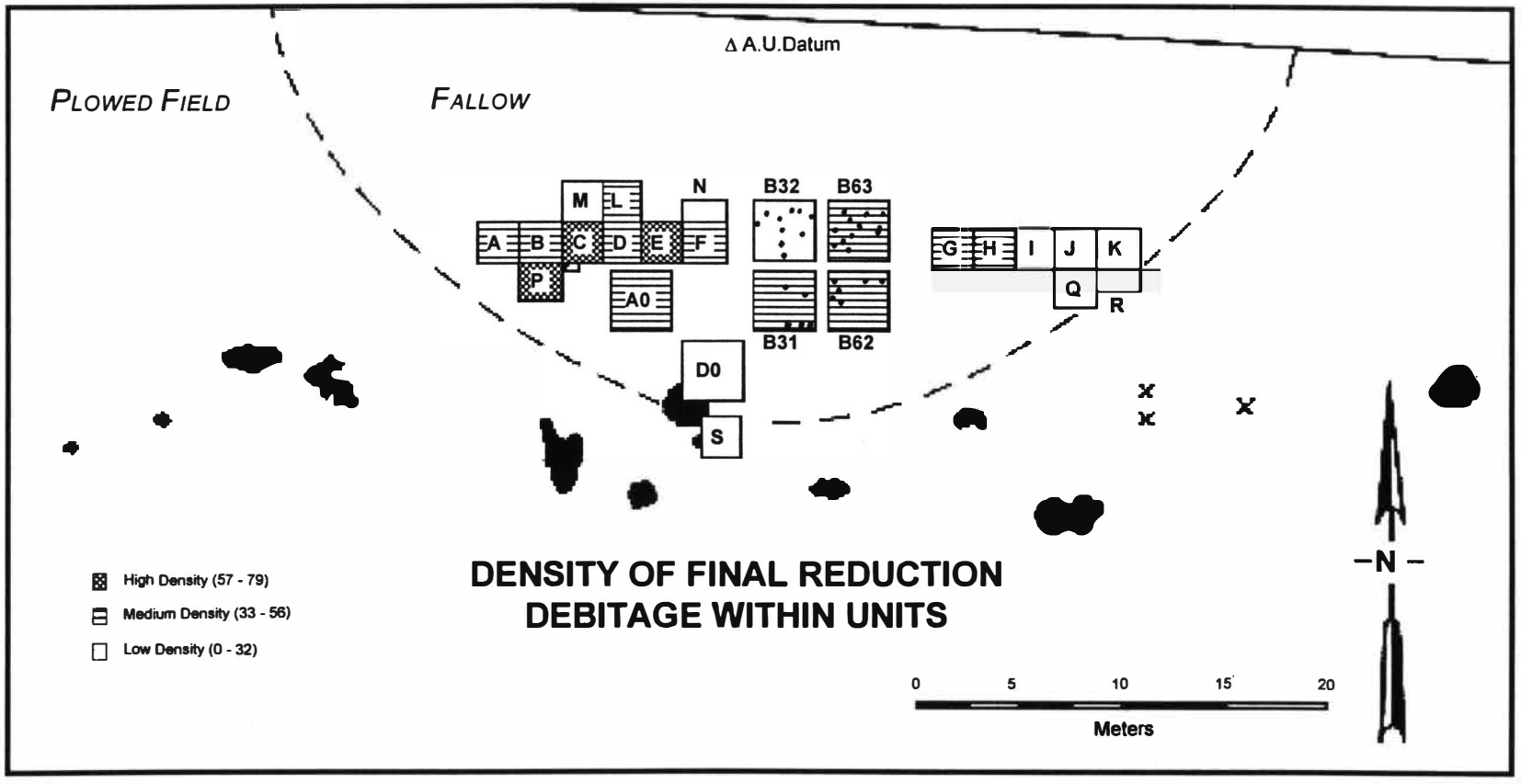

Figure 14. Density of Final Reduction Debitage Within Units.

areas outside the perimeter of the structure in Units B31, B62 and B63. The patterning of lithic deposition observed in these four units gives further support to the suggestion that the postmolds represent a former structure.

Lithic reduction activities were depicted by grouping debitage into initial and final reduction stages. Primary and secondary decortication flakes and block shatter were associated with the initial stages in the lithic reduction sequence. Bipolar, tertiary, bifacial thinning flakes and flake fragments were associated with the final stage of lithic reduction. The reason for defining these two general stages in the lithic reduction sequence was to get a sense of the reduction activities carried out at different locations on the site.

Evidence of lithic reduction, both initial and final stage, is observed across the site. However, the area near units A0 and P show higher concentrations than anywhere else. Both initial and final stage reduction are concentrated in this area suggesting a focal point of lithic activity. Feature A0-5, located within Unit A0, contained a very high concentration of lithic material (Figures 15 and 16). This firepit/trashpit feature was located in the center of excavation unit A0. In addition to a large number of flakes, it also contained bone fragments, pottery, and what was noted by Andrews collectors as possible red ochre.

Features 91-58 and 91-64 also represent areas of highly concentrated lithic activity (Figures 15 and 16). Both features contain the highest incidence of faunal, botanical and lithic material recovered

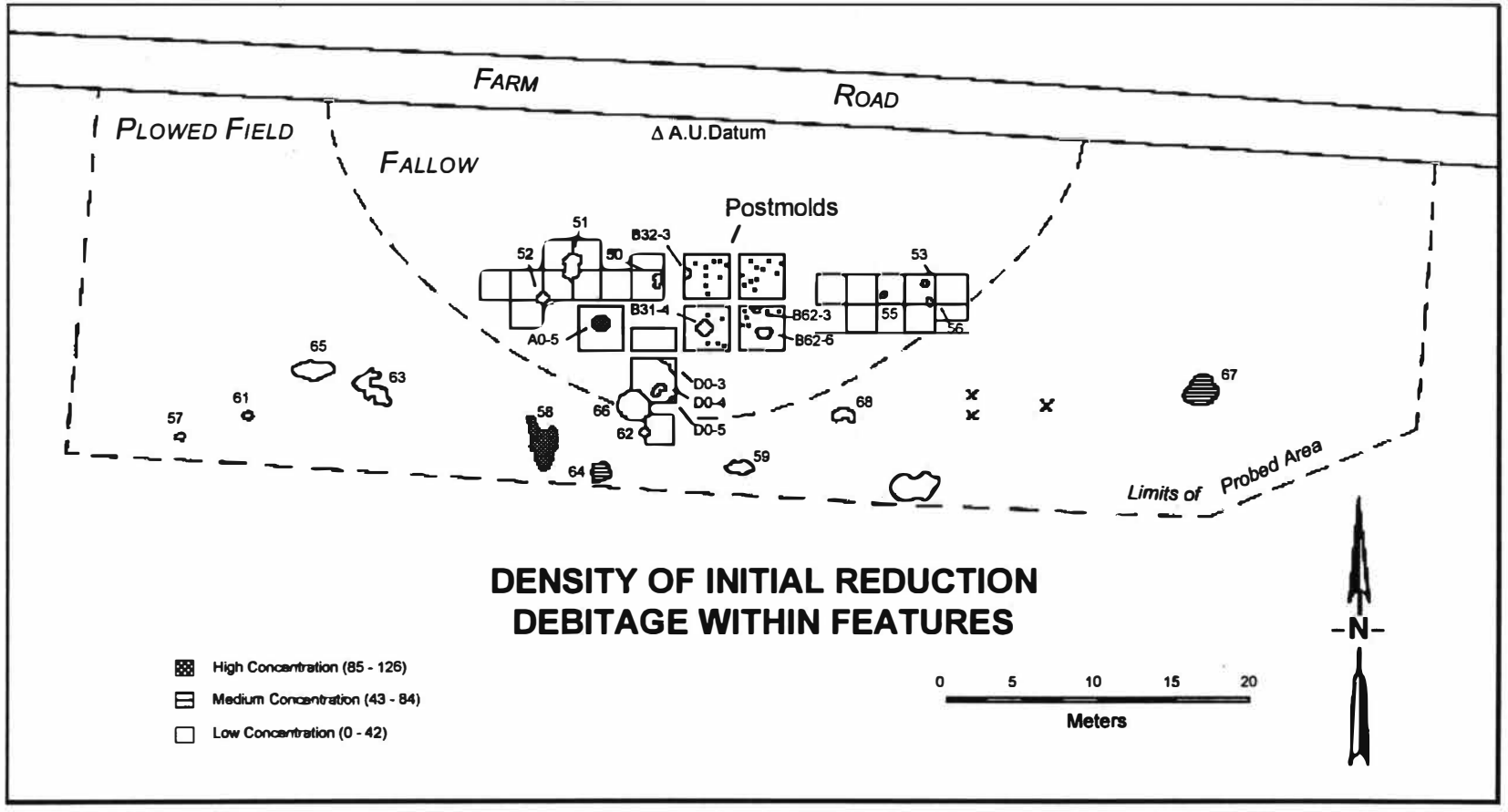

Figure 15. Density of Initial Reduction Debitage Within Features.

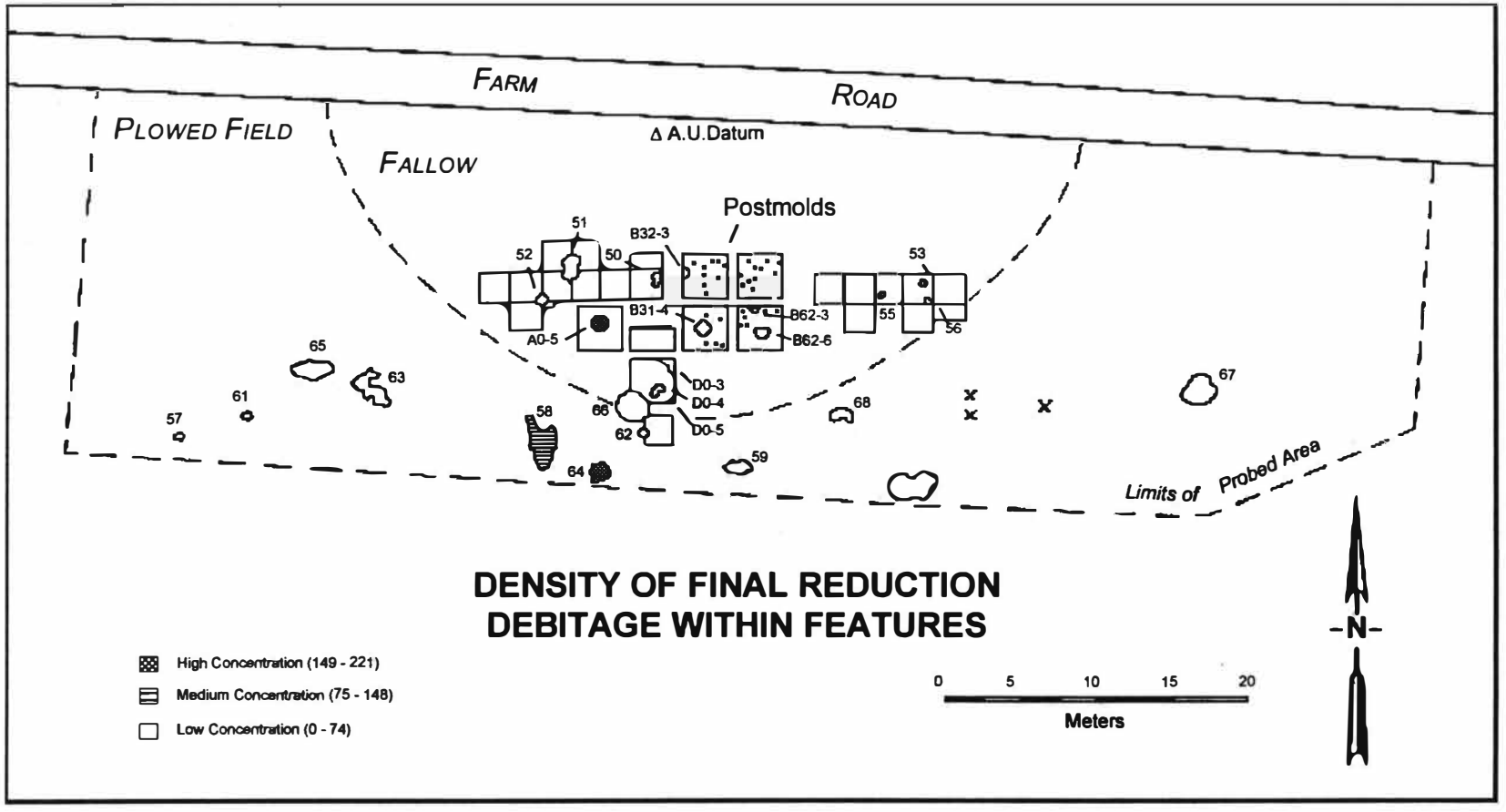

Figure 16. Density of Final Reduction Debitage Within Features.

from the Western Michigan University excavations on the West knoll (Table 5). Lithic evidence suggests that these features represent areas of intensive food processing and waste disposal. Relatively high numbers of blades and utilized flakes (Table 9) help to substantiate the suggestion that A0-5 may have been used in a similar fashion to Features 91-58 and 91-64. The location of these three functionally similar features in the same general area of the site suggests repeated use by the same group of people.

Another activity area at the Wymer-West knoll was in the vicinity of Western Michigan University excavation units G, H, I, and Q on the eastern portion of the West knoll (Figure 13). Three small hearth features were excavated within Units I, J and Q. Features 91-55 and 91-56 had high concentrations of wood charcoal while Feature 91-53 did not (Parker 1991). However, oxidized soil was noted in all three features. It is suggested that the area surrounding these excavation units was used for cooking and meal preparation. Feature morphologies and abundant fire-cracked rock suggest that 91-53, 91-55 and 91-56 were cooking hearths (Garland 1991:43, 55).

Unit H contained the highest density of lithic tools of any of the Western Michigan University excavation units (Table 10). The blades, utilized flakes, unifaces and bifaces recovered from Unit H (Table 10) may suggest final processing of food prior to cooking. Relatively low densities of initial and final stage lithic reduction in the area of Units H, I, J, and Q (Figure 13 and 14) suggest that these lithic tools were being manufactured elsewhere on the site.

Table 9

Distribution of Lithic Tools in Pit Features
on the Wymer-West Knoll

Provenience	AC	BPC	PC	PRE	HFT	BFC	DRL	UFC	BLD	UTF	N
B62-3	8	2			1	1	1	2		3	18
91-64	2	2	1	1		1		3	4	4	18
91-58	5	3				2			2	5	17
91-67	3	5					1	1		5	15
91-63A&B		6				1		2		5	14
A0-5	2	2				1		1	1	4	11
B32-7	2	1								8	11
91-63C		4								4	8
91-65						1			1	2	4
91-51A	1	1								1	3
91-68	1	1								1	3
D0-5										3	3
B32-8										3	3
91-59A									2		2
A0-4										2	2
B32-3		1							1		2
B32-4	1										1
91-55										1	1
D0-6										1	1
Total	25	22	1	1	1	6	2	7	11	47	137

Table 9 -- Continued

Key to Abbreviations

AC = Amorphous Core	HMP = Humpback Scraper
BPC = Bipolar Core	DRL = Drill
PRE = Preform	UFC = Uniface
HFT = Hafted Biface	BLD = Blade
BFC = Biface Fragments	UTF = Utilized Flake

In association with these concentrations of lithic artifacts were concentrations of shell-tempered pottery in Units H and Q (Figure 17 and 18) and high densities of fire-cracked rock (Figure 19). Units H and Q had the highest densities of shell-tempered pottery on the Wymer-West knoll. The combination of all these materials in one location is suggestive of an activity area dedicated towards meal preparation.

