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Lithic resource procurement and utilization strategies among Middle and Late Archaic inhabitants of the Hayes site : a stratified shell midden in Middle Tennessee

Joanne M. Juchniewicz

To the Graduate Council:

I am submitting herewith a thesis written by Joanne M. Juchniewicz entitled "Lithic resource procurement and utilization strategies among Middle and Late Archaic inhabitants of the Hayes site : a stratified shell midden in Middle Tennessee." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Anthropology.

Walter E. Klippel, Major Professor

We have read this thesis and recommend its acceptance:

Richard L. Jantz, Jefferson Chapman

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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LITHIC RESOURCE PROCUREMENT AND UTILIZATION STRATEGIES AMONG MIDDLE AND LATE ARCHAIC INHABITANTS OF THE HAYES SITE: A STRATIFIED SHELL MIDDEN IN MIDDLE TENNESSEE

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ABSTRACT

Daniel S. Amick (1984) proposed two hypotheses concerning Middle and Late Archaic settlement/subsistence organizations based on raw material variability. The purpose of this present research was directed toward testing Amick's model using the lithic data from the Hayes site in Middle Tennessee.

The Hayes site is a stratified shell midden ranging in age from 6,000 to 4,000 years B.P. It contains three major stratigraphic sequences. The deepest stratum is assigned to the Middle Archaic cultural phase and is represented by very little shell and Sykes/White Springs and Benton projectile points/knives. The next stratum is assigned to the Late Middle Archaic cultural phase and is represented by a dense concentration of shell and Benton and Ledbetter projectile points/knives. The uppermost stratum is assigned to the Late Archaic cultural phase and is represented by the absence of shell and only Ledbetter projectile points/knives.

Amick (1984) contends that Middle Archaic groups were non-logistically organized with an expedient technology; and Late Archaic groups were logistically organized with a technology exhibiting evidence of 'gearing-up' activities. He states the reason Middle Archaic groups were non-logistically organized and relied on aquatic resources, was due to environmental stress caused by the hypsithermal

climatic interval. Amick feels this climatic episode restricted the movement of people across the landscape, forcing them to rely on a broader range of subsistence resources. Then as the climate became more temperate, there was more freedom of movement and groups became more logistically organized.

Analysis of the lithic assemblage composition of the Middle and Late Archaic components at the Hayes site, revealed the same patterning as in Amick's assemblages. However, the Late Middle Archaic Benton phase revealed a complex patterning, with evidence of movement out of the Inner Basin during part of the year.

Analysis of the faunal and botanical remains revealed the same basic subsistence practices throughout the entire deposit. Research on shell midden sites indicates a seasonal use of aquatic resources, as a supplemental resource, due to an increase in the population base. Increase in the population base is a result of aggregation.

Therefore, the changes observed in the lithic assemblage composition, at the Hayes site, reflects a change in site function. The change in the use of the Hayes site was a result of changing environmental conditions and the availability of subsistence resources.

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Chapter I

INTRODUCTION

Lithic resource procurement and utilization by prehistoric hunters - gatherers are of special interest to many archaeologists as a potential means of defining technological systems, as well as overall settlement/subsistence organizations. A review of the literature reveals a plethora of studies on the subject. Several of these studies have been selected for brief discussion to show the wide range of application this research has on interpreting hunter-gatherer resource selection and use.

Burton (1980) discusses the change in the Neolithic period of Southern England, from a technology centered on local raw material resources, to a more elaborate technology based on extensive trade networks involving non-local resources. His analysis focuses on the character of waste flakes recovered from earlier Neolithic and later Neolithic sites.

Earlier Neolithic assemblages revealed a reliance on small locally available raw material. This was based on the high percentage of waterworn cobble cortex and small flake-cores, with the flakes being modified into tools.

The later Neolithic assemblages revealed a less conservative use of raw material with larger, thicker flakes and large flake-cores. This was because the raw material was being acquired from quarry areas (Burton 1980:137-138).

Burton's contention is that as local resources became scarce, there was a need to find alternate resources no matter how far away they may be. He also contends that this need for resources sparked an increase in the overall trade networks that were already in place. As these trade networks expanded and became more elaborate, "major centers" (1980:142) sprung up. These areas grew in population size, allowing for larger groups to go off and exploit the quarry sites (1980:142).

On the basis of waste flakes recovered from earlier and later Neolithic sites, Burton has proposed that through the Neolithic period, there was a change in technology from use of local raw material resources, to non-local quarrying activities. In conjunction with this technological change, there was a change in internal social structure to make areas of low resource availability attractive for trade exchange (Burton 1980:142).

Dibble (1991) proposes an hypothesis of continual exploitation of local raw material as influencing assemblage variability in the Lower and Middle Paleolithic in Europe.

Dibble's contention is that the availability of local resources may fluctuate due to intensive occupation of particular locals, as well as from environmental conditions. The environmental conditions that may influence resource visibility and accessibility are erosion, deposition, and periods when the outcrops may be covered by snow or vegetation (1991:36).

Many Paleolithic sites may have been continually occupied for many thousands of years. As such, continual exploitation of local resources over such a tremendous time span, could result in the depletion of the higher quality, larger nodules (Dibble 1991:36-37).

Dibble presents several archaeological implications for his hypothesis. If local resources are being depleted over time, the effects may be seen in the lithic assemblages. For example, there may be an intensification in the use of local materials as evidenced by more retouched artifacts, as well as evidence of rejuvenation and reuse. There may also be differential use of various kinds of raw material depending upon its quality. All of this may reflect a change in technology to a more efficient use of local raw materials (1991:37).

Dibble analyzed the lithic assemblages from various Paleolithic sites, and the results supported his hypothesis (1991:37-43). However, Dibble is quick to point out that there is no way of accurately measuring the availability of local resources in the past. His main objective, was to provide yet another possible means of discerning assemblage variability in a region where there is considerable debate over the interpretation of chronological sequences and their respective assemblage compositions (1991:44).

Straus (1980) addresses the question of raw material variability in Solutrean lithic assemblages of the Upper Paleolithic in Spain.