While shell-tempered ceramics were observed throughout the site, Feature 91-66 contained the highest concentrations of sherds at the Wymer-West knoll (Figure 20). This feature contained 101 shell-tempered sherds or 27 percent of the feature associated ceramics at the site. Unit D0, which contained a portion of Feature 91-66, had 67 shell-tempered sherds, which was a lower density when compared to other units on the Wymer-West knoll (Figure 17). However, Unit D0 had 303.65 grams of shell-tempered ceramics which is by far the highest density on the site. Greve-Brown (1997) speculates that the area surrounding Unit D0 and Feature 91-66 may have been the focal point of the manufacture of shell-tempered ceramics at the site. This suggestion is supported by weight/count ratios of shell-tempered

Table 10

Distribution of Tools in Units
on the Wymer-West Knoll

Provenience	AC	BPC	PRE	HFT	BFC	HMP	DRL	UFC	BLD	UTF	N
A0	22	3	1		4		2	5	6	26	69
B62	16	6	1	2	7	1	2	2	2	24	63
D0	6	6			5		2	6	3	24	52
B32	5	3	1		2	1	3	2	3	18	38
B63	8	5			2			4		18	37
B31	5	5	1		1	1	1	2		7	23
H	4	4			1		1	2	2	5	19
M	7						1			9	17
T	10	2			2			1		2	17
P	1	1						2	2	10	16
Q	5	3			1		2	1		3	15
40E 60N	1	5						2		5	13
A		3			3				1	3	10
C	2	3						1		4	10
L	2							2		6	10
B	3	3								2	8
S		2			2			1	1	2	8
81E 5S	2	1						1		3	7
I	2	1			1			1		2	7
J	1	1			2					2	6

Table 10 -- Continued

Provenience	AC	BPC	PRE	HFT	BFC	HMP	DRL	UFC	BLD	UTF	N
E	1	1			1					3	6
G		2	1							3	6
R	2	2								2	6
D	2	1			1						4
F		1						1		1	3
N	1									2	3
K							1			1	2
B0							1				1
Total	108	64	5	2	35	3	16	36	20	187	476

Key to Abbreviations

AC = Amorphous Core
BPC = Bipolar Core
PRE = Preform
HFT = Hafted Biface
BFC = Biface Fragments
HMP = Humpback Scraper
DRL = Drill
UFC = Uniface
BLD = Blade
UTF = Utilized Flake

ceramics which indicate that the average sherd size in Unit D0 was larger than in other areas of the site (Figure 21).

The above observations on artifact distributions focus on the crest of the West knoll in the area originally excavated by Andrews University and subsequently by Western Michigan University. Figure 22 is a depiction of the suggested activity areas at the site in relation to the structural pattern revealed by Andrews University. However, artifacts are also distributed throughout the field to the

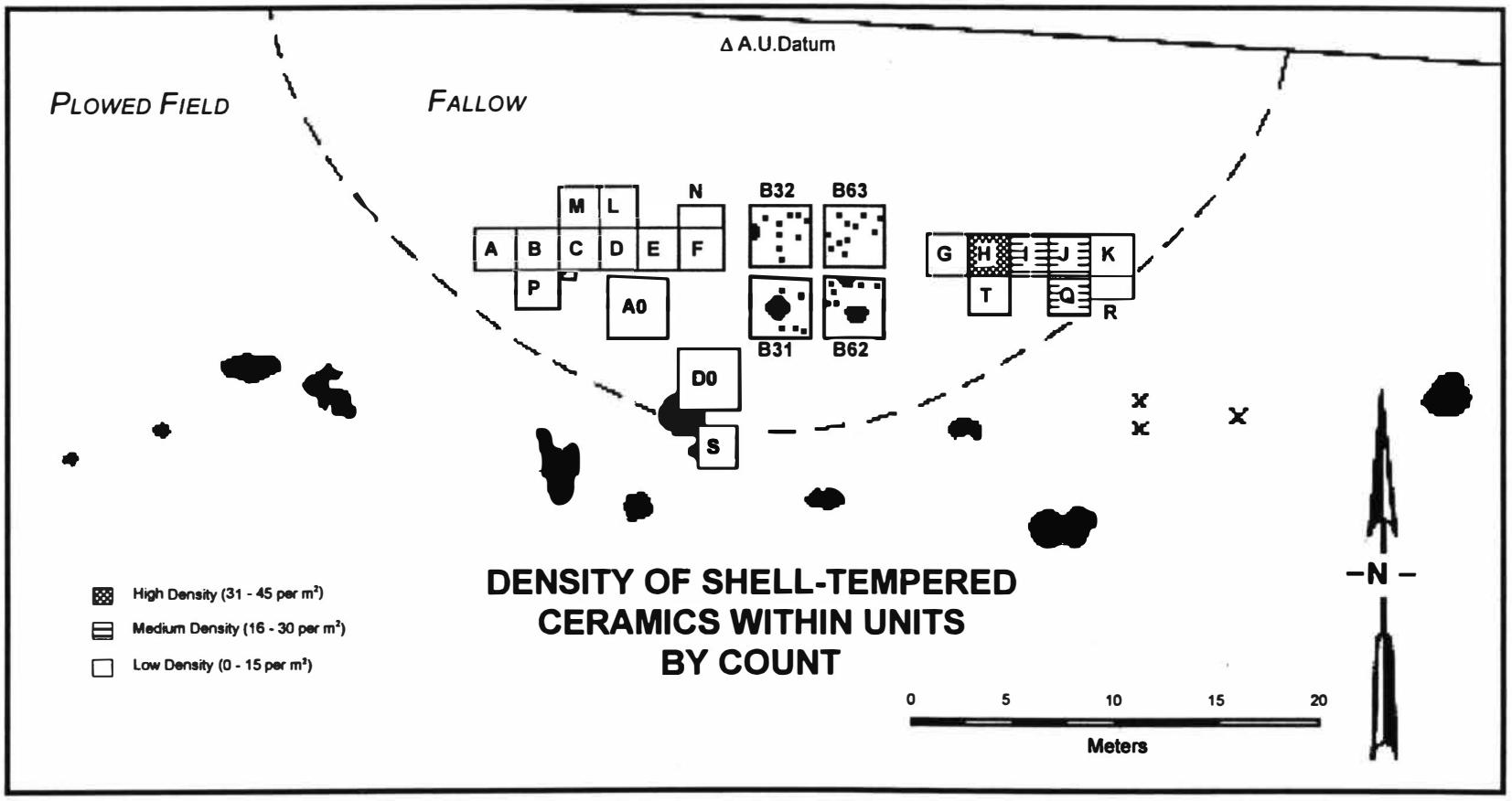

Figure 17. Density of Shell-Tempered Ceramics Within Units by Count.

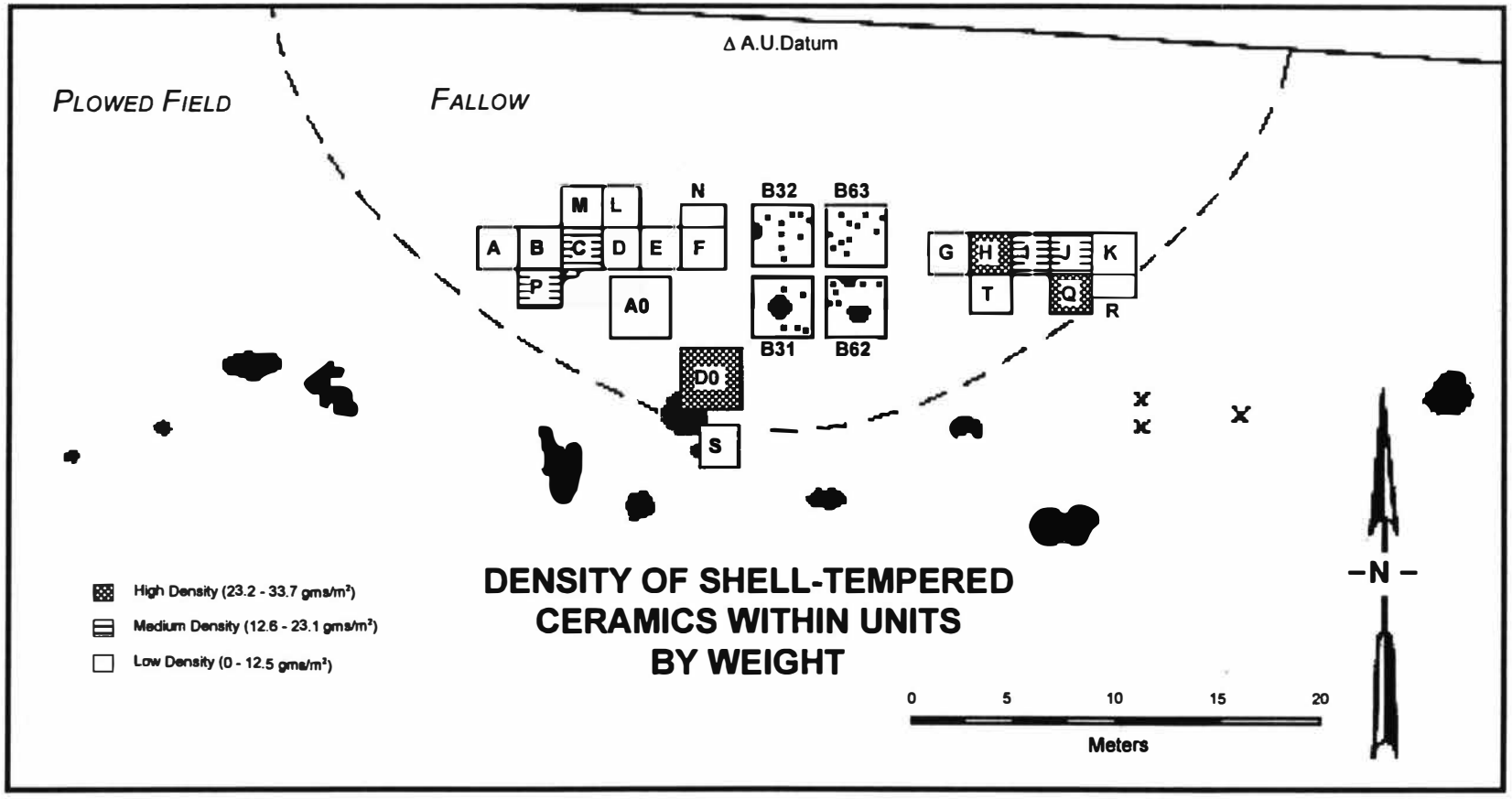

Figure 18. Density of Shell-Tempered Ceramics Within Units by Weight.

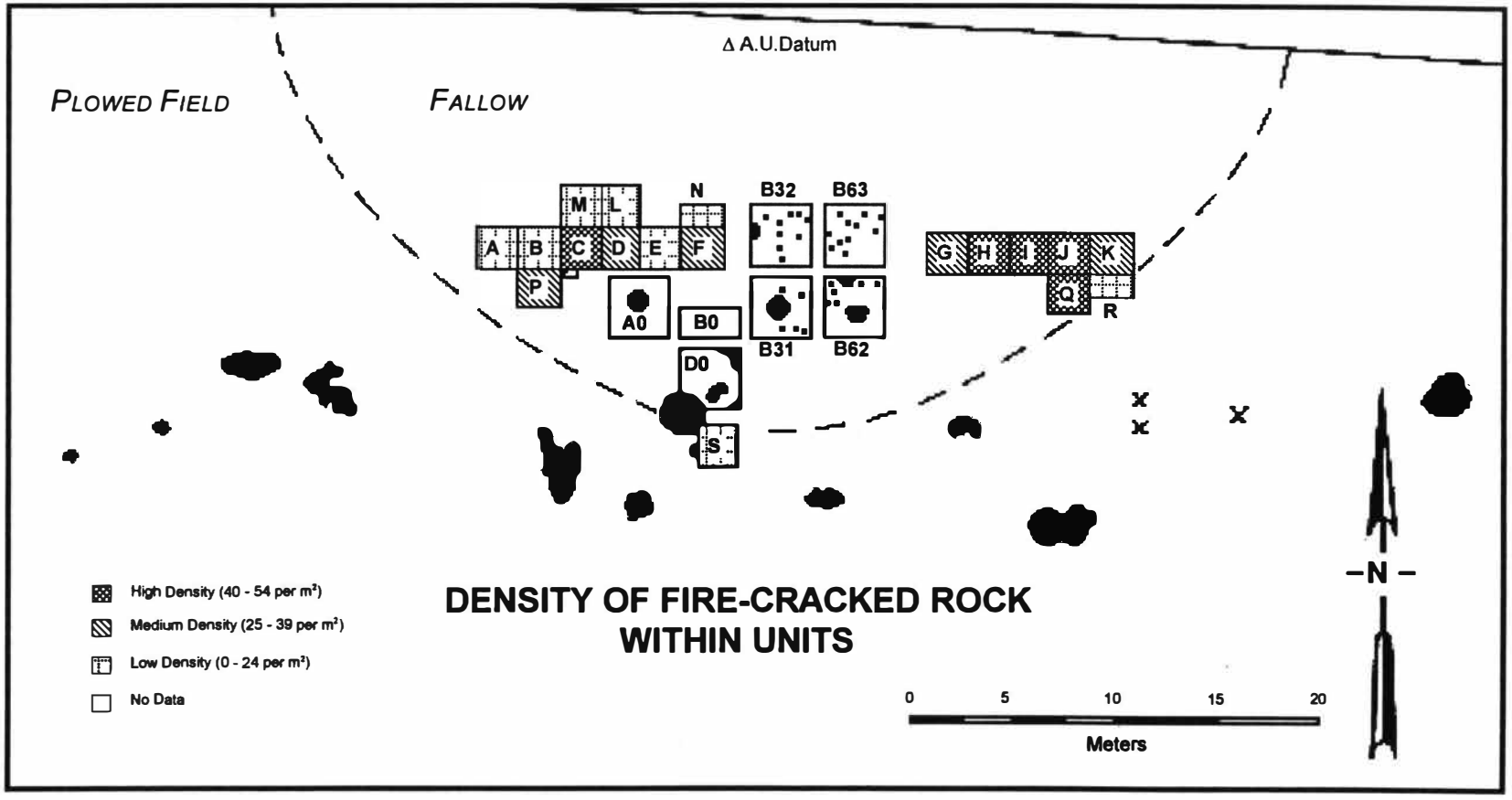

Figure 19. Density of Fire-Cracked Rock Within Units.

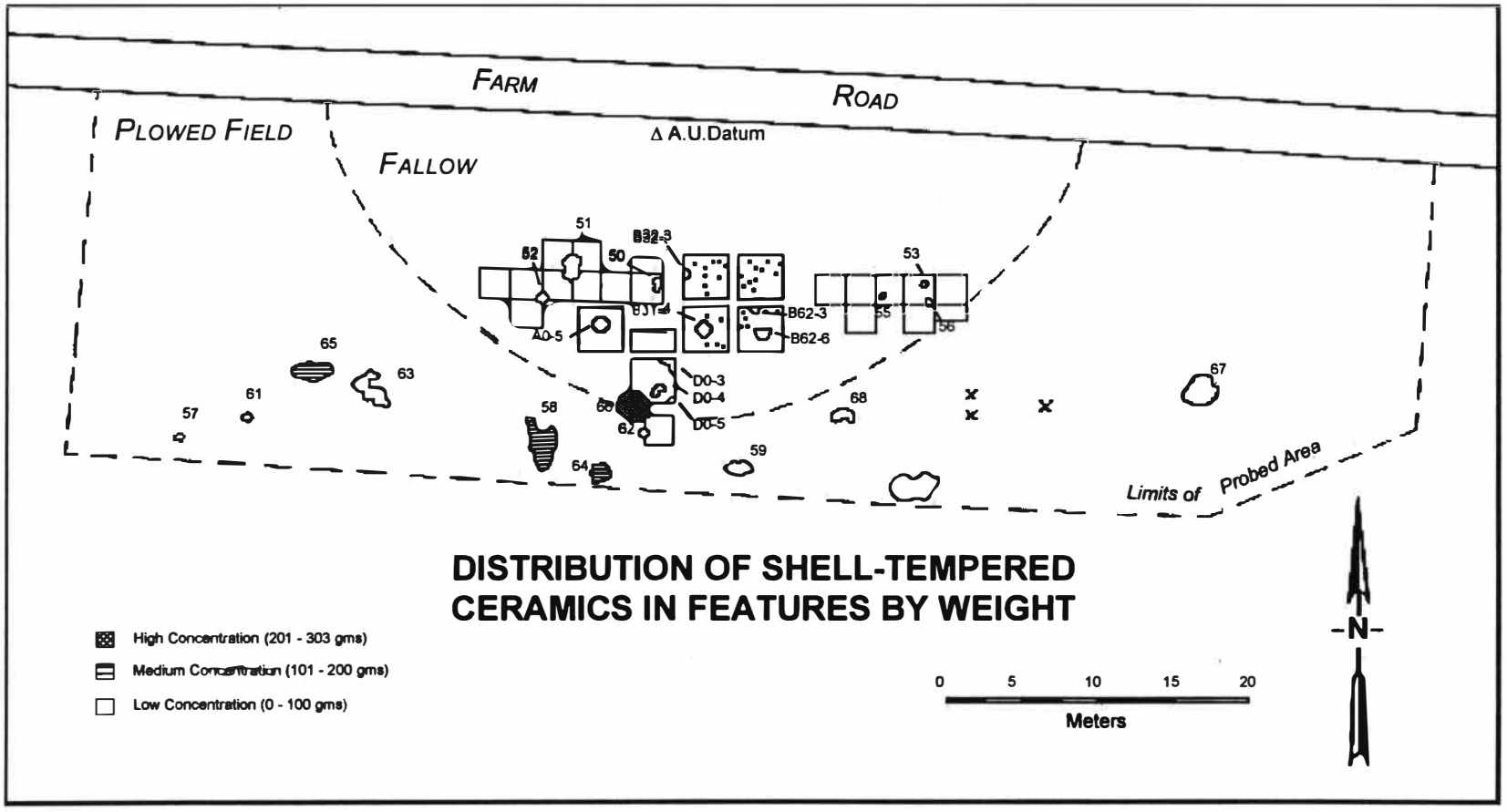

Figure 20. Density of Shell-Tempered Ceramics in Features by Weight.

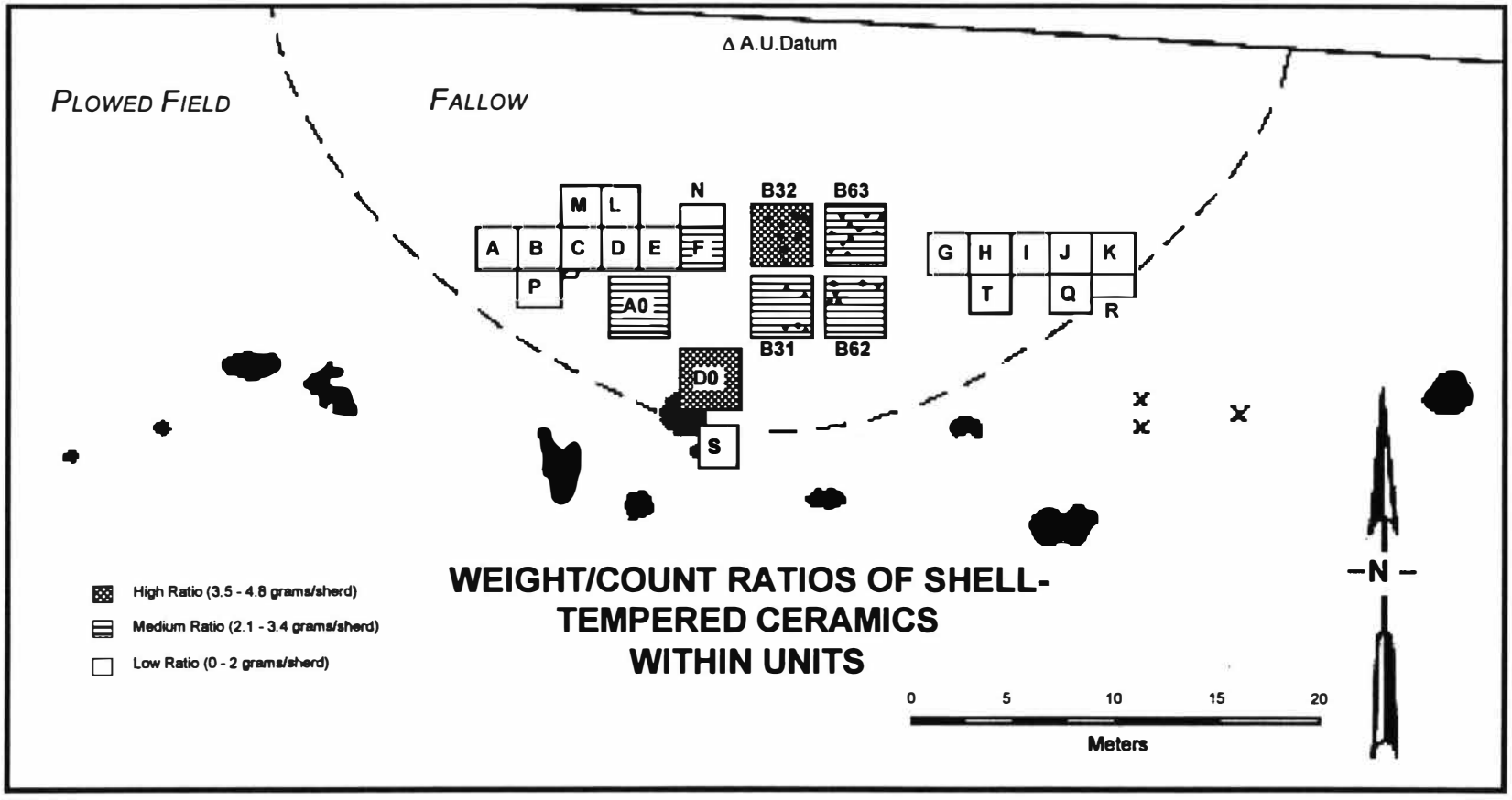

Figure 21. Weight/Count Ratios of Shell-Tempered Ceramics Within Units.

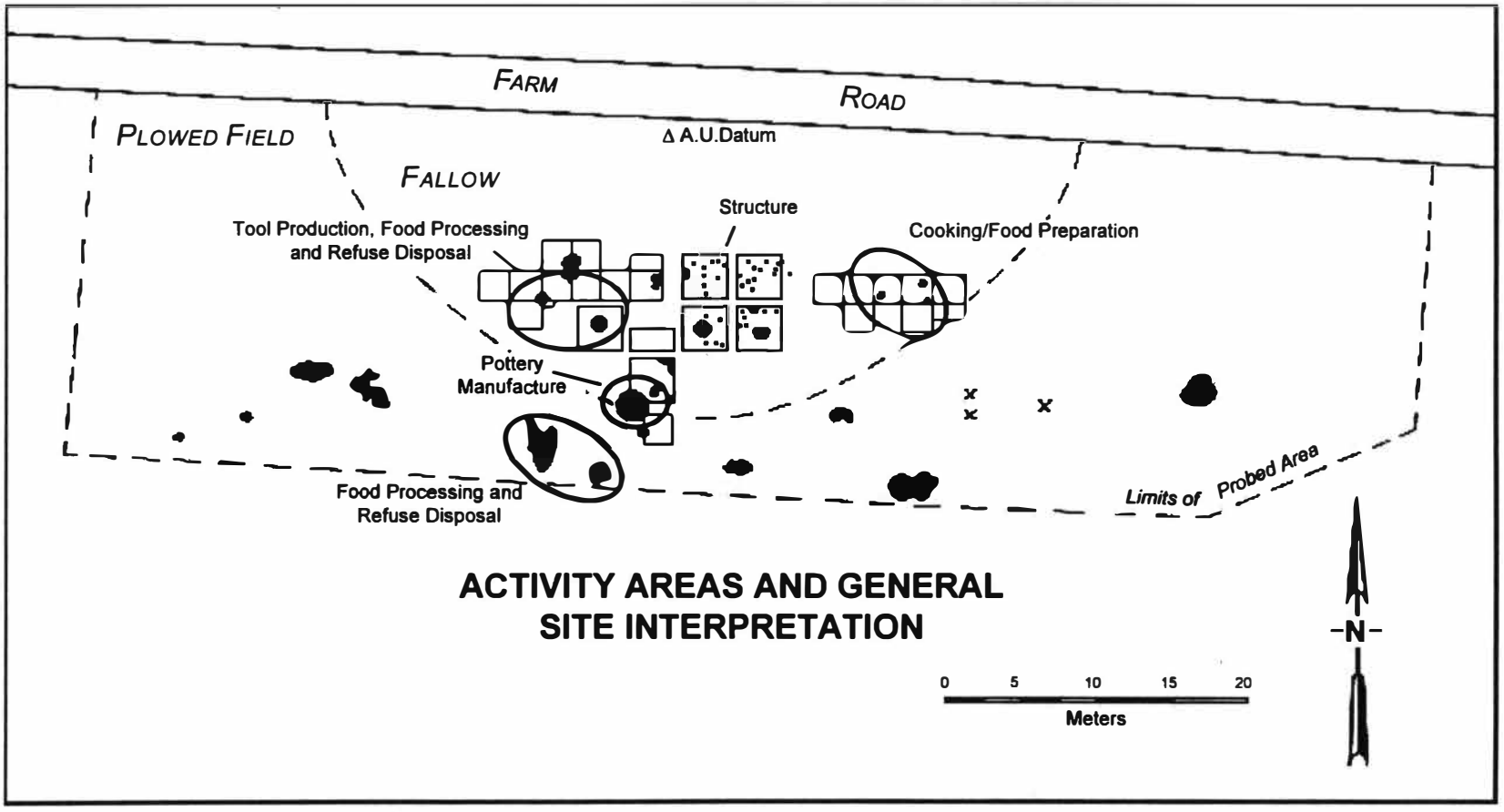

Figure 22. Activity Areas and General Site Interpretation.

west of the main area of investigation. During the 1991 Western Michigan University field school, a controlled surface walkover was conducted to discern possible artifact concentrations and general distributions across the knoll (Figure 23). Field school students were placed in a line along the far west edge of the field spaced at approximately two meter intervals. They then walked transects due east flagging any ceramic sherds, retouched lithics, ground stone and historic debris observed on the ground surface. The transects continued to the Wymer-East knoll. The positions of each artifact were then established using a surveyor's transit.

Eighty five artifacts were recorded in the controlled surface walkover (Figure 23). The large number of artifacts observed over such a wide area indicates that there is still much to be learned from the Wymer-West knoll. Several possible concentrations of artifacts can be noted, indicating potential habitation or additional activity areas. These include two concentrations of bifaces in the southwest and southeast, lithic material in the southeast and central, and ceramics in the central portion of the knoll.

The controlled surface walkover assisted in discerning additional concentrations of artifacts suggesting potential activity areas. However, the walkover did not predict the location of features where ceramic or lithic densities were high. One probable explanation for this apparent discrepancy is the ongoing collection activities of local hobbyists and amateurs. A prime location for the collection of surface artifacts was revealed by the Andrews University excavations on the

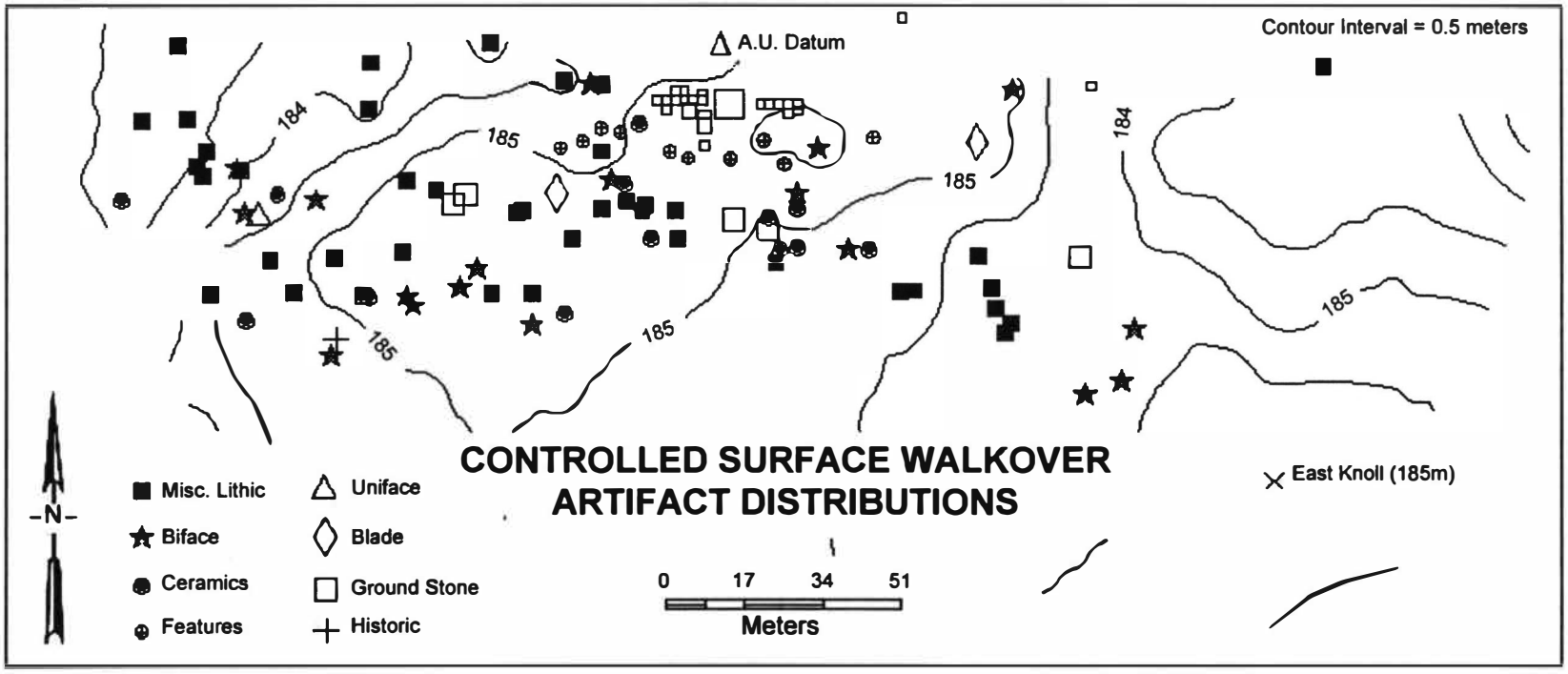

Figure 23. Controlled Surface Walkover Artifact Distributions.

crest of the knoll. Thus, while subsurface deposits were relatively untouched, surface artifacts became scarce in this area.

Much was learned about the Mississippian habitation of the Wymer-West knoll from the Andrews University and Western Michigan University excavations. However, the density of cultural material throughout the remaining portions of the knoll clearly indicates the need for continued investigation and research.

CHAPTER III

PATTERNS OF TRIANGULAR POINT VARIABILITY

Introduction

Numerous studies have been undertaken to establish cultural relationships and chronologies using statistical comparisons of the metric attributes of projectile points (Maher and Baerreis 1958; Faulkner 1972; Brose 1983; Lynott 1991; Shott 1997). Each of these studies used different statistical techniques to establish patterns of similarity and difference between the groups compared. The present study also uses a statistical method for comparing the Wymer-West knoll with other known Mississippian groups throughout the midwestern United States. The objective of this study is to determine whether or not triangular point morphology from the Mississippian occupation at the Wymer-West knoll can be used to posit cultural affiliations with other Mississippian groups.