His results revealed a differential use of locally available material, from the river gravels, on the basis of quality and cobble size. Quartzite and flint are the two main resources available. Quartzite is very granular, and occurs in large cobble size. Flint is of high quality, but occurs in small cobble size. Straus discusses the variability in the lithic assemblages in the subregions of Northern Spain on the frequency of occurrence of quartzite and flint on the basis of their availability. Despite the varied availability across the region, a common thread is present concerning the use of these two raw materials as reflected in the tool types (1980:69-70).

Straus' analysis of the tool types showed that the larger, cruder, more "archaic" (1980:69) types are made of quartzite. The tools made of flint, on the other hand, are smaller and more refined. He suggests that the quartzite tools were created for expedient purposes, and used to perform tasks, for an extended period of time, that required a more resilient material. The tools made from flint were probably curated (1980:71).

Ahler (1977) discusses the differential use of raw material resources between the Middle Missouri Tradition (11th century A.D.), and the Coalescent Tradition (14th and 16th century A.D.), on the Oaho Reservoir in South Dakota (1977:133).

The four sites utilized in the analysis were obtained from a single location. This was done so that the availability of various raw material resources, for the two traditions, would have been the same. Ahler's analysis focuses on the entire lithic assemblage, ranging from debitage to bifaces (1977: 140-147).

The results of his analysis revealed that both traditions made use of locally available material. However, a difference arises in the use of non-local materials. During the Middle Missouri Tradition, there was a preference for Knife River Flint, obtained from sources to the Northwest. The Coalescent Tradition peoples, on the other hand, relied on chalcedony and quartzite, obtained from sources to the South and Southwest (Ahler 1977:147-148).

Ahler does not perceive this difference to be related to "inter-tradition" differences based on trade, but rather, to "within-tradition" selection for particular source areas (1977:148).

Hassen (1987) looks at the artifact assemblage from the Wendle site, in West-Central Illinois, to determine the effects of resource selection on the manufacture and use of different tool types.

The results of his analysis revealed that the poor quality, locally available materials were represented by primary and secondary reduction flakes, as well as comprised the majority of the unretouched utilized flakes. The higher quality, locally available materials were represented by tertiary flakes, retouched flakes, a small sample of the unretouched flakes, and a few formalized tools. The highest quality, non-local chert was represented by a biface (Hassen 1987:48-59).

Hassen states, "the availability, accessibility and quality of chert resources, along with the anticipated tool use, are critical factors in resource selection" (1987:45).

Kamp and Whittaker (1986) examine patterns of resource exploitation at a quarry site, near Lake Mead in Nevada, by core refitting.

Various stages of core reduction were evidenced on the basis of raw material quality. The poorest quality material was represented by incipient cores. Those nodules exhibiting internal variability, were represented by exhausted cores which had flakes removed to be used at a later date. Nodules of small size, but of high quality, were worked into crude bifacial preforms. Finally, the presence of a few cortical flakes from a single nodule represented high quality cores that were subsequently removed from the quarry area (Kamp and Whittaker 1986:383-388).

Johnson's (1984a) survey of the Yellow Creek area in Northeastern Mississippi was directed toward identifying the different types of activities carried out at various quarry sites located on the landscape.

One class of sites was located at the chert source on the valley slopes, and the other class of sites was located down slope in the stream valley bottoms, but within easy access to the chert source (Johnson 1984a:234).

Johnson's analysis centered on the bifaces present and their stage in the reduction process. The presence and diversity of other tool types were also incorporated into the analysis (Johnson 1984a:230-233).

Another aspect of the analysis was the incorporation of what Raab et al. (1979) termed "long trajectory and short trajectory sites" (Johnson 1984a:231). "Long trajectory" sites are thought to reflect a wide range of biface reduction sequences as well as a diversity of tool types. "Short trajectory" sites are thought to reflect only one specific type of activity; in this case quarrying (Johnson 1984a:231).

The results of the analysis revealed that the sites located at the chert source contained mostly early stage reduction bifaces and few other tool types. On the other hand, the sites located downslope from the chert source, revealed the full range of biface reduction as well as a variety of other tool types, including finished products (Johnson 1984a:234-235).

Therefore, it was suggested that the sites located at the chert source reflected "short trajectory" sites, and the sites located downslope from the chert source reflected "long trajectory" sites. Johnson concludes by saying:

> When lithic resources are convenient to other resources being exploited in the subsistence system, a broader range of activity will have been performed at the quarry sites and there

> will have been a more permanent habitation. As a result, nonextractive activities, tool manufacture for example, are more apt to have been carried out at quarry locations (1984a:235).

Johnson (1984b), using the same analytical scheme from the Yellow Creek survey, looked at resource exploitation at Colbert Ferry Park in Northwest Alabama.

Johnson's contention was that the exploitative strategies at Colbert Ferry Park should be similar to the strategies employed in the Yellow Creek area (24 km to the West) because they have similar physiographic characteristics (1984b:153). This turned out not to be the case.

An analysis of the lithic assemblages from the Colbert Ferry Park area revealed two distinct technological site types. One site type, located high on the ridge tops, consisted primarily of a "chopper" (Johnson 1984b:155) technology. Bifaces are present, but represent only finished products. The other type, located in the stream bottoms of Colbert Creek, contained no "choppers" and represented the full range of bifacial reduction (Johnson 1984b:155-156).

Each of the two site types utilized locally available material in the form of alluvial and terrace gravels and cobbles. However, the material available on the ridge tops is of low quality. The "choppers" are made from the low quality material, while the bifaces are made from a variety of materials, including non-local resources. The material available in the stream bottoms, on the other hand, is of high quality. This, therefore, provided means for the full range of bifacial reduction to occur. Johnson relates these sites to the "long trajectory" sites in the Yellow Creek area (1984b:156-160).