Research Methodology

Triangular points from the Wymer-West knoll were compared to triangular points from other sites of various Mississippian cultural affiliation. A students t-distribution was used to compare the means of the length, width and width/length ratio attributes of the triangular points (Thomas 1976:227). Collections from one site were consid-

ered significantly different from another if the probability of them being from the same population was less than 5% (.05).

Point data from the Wymer-West knoll was obtained from collections recovered during the 1991 Western Michigan University field school excavations and from collections acquired during various excavations in the 1970's and 1980's by Andrews University. Length and width measurements were tabulated and used to calculate the width/length ratio for each point. A histogram of the width/length ratio from the entire Wymer-West knoll collection was created to determine possible intrasite variability.

Figure 24 represents the distribution of width/length ratios of triangular points from the Wymer-West knoll. It suggests a normal distribution of values clustering at the 0.5 range. The gap in values at the 0.7 range and additional values at 0.8 suggest some possible outlier triangular points. However, Figure 24 does not suggest a second population of triangular points at the Wymer-West knoll.

Three points constitute the 0.8 width/length ratios. One was recovered from Feature 91-58, noted in the previous section for its abundance of faunal and lithic material. The other was recovered from the plowzone of Unit N. The third point was recovered from an unknown surface location during the excavations of the Wymer-East knoll. All three items were considered part of the overall population of triangular points associated with the Mississippian component of the site. Sixty-one triangular points were recovered from the

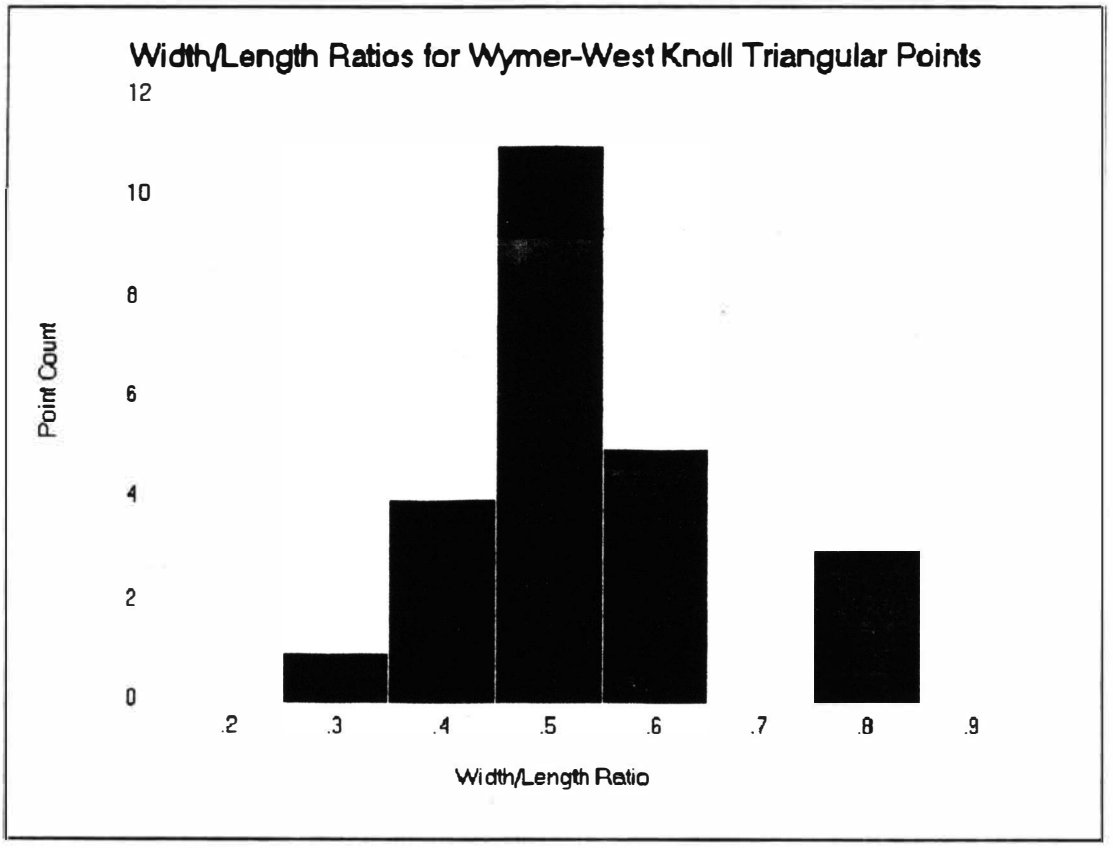

Figure 24. Width/Length Ratios for Wymer-West Knoll Triangular Points.

Wymer-West knoll. Of these, 35 were broken or damaged. This left 26 triangular points available for comparison with other sites.

Point data for the remaining sites was obtained through published documentation or through the investigation of actual collections. Where tables of metric attributes were not available in the text, photographs were used to obtain relevant measurements. In cases where triangular point documentation consisted only of mean values and standard deviations were unavailable the Wymer-West knoll collection was tested against the documented mean value. Unfortunately this meant that in those instances standard deviations

and sample counts could not be used in the statistical calculations. The impact on probable outcomes should be negligible in most cases since the actual mean values were very distinct.

Triangular point data was not readily available for all cultural affiliations. Middle Mississippian sites, for instance, were we%w documented through the FAI-270 highway project but lack detail with regards to projectile point typologies (Emerson, Milner and Jackson 1983; Emerson and Jackson 1984; Kelly, Ozuk and Williams 1990). Most of the effort in these reports was directed towards an understanding of the ceramic typology and botanical and faunal resource utilization in the American Bottom. Therefore, photographs, drawings and tables depicting the Middle Mississippian triangular point assemblages at these sites were simply not available for inspection.

Sites were categorized by their cultural affiliation whether Middle Mississippian, Fort Ancient, Upper Mississippian or Oneota. Sites used for this analysis are listed in Tables 11, 12, and 13.

Observations

The most striking observation is in the Wymer-West knoll's similarity to Middle Mississippian sites. In all three attribute categories, Wymer-West knoll triangular points were not significantly different from triangular points from other Middle Mississippian sites. The one exception is the Aztalan site where triangular points are similar in length but much wider than those from the Wymer-West knoll (Table 12). At Dickson Mounds on the Illinois River and the

Table 11

Statistical Comparisons of Triangular Point Length Measurements Between the Wymer-West Knoll and Other Sites Grouped by Cultural Affiliation

Site	Dates A.D.	Length cm (x)	SD	n	t value	df	prob.
Wymer-West knoll	1000-1100	25.98	3.8	24	-	-	-
Middle Mississippian							
Bridges (Billings 1983)	1160-1390	25.2	5.24	9	-.46	31	.648
Aztalan (Maher and Baerreis 1958)	1000-1150	25.82	-	200	.21	23	.835
Dickson Mounds (Harn 1980)	1050-1350	26.7	5.16	15	.52	37	.605
Fort Ancient							
Fort Ancient Type 4 (Railey 1992)	1400-1700	21.1	-	16	4.9	38	<.001*
Fort Ancient Type 6 (Railey 1992)	1550-1700	28.9	-	11	-2.32	33	.027*
Fort Ancient Type 2 (Railey 1992)	1000-1300	31	-	22	-5.79	31	<.001*
Fort Ancient Type 5 (Railey 1992)	1400-1550	34.9	-	14	-7.83	36	<.001*
Upper Mississippian/Fisher/Huber/Oneota							
Carcajou (Hall 1962)	1000+	21.79	3.38	14	5.4	23	<.001*

Table 11 -- Continued

Site	Dates A.D.	Length cm (x)	SD	n	t value	df	prob.
Huber II (Brown and O'brien 1990)	1600+	22.25	2.78	31	-4.21	53	<.001*
Pipe (Overstreet 1981)	800-1650	22.27	8.8	11	-1.34	12	.205
Huber I (Brown and O'brien 1990)	1600+	22.61	7.02	89	--3.13	69	.003*
Elam (Garland 1989)	1200-1500	23.27	4.91	94	-2.52	116	.013*
Carcajou (Maher and Baerreis 1958)	1000+	24.61	-	28	1.77	23	.090
Moccasin Bluff (Bettarel and Smith 1973)	1500-1640	25.85	6.26	34	-.1	55	.922
Anker (Bluhm 1961)	1400-1500	26.25	-	11	-.34	23	.735
Oak Forest (Bluhm 1961)	1425-1625	33.75	-	33	-9.99	23	<.001*

* Difference significant to the .05 level

Bridges site on the Kaskaskia River, triangular points are relatively the same length and width. All of the Middle Mississippian sites tested dated to between A.D. 1000-1390 (Harn 1980:82; Hargrave and Butler 1983:345) while the major Mississippian occupation at the Wymer-West knoll has been dated to A.D. 1000-1150 (Garland 1991:4).

Table 12

Statistical Comparisons of Triangular Point Width Measurements Between the Wymer-West Knoll and Other Sites Grouped by Cultural Affiliation

Site	Dates A.D.	Width cm (x)	SD	n	t value	df	prob.
Wymer-West knoll	1000-1100	14.27	2.11	26	-	-	-
Middle Mississippian							
Bridges (Billings 1983)	1160-1390	13.66	2.13	9	-.87	33	.390
Dickson Mounds (Harn 1980)	1050-1350	15.93	3.1	15	1.85	22	.078
Aztalan (Maher and Baerreis 1958)	1000-1150	18.75	-	200	-10.85	25	<.001*
Fort Ancient							
Fort Ancient Type 4 (Railey 1992)	1400-1700	15.4	-	16	-2.74	25	.011*
Fort Ancient Type 6 (Railey 1992)	1550-1700	16.1	-	29	-4.44	25	<.001*
Fort Ancient Type 5 (Railey 1992)	1400-1550	16.2	-	33	-4.68	25	<.001*
Fort Ancient Type 2 (Railey 1992)	1000-1300	18.3	-	33	-9.76	25	<.001*
Upper Mississippian/Fisher/Huber/Oneota							
Huber I (Brown and O'Brien 1990)	1600+	15.31	2.39	35	1.76	59	.083

Table 12 -- Continued

Site	Dates A.D.	Length cm (x)	SD	n	t value	df	prob.
Elam (Garland 1989)	1200-1500	15.37	2.51	94	2.04	118	.044*
Pipe (Overstreet 1981)	800-1650	15.53	2.64	15	1.93	40	.061
Carcajou (Hall 1962)	1000+	15.56	2.14	16	-3.13	25	.004*
Carcajou (Maher and Baerreis 1958)	1000+	15.64	-	28	-3.32	25	.003*
Oak Forest (Bluhm 1961)	1425-1625	15.85	-	-	-3.83	25	<.001*
Moccasin Bluff (Bettarel and Smith 1973)	1500-1640	16.18	3.51	34	2.61	55	.012*
Anker (Bluhm 1961)	1400-1500	16.5	-	11	-5.4	25	<.001*
Huber II (Brown and Obrien 1990)	1600+	16.99	1.79	23	4.84	47	<.001*

* Difference significant to the .05 level

One potential explanation for the variation at the Aztalan site is the intermix of cultures present at the site during the same period. Middle Mississippian and indigenous Late Woodland peoples were interacting at Aztalan as is evidenced by the ceramic assemblage (Peters 1976; Hurley 1977). Though there is much speculation regarding the nature of the interaction between these groups, the

Table 13

Statistical Comparisons of Triangular Point Width/Length Ratios Between the Wymer-West Knoll and Other Sites Grouped by Cultural Affiliation

Site	Dates A.D.	Ratio W/L (x)	SD	n	t value	df	prob.
Wymer-West knoll	1000-1100	.560	.06	20	-	-	-
Middle Mississippian							
Bridges (Billings 1983)	1160-1390	.543	.04	9	-.74	27	.466
Dickson Mounds (Harn 1980)	1050-1350	.605	.1	15	1.48	22	.152
Aztalan (Maher and Baerreis 1958)	1000-1150	.726	-	200	-11.81	19	<.001*
Fort Ancient							
Fort Ancient Type 2 (Railey 1992)	1000-1300	.590	-	-	-2.12	19	.047*
Fort Ancient Type 4 (Railey 1992)	1400-1700	.730	-	-	-12.09	19	<.001*
Fort Ancient Type 5 (Railey 1992)	1400-1550	.464	-	-	6.84	19	<.001*
Fort Ancient Type 6 (Railey 1992)	1550-1700	.557	-	-	.22	19	.825
Upper Mississippian/Fisher/Huber/Oneota							
Oak Forest (Bluhm 1961)	1425-1625	.47	-	-	6.42	19	<.001*

Table 13 -- Continued

Site	Dates A.D.	Length cm (x)	SD	n	t value	df	prob.
Greismer (Faulkner 1972)	1500-1600	.49	.06	19	-3.05	37	.004*
Huber I (Brown and Obrien 1990)	1600+	.518	.08	35	-2.00	53	.051
Anker (Bluhm 1961)	1400-1500	.63	-	-	-4.97	19	<.001*
Carcajou (Maher and Baerreis 1958)	1000+	.635	-	28	-5.33	19	<.001*
Moccasin Bluff (Bettarel and Smith 1973)	1500-1640	.649	.15	33	2.93	46	.005*
Elam (Garland 1989)	1200-1500	.682	.15	94	5.85	71	<.001*
Carcajou (Hall 1962)	1000+	.714	-	14	-10.95	19	<.001*
Pipe (Overstreet 1981)	800-1650	.721	.20	10	2.51	10	.031*
Fifield (Faulkner 1972)	1600-1700	.722	.13	216	9.83	36	<.001*
Huber II (Brown and Obrien 1990)	1600+	.741	.07	23	8.51	41	<.001*

* Difference significant to the .05 level

fact that they coexisted for a period is certain. In examining triangular point variability between Aztalan and other Wisconsin area

sites, Maher and Baerreis (1958) made an effort to distinguish Middle Mississippian items from non-Mississippian items on the basis of morphology. However, the possibility of mixing suggests that the mean width/length ratio of 0.75 given by Maher and Baerreis for the Middle Mississippian component could actually be greater than what would be expected from a strictly Middle Mississippian assemblage.

Significant differences in length, width and width/length ratio attributes were noted among Upper Mississippian Huber and Fisher sites in Illinois, Indiana and Michigan, and Oneota sites from Wisconsin. Those sites that are similar in one attribute, are significantly different in another attribute. While no formal statistical studies have been performed on the triangular projectile point assemblages from Upper Mississippian and Oneota sites, the data obtained for this study shows great variation in the metric attributes of triangular points among these types of sites (Table 11, 12 and 13). Given this variability, a comparative analysis of this sort might prove useful in future research.

Triangular point attributes from Fort Ancient sites also proved to be dissimilar when compared to the Wymer-West knoll assemblage. Data from seven Fort Ancient sites in the Ohio River Valley were collected and analyzed by Railey (1992). Triangular points were categorized into seven types according to morphological characteristics. Each type was then shown to be prevalent at different periods from A.D. 1000 to the early historic. Four of these types showed general morphological similarities to the triangular points observed at

Wymer-West knoll. However, the triangular points from the Wymer-West knoll were statistically different from all four of the comparable subtypes of triangular points found at Fort Ancient sites. In the previous section it was noted that lithic source material was not being imported to the Wymer-West knoll through interaction with populations to the southeast. Differences in triangular point manufacture between Wymer-West knoll and Fort Ancient groups provides additional evidence for a lack of technological influence from this direction.

Summary and Conclusions

Statistical comparisons of length, width, and width/length ratios of triangular points from the Wymer-West knoll and other Mississippian sites were performed to see if patterns of similarities and differences between the points could be noted. Most sites showed significant differences in triangular point morphology with respect to the Wymer-West knoll collection with the exception of Middle Mississippian sites. Two of the three Middle Mississippian sites used in this analysis were shown to lack significant differences with regard to triangular point morphological attributes. Of the Middle Mississippian sites compared only Aztalan showed significant differences in width measurements. This may be explained by the coexistence of Late Woodland and Middle Mississippian peoples at that site resulting in an intermixing of triangular points within the assemblage.