Johnson attributes the presence of a "chopper" technology, in the Colbert Ferry Park area, to the type of exposure represented by the Fort Payne Formation. In the Yellow Creek area, where there is no "chopper" technology and only a bifacial technology, the lower portion of the chert formation is exposed. In the Colbert Ferry Park area, the uppermost portion of the formation is exposed. Johnson further states that the high quality material is found in the lower portions of the formation. Therefore, the prehistoric inhabitants of the Colbert Ferry Park area adjusted their technology to allow for the use of locally available, low quality material by incorporating a "chopper" technology with a biface industry (1984b:161).

Johnson concludes by suggesting that the "choppers" represent an alternate tool type used for expedient purposes, while the bifaces were curated for special tasks (1984b:162).

Francis (1980) presents an hypothesis, with subsequent archaeological test implications, for interpreting the changes in lithic resource procurement from Paleo-Indian to Archaic times in the Northwestern Plains.

Francis begins by discussing certain problems inherent in regional studies of hunter-gatherer settlement/subsistence strategies (1980:2-4). She then goes on to discuss the various raw material exploitation strategies that may have taken place, on the basis of group organization and mobility (1980:4-8). Francis then proposes an hypothesis regarding Paleo-Indian and Archaic procurement strategies (1980:8-11).

Very briefly, Francis states that Paleo-Indian hunters-gatherers were highly mobile, exploiting large areas and possessing elaborate interaction networks with other groups. This type of organization would lead to procurement of high quality distant resources, with these resources being curated. There would also be evidence of exotic material resulting from contact with other groups (1980: 9-11).

Archaic hunters-gatherers, on the other hand, became more restricted in their range of exploitation and did not maintain a high level of interaction with other groups. As a result, there should be a decrease in the use of more distant resources and an increase in the use of local material. The presence of curated items should decrease and more expedient types of tools should increase. There should also be a decrease in the number of exotic items due to limited contact with other groups (Francis 1980:9-11).

Francis relates these changes in group organization and mobility to changing environmental conditions. A more temperate climate and increased moisture around 2500 B.C. served to consolidate subsistence resources to particular areas. Therefore, there was no longer a need to travel great distances to obtain the various resources necessary for survival (1980:10).

Andrefsky (1984), using projectile points/knives, looks at the changing use of lithic raw material types from Late Archaic to Early Woodland times in the Upper Delaware Valley.

The results of his analysis revealed two trends. The first trend is a decrease in the use of distant raw material resources from the Late Archaic to the Early Woodland. Another aspect of this trend is that the more distant resources decrease in use first; from Late Archaic to Early Woodland there is an increase in the use of resources closer to the site. The second trend is an increase in the number of different raw material types used. Late Archaic projectile points/knives were made primarily from a single raw material type, while Early Woodland points were made of at least five different types of raw material (Andrefsky 1984:178-219).

Andrefsky proposes two hypotheses for the observed trends. The first is a reduction in the broad-scale social networks resulting from an increase in territoriality from the Late Archaic to the Early Woodland. This would make it difficult to obtain distant raw material resources. The second hypothesis is population stress. As population size increased from the Late Archaic to the Early Woodland, there was a decrease in mobility. With a decrease in mobility there was an increase in closer social networks. Associated with decreased mobility is the inability to exploit more distant raw material resources. Also, increased population size necessitates the use of a wider variety of raw material resources (1984:227-228).

Gatus (1983) and Nance (1984) conducted an extensive geologic survey of the availability of chert resources in the Lower Tennessee-Cumberland region of Western Kentucky.

Their survey revealed a limited availability of bedrock chert. However, the upland streams contain a large quantity of usable chert in the form of gravels and residuum. The area of highest abundance appeared to be along the right bank of the Cumberland River. This area also contained a wide variety of chert resources. This was reflected in the diversity discovered in the lithic assemblages from surface collected material of sites in the area (Gatus 1983:99-103; Nance 1984:105-110).

One quarry site was discovered that yielded a high frequency of material in the lithic assemblages. No other quarry site was discovered in the survey. Barring bias, this suggests that this particular site may have been of great importance in prehistoric chert exploitation (Gatus 1983:108).

An analysis of the composition of the lithic assemblages represented by Archaic and Woodland occupations, revealed that the chert resources were exploited on the basis of the abundance of particular chert types present in the environment. Nance suggests an embedded exploitation strategy. He further suggests that on the basis of the quality of the materials present, there was a certain amount of selectivity for those materials that had the highest chippable qualities (Nance 1984:119). Non-local materials were also recovered, suggesting more than just one type of exploitation strategy (Gatus 1983:105).

In comparing assemblages from Archaic to Woodland times, there was a consistent pattern of utilizing the most environmentally abundant materials. The only observable change was in the proportion of certain chert types (Nance 1984:113). On the basis of the results of the survey, Nance states:

> Exploitation of stream deposits, bedrock quarries, and residuum suggest that lithic exploitation patterns in the Lower Tennessee-Cumberland involved utilization of nearly all available sources in the local environment (1984:110).

Faulkner and McCollough (1973:52-61) and Prescott (1978:419-432), provide a detailed description of the location and utilization of various lithic raw material sources by prehistoric inhabitants of the Normandy Reservoir, located in the Upper Duck River Valley in Tennessee. Only a very brief discussion of their results is presented.

The chronological sequence represented by the sites in the Normandy Reservoir range from Paleo-Indian through the Mississippian period. The use of various local and non-local lithic resources varied considerably throughout the time span of occupation. The use of locally available materials (grey banded chert) was directly related to the sites proximity to the resource. For example, sites located in the lower reservoir and tributary areas, distant from the resource, did not show high percentages of use.

Those sites located in the uplands, close to the source, showed high percentages of use (Prescott 1978:425).

The use of non-local material is best viewed by cultural time periods. In the Paleo-Indian/Early Archaic periods, the use of non-local materials was minimal. There was a sharp increase in the presence of non-local material during the late Early Archaic through the Middle Archaic. The Middle Archaic Morrow Mountain phase, exhibited the highest percentage of non-local materials. During the Late Archaic period, there was a decrease in the presence of non-local material. Then in the Middle Woodland period, use of non-local materials begins to increase (Prescott 1978:432).