Projectile point variability is the result of many factors; size of available raw material, desired use, technical ability of the manufacturer and technological demands like aerodynamics, resistance to breakage, and hafting. In examining the wide variability between other Mississippian sites and the Wymer-West knoll, it is noteworthy that similarities in point attributes appeared to adhere to cultural affiliations without regard to individual site function. Dickson Mounds is a large mortuary site (Harn 1980) while the Wymer-West knoll is a seasonal agricultural encampment (Parker 1991). The Bridges site is a Middle Mississippian nodal village with ceremonial mounds and a plaza (Hargrave and Butler 1983). These three sites exemplify three different types of occupation and site function yet sharing a common idea of triangular projectile point size and shape.

Garland (1991:6) and Greve-Brown (1996b) have noted morphological similarities of Wymer-West knoll ceramic vessels with ceramic vessels from the Dickson Mounds (Harn 1980:110). This study shows that triangular points from the Dickson Mounds and Wymer-West knoll lack significant differences with regard to length and width. Radiocarbon dates show occupation of the two sites occurring at the same time and lithic raw materials from the Wymer-West knoll indicate almost exclusive interaction with groups to the southwest, particularly central Illinois. These similarities make a strong case for a direct relationship between the Dickson Mounds and the Wymer-West knoll, though the exact nature of that relationship is still unclear. Never-

theless, the evidence for the Wymer-West knoll being part of Middle Mississippian interaction throughout the Midwest is noted.

CHAPTER IV

TECHNOLOGICAL AND FUNCTIONAL COMPARISONS TO OTHER MISSISSIPPIAN SITES

Introduction

The Wymer-West knoll site is unique in the region for many reasons: its shell-tempered ceramics (Garland 1991; Greve-Brown 1997) associated with American Bottom Lohmann and Stirling Phase radiocarbon dates (Table 1), its early use of Eastern Eight Row maize horticulture (Parker 1991), and among non-local raw materials, its nearly exclusive use of chert resources originating from central and southern Illinois. Comparisons between Wymer-West knoll and other sites in the region help to establish patterns of similarity and difference which can be used to help draw conclusions regarding Wymer-West knoll's cultural affiliation. Comparisons can also be used to help understand regional chronologies to which Wymer-West knoll belongs.

The objective of this section is to attempt to use site function, from the perspective of the overall Wymer-West knoll material culture in general and the Mississippian lithic technology in particular, as a framework to better understand Wymer-West knoll's place in the regional cultural chronology. Given the mixed economy and maize horticultural nature of the site, what comparisons can be drawn to

other Mississippian horticultural sites and how might the defined lithic technology at Wymer-West knoll be similar or different?

Maize Horticulture From a Technological Perspective

Parker has concluded that the Mississippian occupants of the Wymer-West knoll were participating "in a mixed economy based on the exploitation of localized resources, supplemented by maize horticulture," (Parker 1991:18). She goes on to state that "a similar type of generalized economy has been described for Upper Mississippian and Oneota sites throughout the Upper Midwest," (Parker 1991:18). In evaluating Wymer-West knoll's place in the cultural chronology of the region, it is necessary to observe the entire tool assemblage in relation to the subsistence activities being pursued at individual sites.

Upper Mississippian

Numerous sites throughout the region practiced some form of maize cultivation. In the Upper Midwest maize cultivation was normally associated with other types of subsistence resources including mammals, fish, nuts, tubers, and other locally available resources. Botanical and faunal evidence suggests that the occupants of sites like Huber, Fisher, Greismer, Oak Forest, Fifield, Hoxie Farm, Pipe and Moccasin Bluff sites utilized maize horticulture to supplement their diet (Bluhm 1961; Brown and O'Brien 1990; Bettarel and Smith 1973; Overstreet 1981).

These subsistence practices are also indicated by the tool technologies observed at these sites. Evidence of bison and elk scapula hoes, shell hoes, antler digging tools and ground stone agricultural processing tools including manos and metates, is indicative of cultivation (Jeske 1989; Herold, O'Brien and Wenner 1990; Bettarel and Smith 1973). Three of these sites, Huber, Hoxie Farm and Moccasin Bluff, were seasonally reoccupied during the Upper Mississippian and participated in a broad spectrum subsistence economy, similar to that seen at the Wymer-West knoll. Also present on these sites were utilitarian and non-utilitarian items such as antler pressure flakers, bone awls, marine shell ornaments and beads, stone pipes, and decorative pendants all of which are indicative of the Upper Mississippian cultural norm to which each of the above sites belonged. Herold, et al. (1990:91) suggests that the late prehistoric Upper Mississippian settlement system is characterized by permanent village sites like Oak Forest, seasonally reoccupied mortuary/ceremonial sites like Huber, Hoxie Farm, Moccasin Bluff and Anker, and special purpose extractive sites like Palos, Schwerdt (Cremin 1980, 1983) and Elam (Barr 1979).

At the Wymer-West knoll, however, there is no comparable hoe technology used for cultivation, no evidence of ceremonial objects, and no utilitarian or non-utilitarian implements like those seen at the above mentioned Upper Mississippian sites. It also does not appear that the inhabitants of the Wymer-West knoll were pursuing any specialized extraction of local resources. At this time, it does not

appear that the Wymer-West knoll can be associated with an Upper Mississippian settlement system, as defined by Herold, et al. (1990).

With regard to the presence or absence of agricultural digging implements and scapula hoes, Jeske (1989) draws some interesting distinctions between Langford tradition horticulture and Fisher/Huber horticulture in northeastern Illinois. Using a contingency table analysis Jeske was able to illustrate statistically significant differences between Langford and Fisher/Huber sites based on the presence or absence of hoes (Jeske 1989:112).

Langford sites, characterized by a continuation of grit-tempered ceramic manufacture, were utilizing maize horticulture at a level comparable to Fisher/Huber sites yet were not utilizing hoe technology. Langford sites are normally distributed in dryer upland settings where, Jeske (1989:112) speculates, they were planting corn hills in the better drained savannah soils. A similar situation exists at the Wymer-West knoll where the soils are a well drained sandy loam (Garland and Mangold 1980:27). In this type of environment chert, scapula or shell hoes would not be necessary for maize cultivation. Digging sticks would most likely provide a sufficient alternative. With respect to the Wymer-West knoll, Greve-Brown (1996b) compared but found no similarity between grit-tempered Langford ware and Wymer-West knoll shell-tempered ceramics suggesting an absence of any cultural relationship between the two.

It has been established that the Moccasin Bluff site represents an Upper Mississippian manifestation in southwest Michigan (Bettarel

and Smith 1973). As mentioned above, cultural material from the site is representative of Upper Mississippian sites throughout the region including the presence of a hoe technology for the cultivation of maize. However, soil conditions at the Moccasin Bluff site are very similar to those at the Wymer-West knoll (Bettarel and Smith 1973:6; Garland and Mangold 1980:27). They are well drained sandy loams which are easily tilled. This suggests that the use of elk or bison scapula hoes is not dependent on soil conditions but rather on the cultural norms of the cultivators. In Jeske's (1989) study of the differences between the Langford tradition and the Upper Mississippian he tested nine Upper Mississippian sites in the northern Illinois area for the presence or absence of a hoe technology. All of the Upper Mississippian sites used hoe technology. The fact that the inhabitants of the Wymer-West knoll did not use elk or bison scapula hoes for maize cultivation is additional evidence that suggests they were not Upper Mississippian.

Oneota

A similar situation exists for Oneota populations in eastern Wisconsin. At the Pipe site in Fond du Lac County, Wisconsin, Overstreet (1981:495) has shown that the Oneota were taking advantage of a multitude of locally available resources in addition to maize horticulture. Like the Upper Mississippian sites in the Chicago area, hoes and ground stone milling tools are commonly found in association with maize horticulture at Oneota sites in eastern Wisconsin

(Jeske 1989). However, Carcajou Point, like Langford tradition sites in Illinois, lacks hoes (Hall 1962). This is interesting when contrasted with the absence of hoes at the Wymer-West knoll.

Middle Mississippian

Parker (1991:18-19) has drawn a distinction between the mixed horticultural economies of the Upper Midwest and the agricultural villages dominated by maize in the American Bottom. The size, seasonality, and subsistence base of these sites differed greatly, however, where maize was being grown, common themes in the tool assemblages can be recognized. As shown above, hoe technology, ground stone milling tools, and wood and antler digging sticks are nearly universal at sites participating in maize cultivation and the Middle Mississippian sites in the American Bottom and beyond are no exception (Harn 1980; Emerson and Jackson 1984; Emerson, Milner and Jackson 1983; Billings 1983; Freeman 1986).

The Wymer-West knoll, however, was participating in a mixed economy supplemented by maize horticulture. This distinction in economic focus could explain the lack of material culture evident at large Middle Mississippian villages from the American Bottom. No bone, chert, or shell digging implements were observed at Wymer, though a lack of preservation would be a factor for bone and wood digging sticks. Also the presence of three possible manos, described in an earlier section, suggests that maize was indeed being processed at the site. However, lithic evidence, including implements for the

hunting and processing of local faunal resources, suggests a primary reliance on hunting and gathering.

Discussion

Clearly maize horticulture is a common theme at many Mississippian sites throughout the midwest. These sites, whether Upper Mississippian, Oneota or Middle Mississippian all possess common technologies with which to participate in maize cultivation. In contrast to the great majority of these sites, the Wymer-West knoll is unique in its apparent lack of a technology geared towards the exploitation of maize. There are many potential reasons for this lack of technological evidence.

The Wymer-West knoll is located near the town of Berrien Springs, Michigan. It has been a favorite spot of collectors for decades resulting in the loss of untold numbers of artifacts. In addition to projectile points, artifacts such as ground stone manos, metates, bannerstones, adzes, axes and other tool types are favorites for collectors. Many of these tools have been brought to the surface through the action of plows or erosion and are thereby susceptible to collection. Yet, Andrews University has extensively collected the Wymer-West knoll and there is no evidence of chert hoes or sharpening flakes which might indicate the use of a hoe technology. Though evidence for ground stone artifacts is sparse or fragmentary at the Wymer-West knoll, collection over the years has undoubtedly resulted in unrecoverable losses.

Preservation of organic material is another factor which may ultimately impact the ability to accurately draw conclusions on the use of animal bone and wood as agricultural tools at the Wymer-West knoll. Faunal analysis from the Wymer-West knoll has not yet been completed but a cursory examination revealed no indications of scapula hoes or other bone agricultural tools.

A third possibility is that the Wymer-West knoll may indeed have had more of a specialized function than previously thought. Radiocarbon dates indicate occupation of the Wymer-West knoll during the Middle Mississippian Lohmann and Stirling phases when expansion of Middle Mississippian ideas and culture was at its peak.

Greve-Brown (1997) makes a strong case for the influence of Middle Mississippian groups at the Wymer-West knoll as evidenced by blackened, burnished and red-slipped, shell-tempered ceramics. She has also suggested that some of these ceramic vessels were produced at the site while others may have been brought to the site or imported.

Evidence suggests that similar conclusions can be drawn regarding the lithic technology. Exotic raw materials were either imported or brought to the site from central and southern Illinois. At the same time, triangular point comparisons provide further evidence for a direct relationship to Middle Mississippian groups and possibly that the inhabitants of the Wymer-West knoll were indeed of Middle Mississippian cultural affiliation.

Parker (1991:22) has suggested the possibility that the Wymer-West knoll was acting as a trade conduit, a node in an interregional trade network. Her identification of Eastern Eight-Row maize at the Wymer-West knoll during a time when Midwestern Twelve row was the dominant type for Middle Mississippian sites indicates direct interaction with groups to the east. She has also indicated the dominance of a broad spectrum subsistence economy at the Wymer-West knoll rather than one strictly dependant on maize horticulture. If the conclusions based on the lithic and ceramic evidence are correct, then the Middle Mississippian population at the Wymer-West knoll exhibited the ability to adapt to the conditions found locally at the Wymer-West knoll. When Eastern Eight-Row maize was encountered through interaction with other groups, it was quickly adapted for use at the Wymer-West knoll.

This adaptive ability is seen at other Middle Mississippian influenced sites throughout the midwest and is not specific to residents of the Wymer-West knoll. At the Cooke site in northeastern Illinois, Late Woodland indigenous use of Eastern Eight-Row maize in conjunction with a mixed subsistence economy, is evident in relation to multiple influences from the American Bottom (Markman 1991). The Rench site, located in central Illinois, is a Late Woodland indigenous occupation with ceramic evidence to suggest direct or indirect influence from Middle Mississippian groups in the American Bottom (McConaughy 1991). Both of these sites, however, represent the

integration of Middle Mississippian ideas into their own (Stoltman 1991b).

This does not appear to be the case at the Wymer-West knoll. No local antecedents to Wymer-West knoll appear to exist in southwestern Michigan. Ceramics suggest site-unit intrusion of Middle Mississippian people into the region (Garland 1991; Greve-Brown 1997). Lithic raw material and triangular point evidence also suggest Middle Mississippian origin. Like the Eveland (Harn 1991), Silvernale and Diamond Bluff (Wendt and Dobbs 1989) sites, the Wymer-West knoll appears to represent the influx of a group of Middle Mississippian people into a region previously occupied only by indigenous Late Woodland cultures. Interaction with or influence from local groups is evident in the predominant cord-marking of ceramic vessels, exploitation of local chert resources, and the use of a type of maize foreign to Middle Mississippian horticultural practices. However, there is no evidence to suggest that the residents of the Wymer-West knoll were Late Woodland peoples who had integrated Middle Mississippian practices into their own. Rather, it appears that the Middle Mississippian people who moved into the St. Joseph river valley adapted to their local conditions and integrated them into their lives.

Carcajou Point (Hall 1962) and the Langford site (Jeske 1989, 1990) do set a precedent for the type of agriculture that may have been practiced at the Wymer-West knoll, though no evidence of a cultural relationship exists between any of these sites. It is quite

possible that a Middle Mississippian group moved into the St. Joseph River valley bringing with them their norms of ceramic and projectile point manufacture. Interactions with groups to the east reintroduced maize, albeit Eight-Row rather than Twelve-Row, to their mixed subsistence economy. Lacking the lithic resources to make the large chert hoes used for soil preparation, characteristic of Middle Mississippian agricultural communities, maize was cultivated in a fashion where specialized tools were unnecessary, similar to Langford occupations (Jeske 1989).

Summary and Conclusion

Parker's assertion that the generalized subsistence economy of the residents of the Wymer-West knoll was not significantly different from the Archaic and Woodland cultures that preceded it, with the exception of maize horticulture, is echoed in the generalized nature of the lithic assemblage (Parker 1991:19). Indications are that while some individual tools were fashioned according to cultural norms, i.e. triangular points, the general nature of the assemblage as a whole is geared towards the pursuit of a broad spectrum subsistence economy including hunting and fishing.

Tool assemblage comparisons were made to Upper Mississippian, Oneota, and Middle Mississippian sites throughout the midwest. Though many of the Upper Mississippian and Oneota sites participated in a broad spectrum subsistence economy with the addition of

maize, their overall material culture differed significantly from that of the Wymer-West knoll.

Additional comparisons to Middle Mississippian sites also illuminated differences with the Wymer-West knoll. These differences were especially acute with regard to the Middle Mississippian reliance on maize agriculture as a primary subsistence resource (Parker 1991) and in the much larger concentrations of specialized agricultural implements on Middle Mississippian sites which are simply not in evidence at the Wymer-West knoll. However, overall ceramic and lithic similarities to Middle Mississippian sites in general, and a lack of indigenous Late Woodland cultural antecedents provide strong evidence for a site-unit intrusion of Middle Mississippian people at the Wymer-West knoll.