A critical aspect in the patterning of use of non-local resources is site location. Again, the discussion of site location is very brief and limited in scope. Faulkner and McCollough (1973:329-408) and Prescott (1978:381-390), provide a comprehensive locational study of the various sites by cultural time period.

The Transitional Paleo-Indian/Early Archaic sites are most frequently represented in the uplands but present in lower frequency on the floodplain. Toward the end of the Early Archaic, and through the Middle Archaic period, use of the floodplain increases, while use of the uplands decreases. Occupation of the floodplain was most extensive during the Middle Archaic Morrow Mountain phase. In the Late Archaic through Mississippian period, the use of the floodplain decreases sharply and the use of the uplands increases dramatically (Prescott 1978:384-390).

The most commonly occurring non-local raw material was obtained approximately 20 miles from the Normandy Reservoir on the Highland Rim near the Cumberland Plateau. Its representation was highest during the Middle Archaic Morrow Mountain phase when the floodplain was most extensively occupied. This patterning suggests that the settlement/subsistence organization of Middle Archaic peoples may have been quite extensive (Faulkner and McCollough 1973:61). Another hypothesis is that the floodplain zone, during the Middle Archaic, contained a wide variety of subsistence resources that made it attractive to people outside the Upper Duck River Valley (Prescott 1978:447).

The most distant exotic material recovered in the Normandy Reservoir came from the Great Lakes region. This suggests that at certain time periods, the inhabitants of this region were involved in extensive trade networks (Faulkner and McCollough 1973:61).

As can be seen from the above discussion, the differential use of local and non-local lithic resources is determined by cultural time period, site location and settlement/subsistence organizations.

The studies cited show the diversity in the applicability of lithic resource procurement and utilization over a wide range of cultural time periods and regions of the world. Interpretations of the resultant analysis give rise to varying hypotheses, however, there is an underlying premise that all agree on, the critical factors effecting resource selection and use are availability, accessibility, and quality of the raw materials.

One significant study of lithic resource procurement and utilization, that is of particular interest to the present research, is Amick's (1984) analysis of Middle and Late Archaic assemblages in the Central Duck River Basin in Middle Tennessee. It is actually the impetus for this present research. A very brief discussion of Amick's hypotheses will be presented.

Amick conducted an extensive geological survey, in the Central Duck River Basin, to locate the various source areas of the raw materials present in the region (1984:19-68). He also conducted a river gravel study geared toward investigating the distribution, composition, and abundance patterns of chert within the Columbia Reservoir (1981:48-51, 1984:79-99).

The survey area contains two major physiographic sections; the Highland Rim and the Nashville Basin. The Nashville Basin is divided into inner and outer portions. Based on Amick's survey, the Highland Rim contains very high quality material represented by Fort Payne and St. Louis cherts. The Outer Nashville Basin contains several raw material types, and the quality of the material varies. The types include Brassfield, Bigby-Cannon, and Fort Payne cherts. The Inner Nashville Basin contains very poor quality material, represented by Ridley and Carters chert (Amick 1984:103-105).

Each of the source areas are at differing distances from the sites analyzed by Amick. Simply stated, the Highland Rim is the most distant source area. The Outer Basin is the next most distant source area, and the majority of the sites are located within the Inner Basin source area. Therefore, raw materials from the Highland Rim are considered to be non-local resources, and materials from the Inner Basin are considered to be local resources (Amick 1984:106-107).

Amick's analysis of the lithic assemblages from Middle and Late Archaic sites, revealed different frequencies and use of the various raw material types. Simply, Middle Archaic assemblages were comprised mainly of locally available, poorer quality materials. Late Archaic assemblages, on the other hand, consisted mainly of non-local, higher quality materials (1984:105-124, 128-231).

The hypotheses presented by Amick are related to the use of local versus non-local raw materials and its implications on Middle and Late Archaic settlement/subsistence organizations. Briefly, the reliance on locally available material by Middle Archaic peoples represents a non-logistically organized society with an expedient technology. The use of non-local material by Late Archaic peoples represents a change in organization to a more logistical strategy with a corresponding curated technology (1984:105-124, 236-267). Amick suggests that these differences are related to the hypsithermal climatic interval.

The hypsithermal is characterized as a general warming and drying trend. Amick proposes that this trend, along with increasing population density, placed stress on Middle Archaic peoples, restricting their movement. They were forced to rely on a broad range of locally available subsistence resources, as well as local raw material resources. After the hypsithermal interval, the climate became more temperate, which afforded freer movement across the landscape (1984:124-127, 236-267).

The above discussion of Amick's research is an oversimplification of the full extent of his analysis and interpretations. The objective, at this point, is to only introduce Amick's basic research design. The chapters that follow will present data from a stratified Middle and Late Archaic site (Hayes), in the Inner Nashville Basin, using the research design proposed by Amick.

The well preserved stratigraphic sequences represented at the Hayes site, provides an excellent opportunity to view the exploitative strategies of Middle and Late Archaic peoples on a continuum from 6,000-4,000 years B.P. Throughout the discussion, references to Amick's research will be made, and alternative explanations will be offered regarding the observed patterning.

Chapter II

THE HAYES SITE

The Hayes site (40ML139) is located at the confluence of Caney Creek and the Duck River in the Inner Nashville Basin in Marshall County, Tennessee (Figure 1). The 'Block' area of the site is a deep, stratified shell midden, located on the valley slope and within the T1 terrace, ranging in age from 6000 B.P. to 4000 B.P. (Figure 2) (Morey 1988:vi-6). It is labeled the 'Block' because three 1x1 meter units were isolated from surrounding units to be excavated by natural stratigraphic breaks.

There are three main stratigraphic sequences represented at the Hayes 'Block'. The oldest is a Middle Archaic component identified by the presence of Sykes/White Springs and Benton projectile points/knives. The next sequence, which is the shell bearing deposit, is a Late Middle Archaic component represented by Benton projectile points/knives. Above the midden, there is a Late Archaic component represented by Ledbetter projectile points/knives (Figure 2).

A brief description of the stratigraphy of the 'Block' will be presented below. The information concerning the

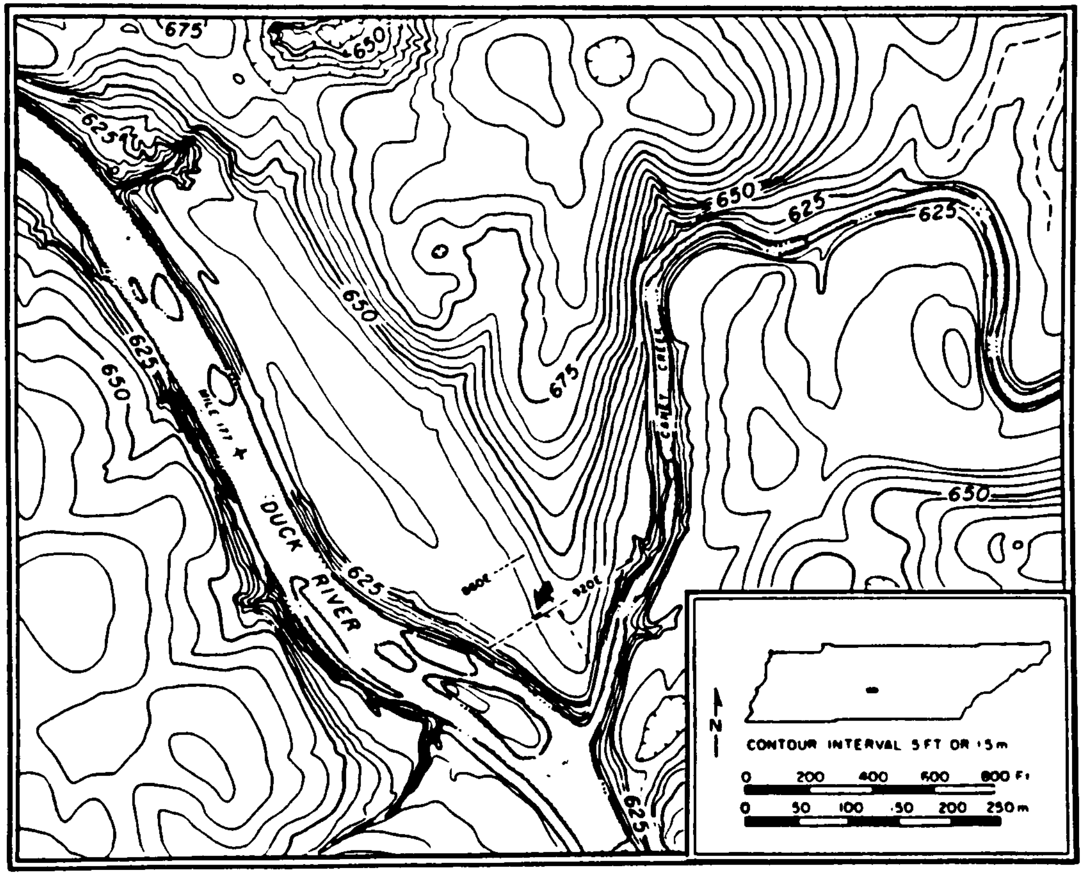

Figure 1: Map of the location of the Hayes site (after Morey 1988).