In conclusion, it has been shown that in the case of the Wymer-West knoll, general comparisons of the lithic assemblage, as defined in the previous sections, with other cultural groups provide a basic insight into possible cultural affiliations with Middle Mississippian groups. However, the use of additional aspects of the material culture provides a more complete picture of the relationship between the Wymer-West knoll and Middle Mississippian providing a framework for understanding the Wymer-West knoll's place in the regional cultural chronology.

CHAPTER V

CONCLUSION

The Wymer-West knoll site is a unique representation of Mississippian culture in southwest Michigan (Garland 1991; Parker 1991; Greve-Brown 1997). This study focused on three research problems relating to the lithic assemblage of the Wymer-West knoll.

The first research problem centered on defining the Mississippian lithic component at the Wymer-West knoll. The Wymer-East knoll was used for projectile point comparisons to help determine the general chronological use of the site as a whole. Exotic raw material evidence reflects a preference for lithic resources from central and southern Illinois. Material distribution maps were used to show areas of artifact concentration. While the primary area of habitation appears to have been within the area previously excavated by Andrews University, there are clearly other areas of specialized use at the site. Concentrations of shell tempered ceramics and fire-cracked rock in association with small hearths suggest possible cooking activities on the eastern portion of the West knoll. Features A0-5, 91-58 and 91-64 show high concentrations of faunal, floral and lithic debris indicating a possible area of waste disposal and food processing. Unit D0 and feature 91-66 showed the highest concentration of shell tempered ceramics at the site leading Greve-Brown (1997) to suggest this as an area of ceramic

manufacture. The main excavation block of Andrews University was the focal point due to the presence of a postmold pattern indicating a possible structure. Artifact concentrations in the immediate vicinity of this postmold pattern would seem to support this conclusion. A controlled surface walkover was conducted during the 1991 WMU excavations at the site revealed clear concentrations of artifacts outside the previous areas of excavation. While previous excavations revealed a main area of habitation, there may indeed be other areas at the site which may yield additional information regarding the extent of the Mississippian presence at Wymer.

The second research problem involved clarifying the cultural affiliation of the Mississippian component from the Wymer-West knoll through statistical comparisons of the triangular points with other Mississippian triangular points. It is suggested that the Mississippian component triangular points from the Wymer-West knoll most closely resemble those of Middle Mississippian sites. Significant differences are noted between Wymer-West knoll Mississippian triangular points and triangular points from Upper Mississippian, Oneota, and Fort Ancient sites. However, no significant differences are evident between Wymer-West knoll triangular points and Middle Mississippian triangular points.

The third research problem involved site function, from the perspective of the overall Wymer-West knoll material culture in general and the Mississippian lithic technology in particular, as a framework to better understand Wymer-West knoll's place in the

regional cultural history. It appears that the Wymer-West knoll Mississippian component represents a seasonal occupation with a mixed subsistence economy supplemented by maize horticulture (Parker 1991). General comparisons of the lithic assemblage, as defined in previous sections, with assemblages from other sites helped to provide a basic insight into possible cultural affiliations with other Mississippian groups.

While maize horticulture was being practiced at the Wymer-West knoll, there is no evidence for the use of a hoe technology at the site. Soil conditions were considered to be a factor in the presence or absence of a hoe technology. Soil conditions at the Moccasin Bluff site were found to be similar to the Wymer-West knoll (Bettarel and Smith 1973:6; Garland and Mangold 1980:27) yet a hoe technology was still being used. The ubiquitous presence of hoe technology on Upper Mississippian and Oneota sites in conjunction with a broad spectrum subsistence economy suggests that the Wymer-West knoll is not Upper Mississippian.

It is suggested that the inhabitants of the Wymer-West knoll were in fact an influx of Middle Mississippian people from the Illinois River Valley who settled along the St. Joseph River and established trading relationships with groups to the south and east at around A.D. 1000.

Future research focusing on additional surveys along the St. Joseph River and further excavations at the Wymer-West knoll would help to increase our knowledge base and either support or dispel the

conclusions drawn from this study. In either case, the importance of the site in understanding the Mississippian/Late Woodland interface in the upper midwest cannot be disputed.

Appendix

Photographs of Artifacts From the Wymer-West Knoll

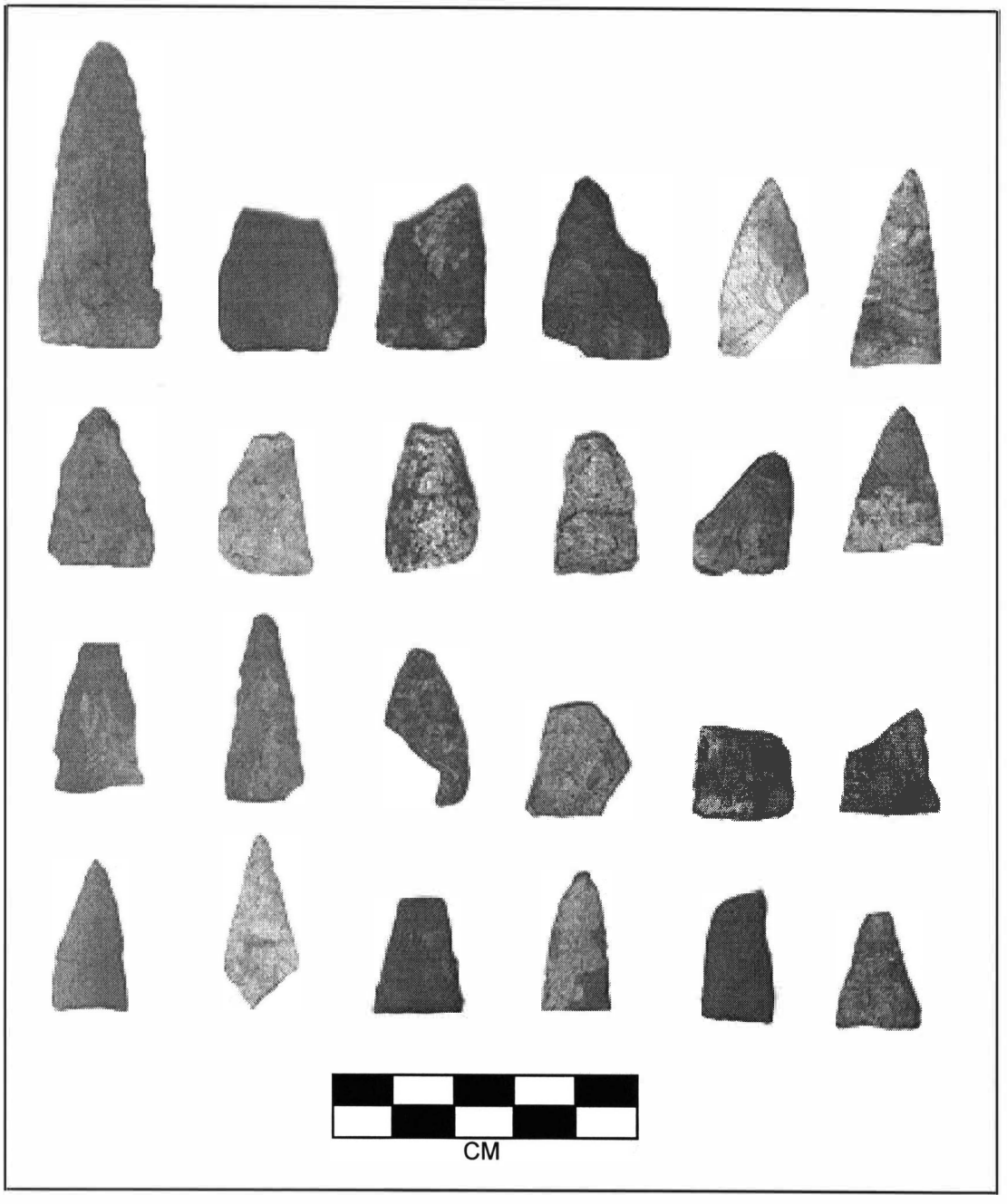

Plate 1. Triangular Projectile Points.

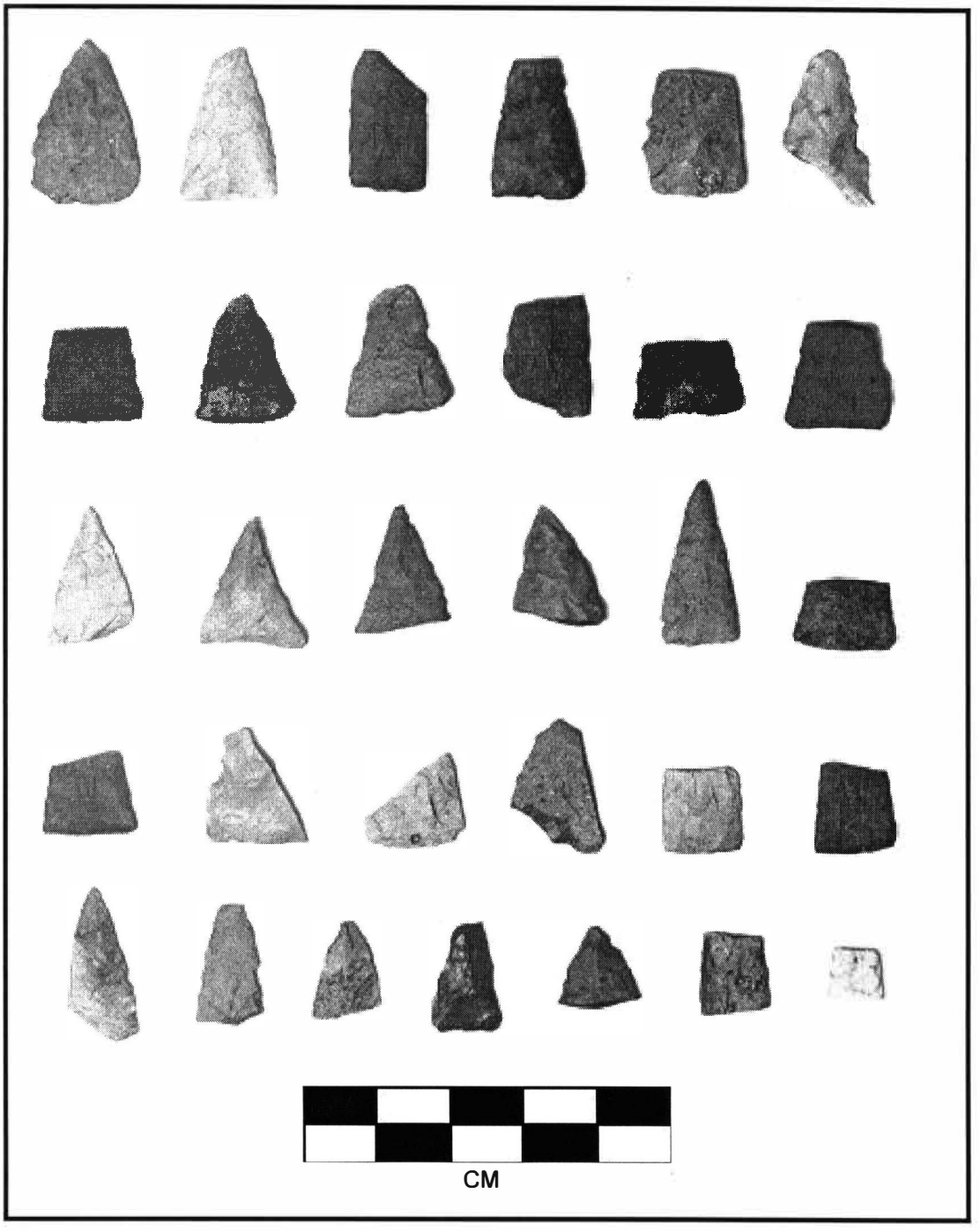

Plate 2. Triangular Projectile Points.

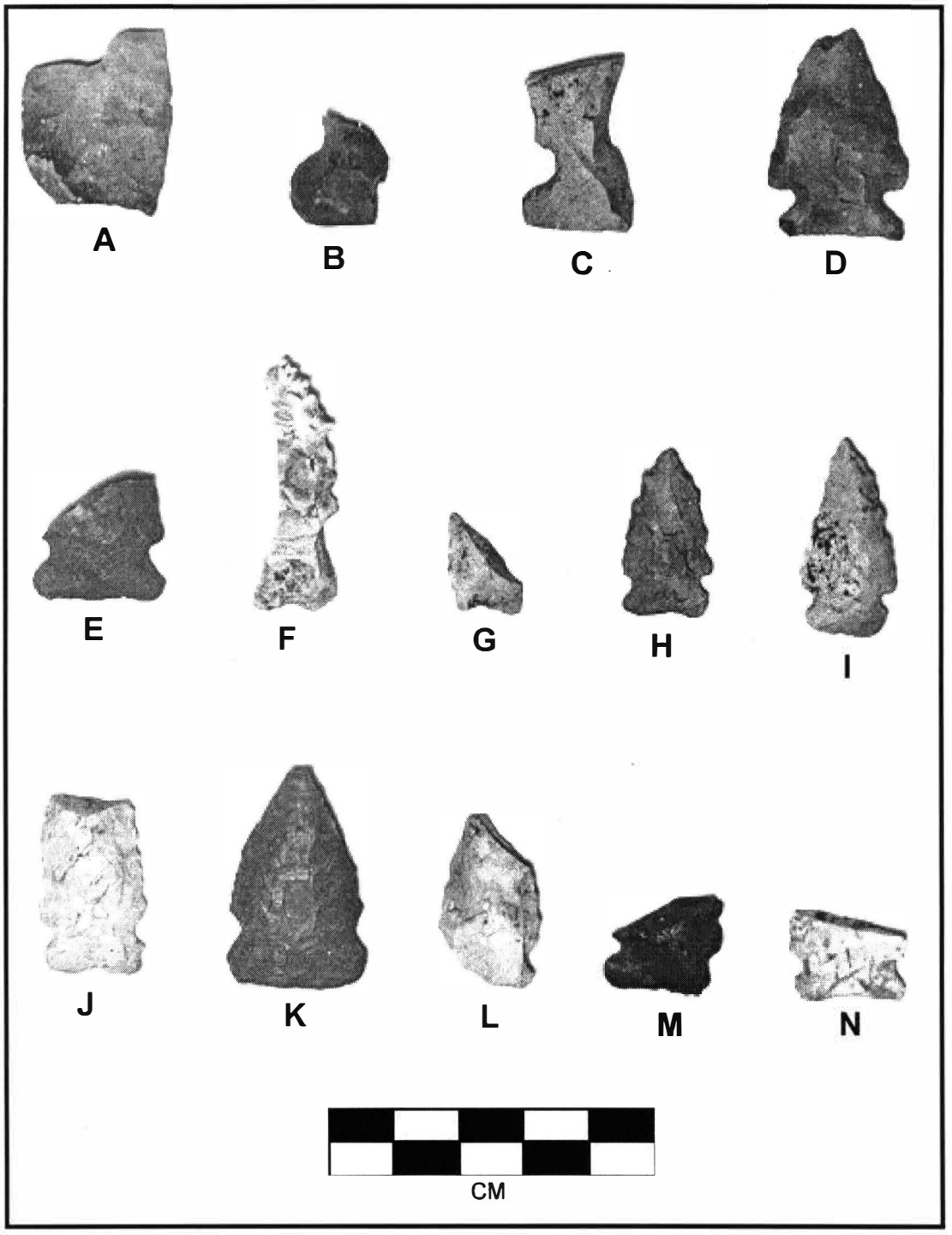

Plate 3. Hi-Lo, A; Thebes, B-C; Kirk Corner Notched, D-E; Bifurcate, F-G; Matanzas, H-N.