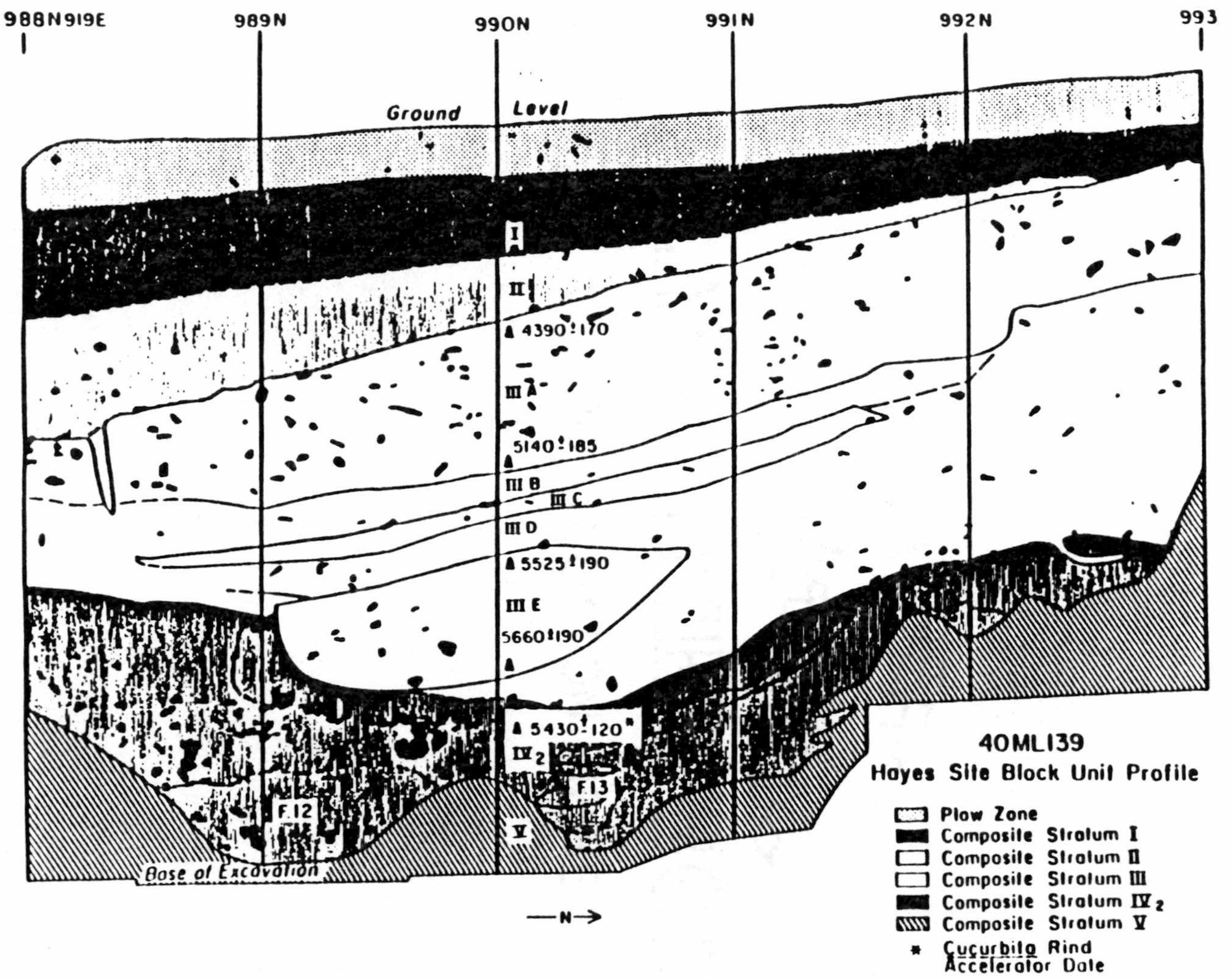

Figure 2: Profile of the 'Block', showing stratigraphic sequences and their respective dates (after Morey 1988).

stratigraphy is taken from Darcy Morey's Faunal Report of the Hayes Site (1988).

'Block' Stratigraphy

CSIV$_2$

The deepest and earliest deposit is Stratum IV$_2$. It contains very little shell except for a few lenses interspersed within the surrounding matrix. The shell lens and the surrounding matrix were given separate designations. For purposes of this research, only the surrounding matrix (IV$_2$A) will be discussed because it contained the lithic material.

Two dates have been obtained for this stratum. A C14 date on burned nut shell, estimates a date of around 5800-6000 years B.P. (Morey 1988:28). "Beta-13395, a direct accelerator date on burned Cucurbita rind, falls at about 5400-5500 B.P." (Morey 1988:28-30).

The presence of Sykes/White Springs and Benton projectile points/knives fits well within the range of the two dates.

CS III

This stratum is the shell bearing deposit. It ranges in age from 5600 B.P. to 4400 B.P. and contains Benton and

Ledbetter projectile points/knives. There are five substrata contained within this one stratum (CSIIIA, CSIIIB, CSIIIC, CSIIID, CSIIIE). They are distinguished on the basis of shell density, charcoal concentration and soil color. Morey provides a detailed description of these substrata (1988:30-32). The most interesting substrata within stratum CSIII is CSIIIA. This one substratum ranges in age from 5140 ± 185 to 4390 ± 170 years B.P. (Morey 1988:27). It contains Benton projectile points/knives as well as two Ledbetter points, recovered from the upper most level of the substratum. Another interesting aspect is the increased presence of bivalves compared to the other substrata (Morey 1988:32).

CSII

This stratum has been dated to 4270± 155 B.P. and contains Ledbetter projectile points/knives. Its distinction from CSIII is quite clear; the absence of shell (Morey 1988:32).

CSI

This stratum, directly beneath the plowzone, contains few artifacts. Some pottery fragments were recovered along with Ledbetter projectile points/knives. Due to this mixing, no date was obtained and it is excluded from this research.

Lithic Resource Distribution

The two major physiographic sections, in Middle Tennessee, that are of interest in determining resource procurement strategies practice by the Archaic inhabitants of the Hayes site, are the Highland Rim and the Nashville Basin (Figure 3).

Highland Rim

Chert resources available on the Highland Rim are Mississippian Fort Payne and Mississippian St. Louis-Warsaw. The material is of very high quality and is abundant. Fort Payne can be found in residual as well as gravel context. St. Louis-Warsaw, located at higher elevations of the Highland Rim, is usually found in residual context (Amick 1984:64-66). The Highland Rim is located approximately 24 to 32km from the Hayes site.

Nashville Basin

The Nashville Basin is divided into two sections: the Outer Basin and the Inner Basin.

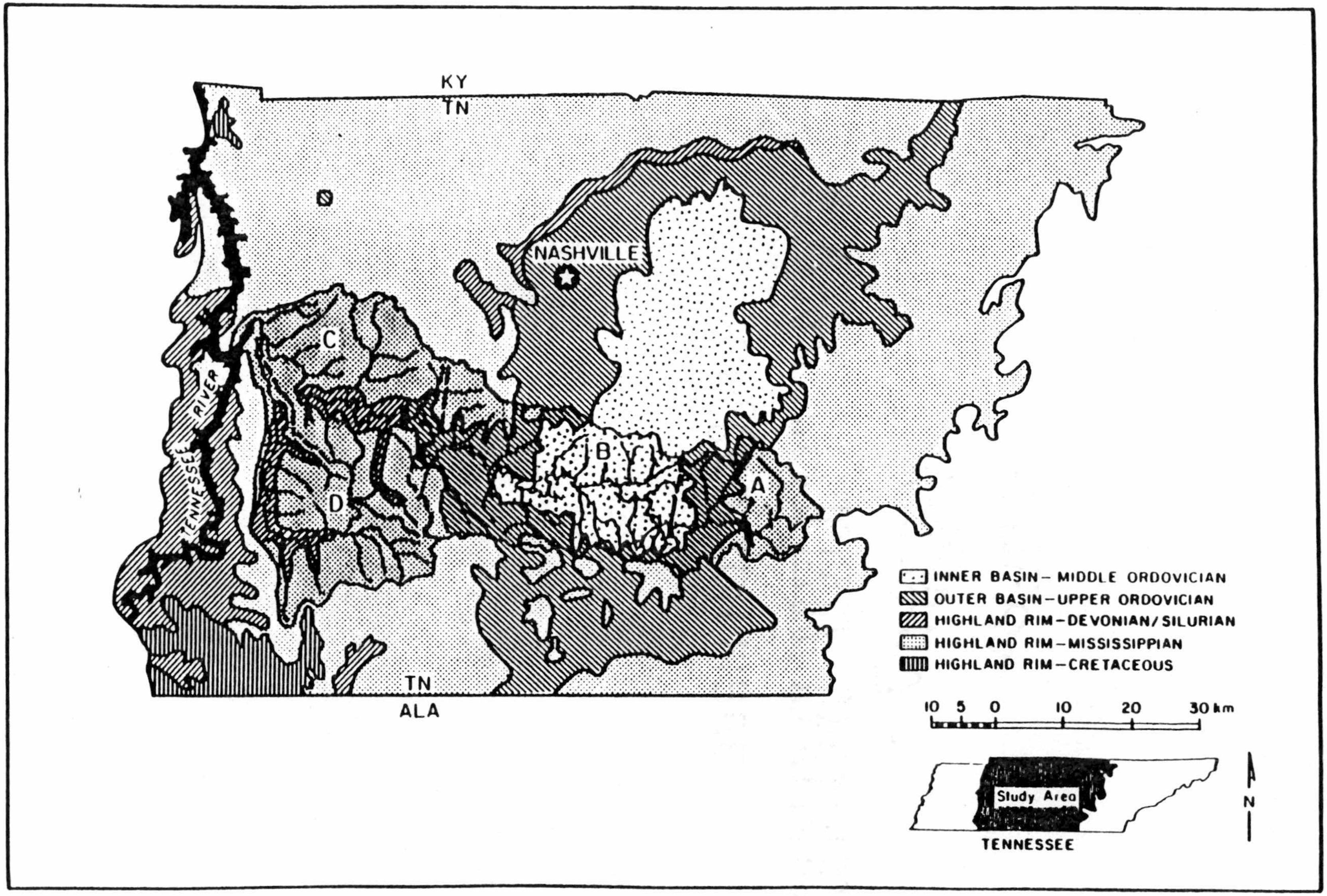

Figure 3: Physiographic/geologic map of Middle Tennessee (after Amick 1984).

Outer Nashville Basin

Chert resources available in the Outer Basin are Ordovician Bigby-Cannon, Silurian Brassfield and Mississipian Fort Payne.

Brassfield is not very abundant, but it is of very high quality (Amick 1984:56-57).

Bigby-Cannon and Fort Payne are present as alluvial cobbles. The quality is fine-grained and the cobble size is moderate. Fort Payne is more abundant than Bigby-Cannon (Amick 1981; 1984:53-65). The western Outer Basin is approximately 16 to 24 km from the Hayes site.

Inner Nashville Basin

Chert resources available in the Inner Basin are Ordovician Ridley, Ordovician Carters, Ordovician Bigby-Cannon and Mississippian Fort Payne.

The most abundantly available materials are Ridley and Carters. They are a very poor quality chert containing many incipient fracture planes. These fracture planes "transect the nodules perpendicular to the bedding causing the chert to split into small blocks and wedges" (Amick 1984:46).

Ridley and Carters are most abundantly found in residual context exposed on the land surface. They are also present in the alluvial gravels, but in limited quantity (Amick 1981:50; 1984:104). The Ridley gravels are usually a higher quality chert than the residual Ridley (Amick 1984:47).

Bigby-Cannon and Fort Payne are present as alluvial gravels. They are of high quality but are available in limited quantity. The cobble size is also fairly small (Amick 1984:104).

The Hayes site is located within the Inner Nashville Basin.

Sample Selection

Lithic material recovered from the 'Block' area of the Hayes site was selected for analysis. The middle unit, 99ON918E, was selected because it was located in the densest part of the midden and has good stratigraphic control. It was also selected for comparative reasons. The faunal analysis (Morey 1988) as well as the botanical analysis (Crites 1987) was done with material from this unit.

As has been stated previously, there are three main stratigraphic sequences within the 'Block'. Excavation was conducted according to the natural stratigraphy. Due to the thickness of the strata, arbitrary 10cm levels were excavated within the natural stratigraphy. All soil was waterscreened through 1/4" and 1/16" mesh screens, except for a 50x50 cm column taken out for floatation. All lithic material recovered from the waterscreen was used in this analysis. Material recovered from floatation was not included.

The lithic material from two levels had to be excluded from analysis because they were accidently combined in the field (level 17F within stratum III, and level 25M within stratum IV_2A).

The lowest stratum (IV_2A) was problematic in that it contained only four levels. Lithic material recovered from this stratum was also very low. Therefore, the material recovered from stratum IV_2A in the two adjoining units was incorporated.

The total sample size of the lithic material analyzed is 4960. Of this total, stratum IV_2A contains 385, stratum III contains 3399, and stratum II contains 1176.

Due to the low sample size in stratum IV_2A compared to the other two strata, a chi-square test was conducted on the flake and blocky debris to see if there was any significant difference within the assemblage. The results of the chi-square ($x^2 = 1.9$, $df = 8$, p value >0.10) revealed there was no statistically significant difference within the assemblage. It was therefore considered to be an adequate and representative sample.

Method of Analysis

Material was subjected to size grading through a series of screens (1", 1/2", 1/4"). Then a coding format was employed to sort the material on the basis of various attributes used to assign them to particular technological stages. The format was created by Daniel Amick and is presented in the Shelby Bend Archaeological Report (1986). Amick's format was used so that the assemblages from Hayes would be comparable to the assemblages analyzed by Amick.

The artifact types recognized are flake debris, flake tools, unifaces, microtools, core debris, cores, core tools, bifaces, drills and projectile points/knives. Two other critical attributes recognized are cortex type and raw material.

A brief description of the kinds of attributes noted for each artifact type will be presented below. Amick provides a much more detailed description in the Topsy Report (1982).

Flake Debris and Core Debris

The attributes looked at with flake debris are: platform configuration, if they were whole or broken (distal or proximal) and percentage of cortex present.

Core debris consists of blocky debris/shatter and potlids with dorsal flaking (Tomka 1989:139).

Flake Tools, Unifaces and Microtools

The attributes looked at with flake tools include, those previously mentioned for flake debris, as well as any evidence of edge damage caused by use (i.e. unifacial utilization/retouch, bifacial utilization/retouch).