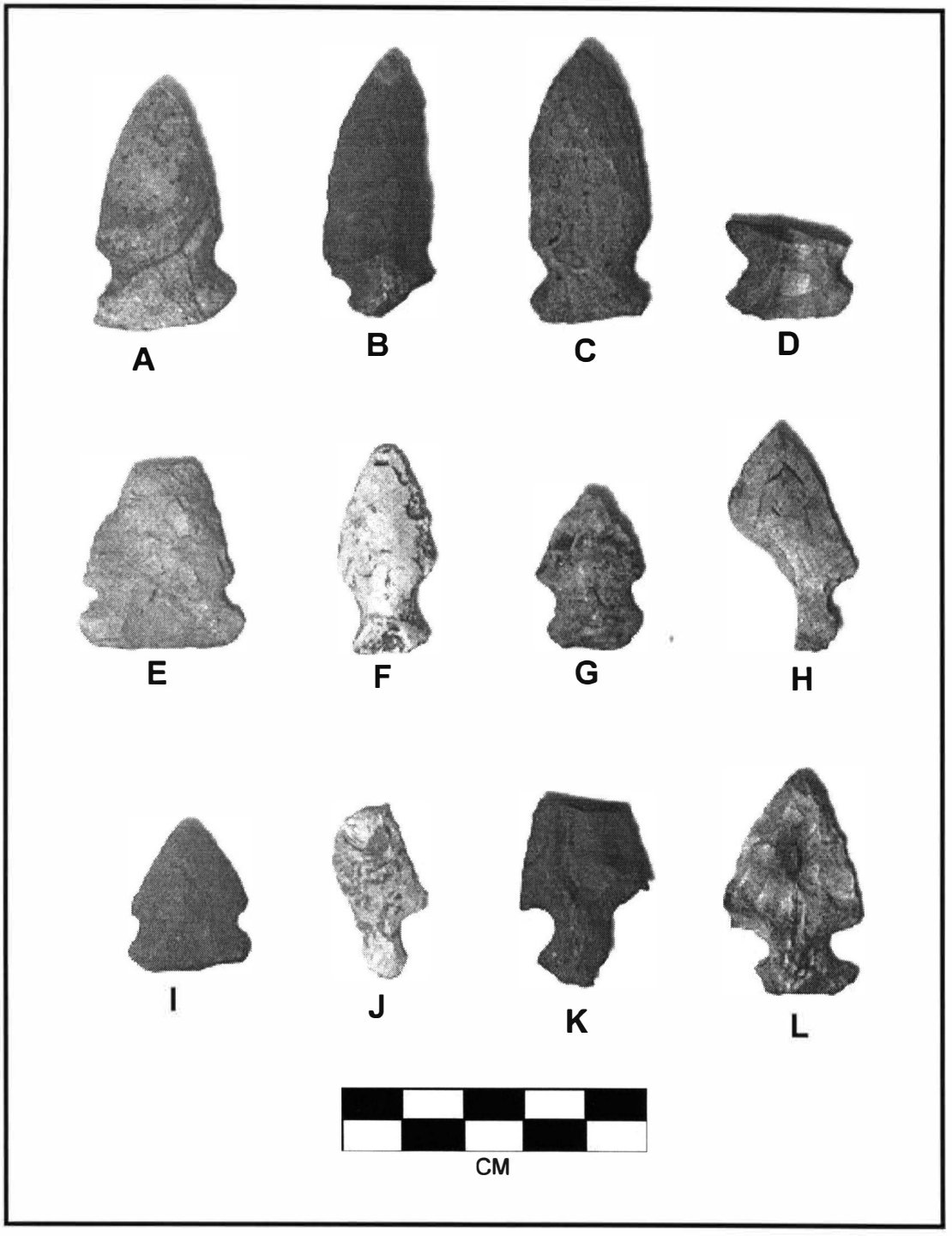

Plate 4. Three Oaks, A-D; Eidson, E; Dustin, F; Berrien, G-H; Oronoko, I; Motley/King, J-L.

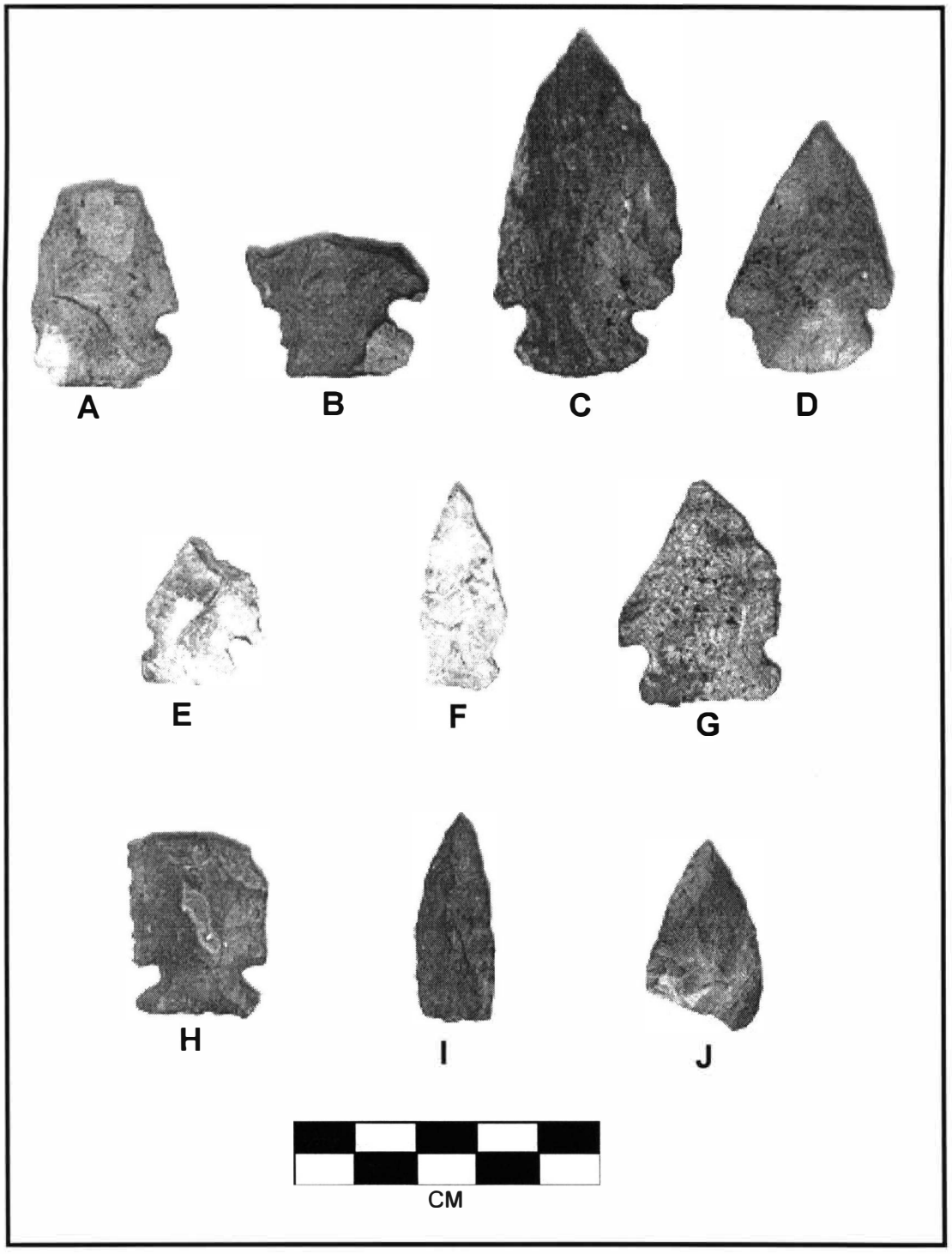

Plate 5. Affinis Snyders, A-E; Affinis Ansell, F; Pipestone Corner Notched, G; Jacks Reef Corner Notched, H; Nodena, I-J.

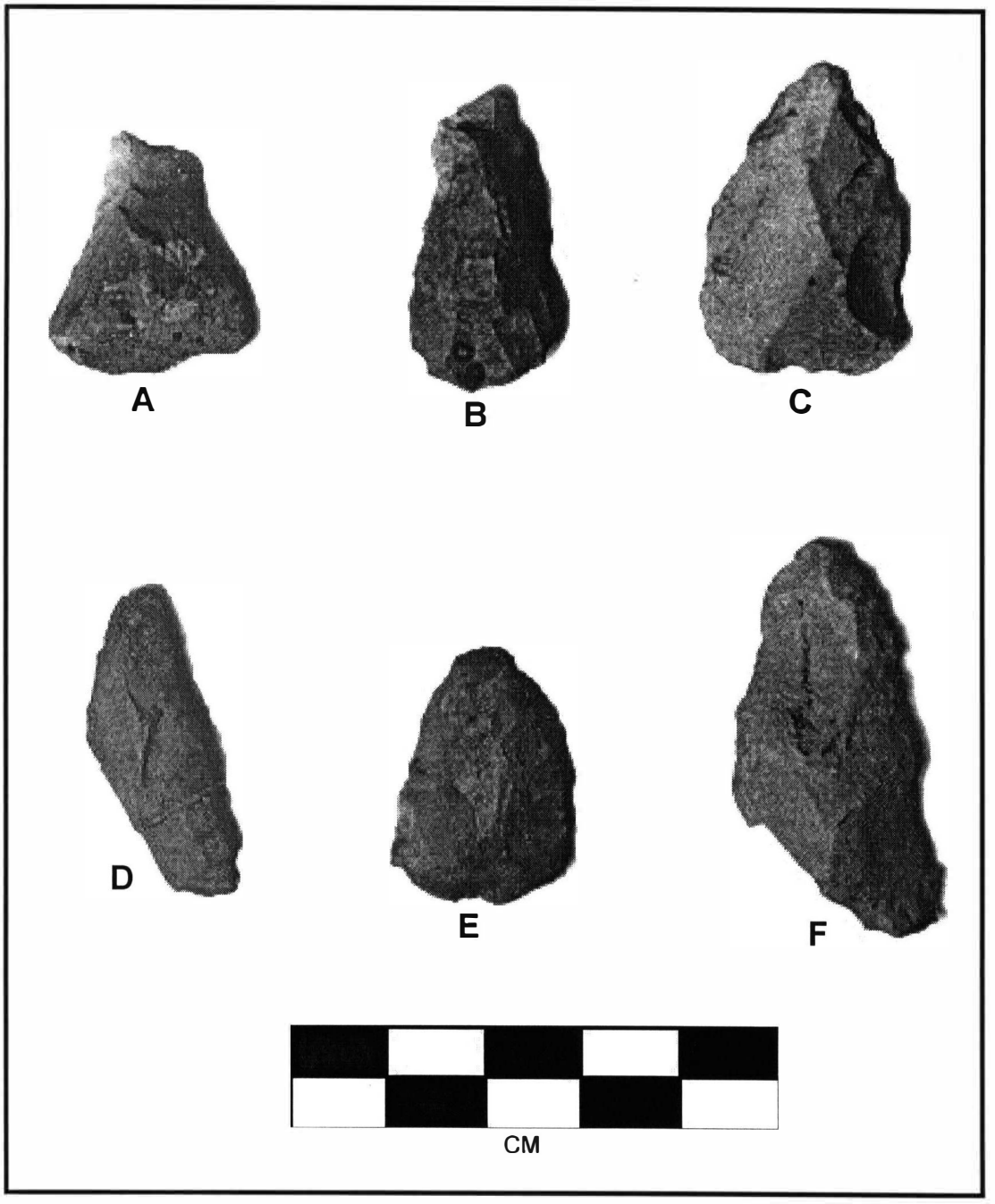

Plate 6. Humpback Bifaces, A-F.

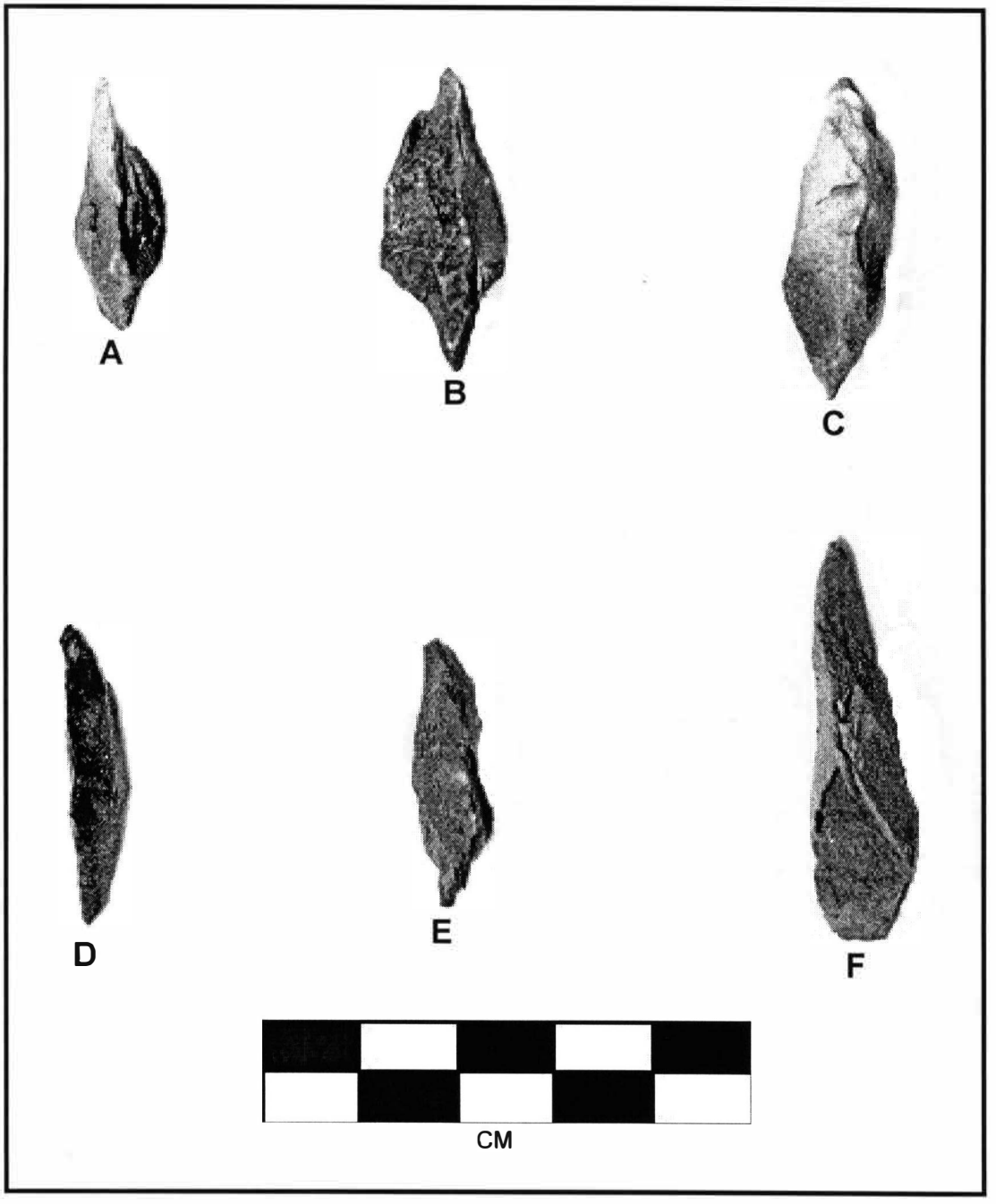

Plate 7. Humpback Bifaces (Profile View), A-F.

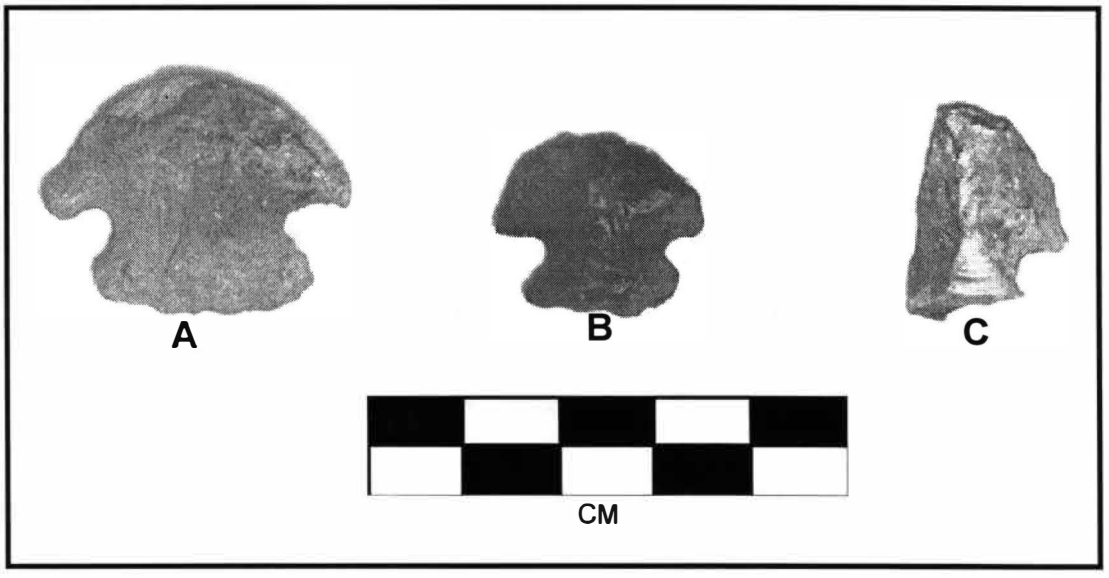

Plate 8. Hafted Bifacial End Scrapers, A-C.

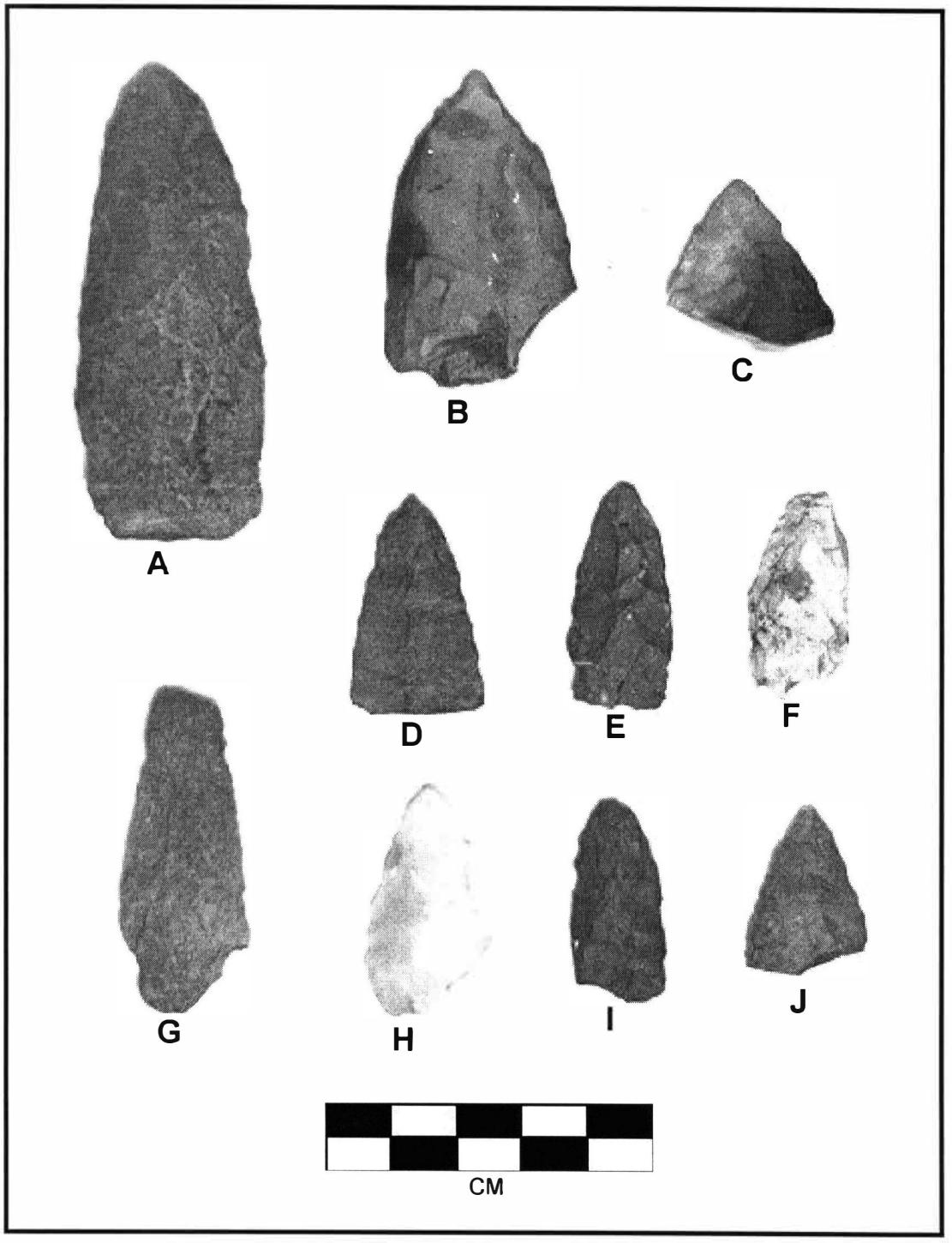

Plate 9. Unidentified Projectile Points, A-J.

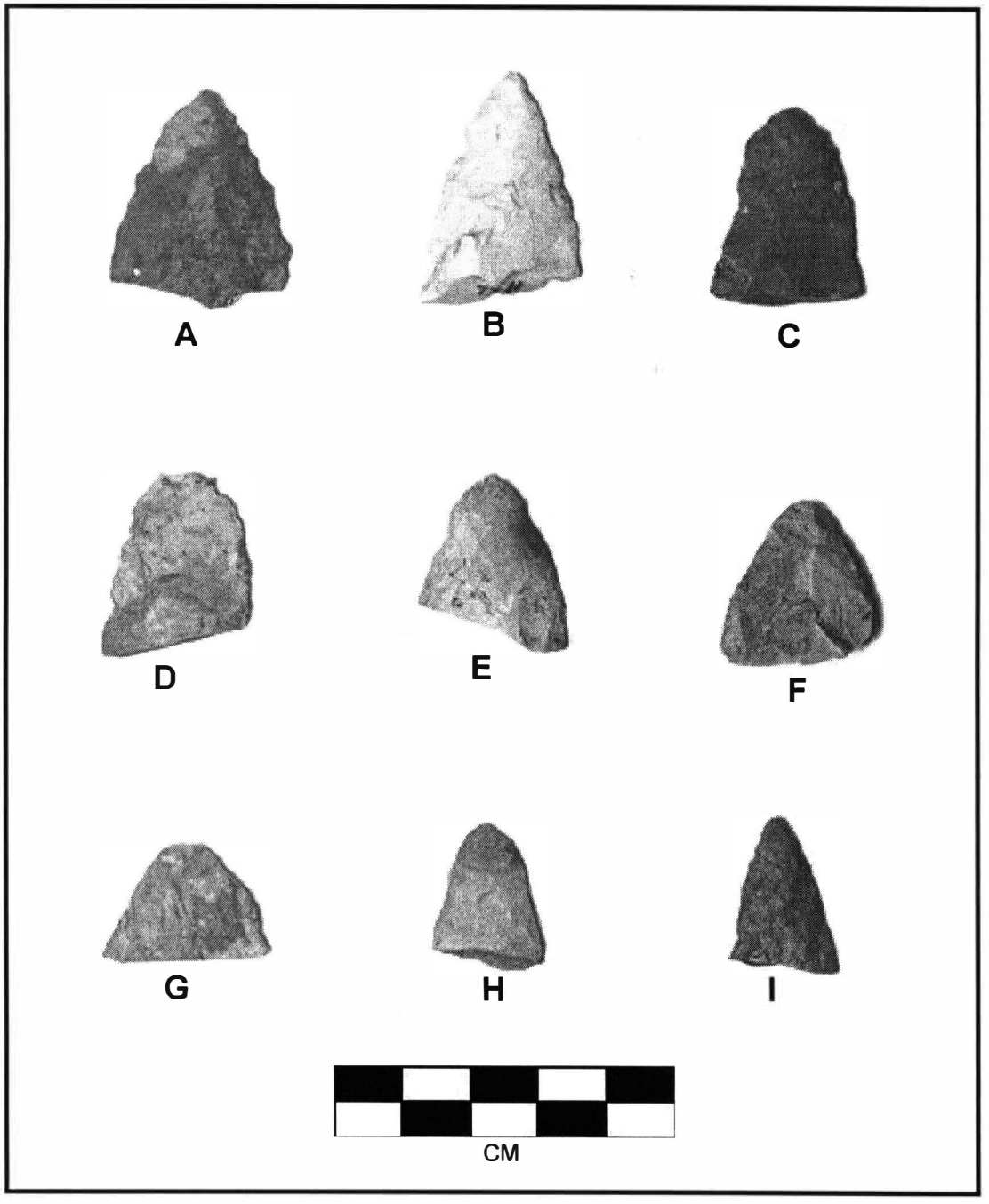

Plate 10. Unidentified Projectile Points, A-I.

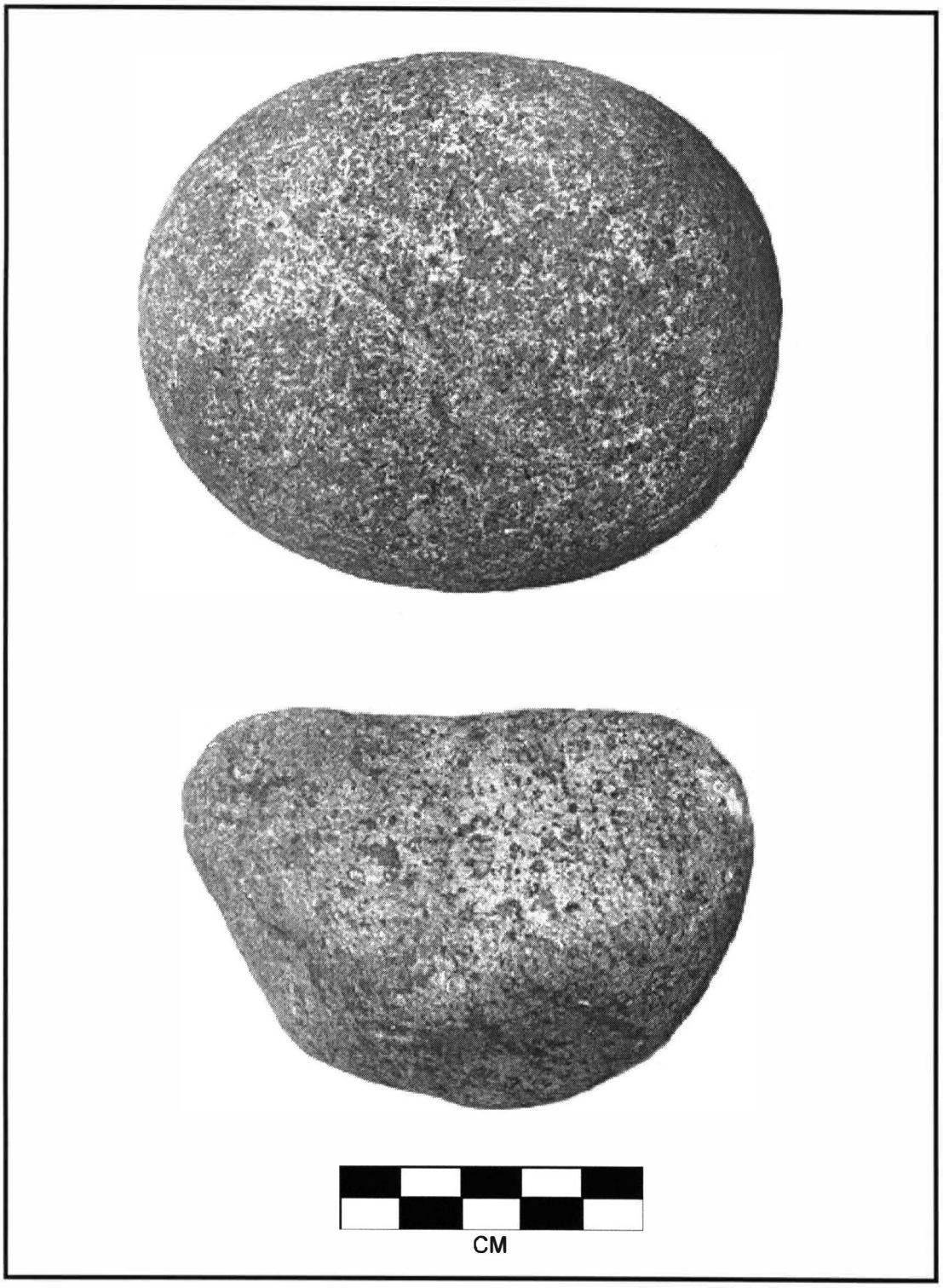

Plate 11. Manos

Plate 12. Metate fragment.

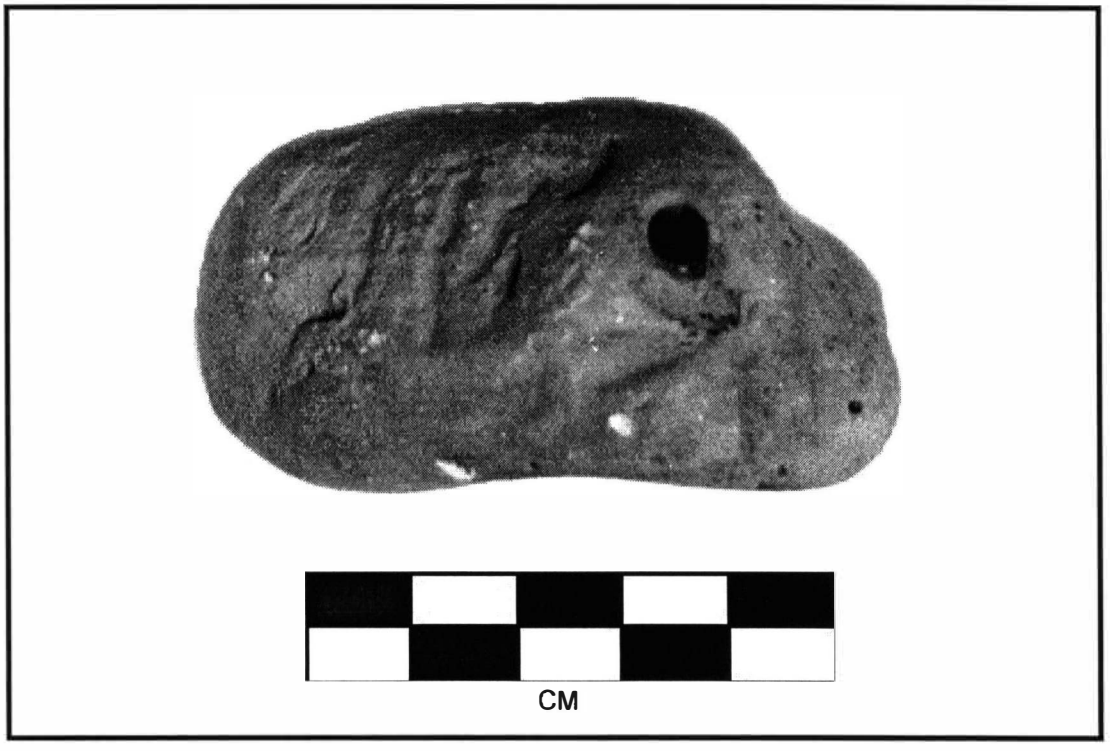

Plate 13. Possible Ceramic Smoothing Stone.

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