Many of the utilized flakes exhibited more than just one form of edge damage; representing multipurpose tools. However, the specific type of wear is not mentioned because it is not the intention of this research to determine specific activities conducted on the site. Rather, the intention is to show increase or decrease in the amount of possible activities occuring based on the presence and diversity of tool types. It is also the contention of this author, based on her use-wear experiments, that the pieces must be examined under a microscope, to construct specific activities. Purely macro-observations of wear are insufficient.

Therefore, all utilized flakes are grouped together as representing a single tool type.

Unifaces are designated as flake tools. However, they are differentiated from utilized flakes because it is presumed unifaces were intentionally modified to perform a specific task for a specific period of time. Utilized flakes, on the other hand, represent more of an expedient function.

Microtools occured on projections of flakes and represent more of a perforating/drilling motion rather than a scraping or cutting motion of utilized flakes.

Cores and Core Tools

Cores were coded as to whether they were complete cores, core fragments or incipient cores/tested cobbles.

Core tools are represented by blocky debris that had subsequently been either unifacially utilized/retouched or bifacially utilized/retouched. Specific type of wear was not mentioned for the same reasons previously stated for flake tools.

Bifaces, Drills and Projectile Points/Knives

Bifaces were coded as to whether their morphology exhibited predominantly hard hammer flaking or soft hammer flaking. If the stage of flake reduction was not clearly evident, they were labeled as biface fragments.

Drills were distinguished from bifaces on the basis of their morphological characteristics.

Projectile points/knives are characterized by bifaces that have been thinned and their edges show signs of final retouch. Whenever possible, the projectile points/knives were assigned to their respective diagnostic type.

Cortex

The two types of cortex recognized are matrix/residual and waterworn cobble.

Raw Material

The different types of raw material present at the Hayes site include Fort Payne, Ridley, Carters, Bigby-Cannon, Brassfield, St. Louis, Quartzite, and Chalcedony.

Lithic Analysis

The main focus of this analysis is to attempt to identify lithic resource procurement and utilization strategies carried out by Middle and Late Archaic inhabitants of the Hayes site. As was stated in Chapter 1, the use of local versus non-local materials has been suggested as a means of differentiating between Middle and Late Archaic settlement/subsistence organizations (Amick 1984).

In a previous section of this chapter, the distribution of the various types of raw material utilized by Archaic peoples at the Hayes site was discussed. Very briefly, it can be stated that Fort Payne and St. Louis represent the most distant resources (non-local). Bigby-Cannon and Brassfield can also be classified as non-local resources. Ridley and Carters are local resources.

The local availability of Bigby-Cannon and Fort Payne in the alluvial gravels confuses the picture. However, due to their presence in small cobble size and limited quantity, it is felt that the amount of cortex, cortex type (waterworn cobble, matrix/residual), and frequency of biface thinning flakes, will aid in determining location of origin (Amick 1984:125-126).

Statistics

The chi-square test is used to determine "whether or not frequencies which have been empirically obtained differ significantly from those which would be expected under a certain set of theoretical assumptions" (Blalock 1979:279). Chi-square tests were run on the frequency of occurrence of the various raw material types by stratigraphic sequence. Tests were also run on various artifact types by raw material and stratum. This was done to see if there was a significant difference in the frequency and distribution of the raw material types, between the three cultural components represented at the Hayes site.

The resultant chi-square tables present the observed values, expected values, row percentages, and column percentages for each individual cell. The difference between the observed and expected values show where the differences lie in the distribution of the variables under consideration. The row percentages show the proportional representation of all variables within a particular stratum. The column percentages show the proportional representation of a single variable between all three strata. The statistics were run using the Statistical Package for the Social Sciences (SPSS).

Results of Analysis

Table 1 shows the number and frequency of occurence of all raw material types present from the sample selected within unit 990N918E by stratigraphic placement. Of the total sample (n=4960), 56.7%(n=2814) is represented by Fort Payne, 30.6%(n=1517) is represented by Ridley, 5.6%(n=277) is represented by Bigby-Cannon, 0.5%(n-24) is represented by Carters, 0.2%(n-12) is represented by Brassfield, 0.1%(n=3) is represented by St. Louis, 0.04%(n=2) is represented by Quartzite, 0.02%(n=1) is represented by chalcedony, and 6.3%(n=310) is represented by unknown chert types.

Table 1: Distribution of the various raw material types by stratum.

STRATUM	Count Row Pct Col Pct	RM UNKNOWN CHERT	RIDLEY	CARTERS	BIGBY-CANNON	BRASSFIELD	FT. PAYNE	ST. LOUIS	QUARTZITE	CHALCEDONY	Row Total
	II	27 2.3 8.7	249 21.2 16.4	1 .1 4.2	27 2.3 9.7	9 .8 75.0	862 73.3 30.6	1 .1 33.3			1176 23.7
	III	255 7.5 82.3	1074 31.6 70.8	20 .6 83.3	224 6.6 80.9	3 .1 25.0	1819 53.5 64.6	2 .1 66.7	2 .1 100.0		3399 68.5
	IV$_2$A	28 7.3 9.0	194 50.4 12.8	3 .8 12.5	26 6.8 9.4		133 34.5 4.7			1 .3 100.0	385 7.8
	Column Total	310 6.3	1517 30.6	24 .5	277 5.6	12 .2	2814 56.7	3 .1	2 .0	1 .0	4960 100.0

The main raw material types present are Fort Payne, Ridley, and Bigby-Cannon (excluding the unknown chert types). Therefore, the majority of the analysis focuses on the distribution and assemblage composition of these three chert types. In some instances, comparisons will be made only between Fort Payne and Ridley. This is particularly the case in stratum III.

Table 2 shows the results of a chi-square test conducted on the distribution of the three main raw material types by stratum. It reveals a statistically significant difference. Looking at the individual cells within the table shows where the differences lie.

In stratum IV_2A (Middle Archaic), Ridley is over represented while Fort Payne is under represented. The difference between the observed and expected values for Bigby-Cannon is not that great, although it does show its presence to be slightly over represented.

In stratum III (Late Middle Archaic), both Ridley and Bigby-Cannon are over represented and Fort Payne is under represented.

In stratum II (Late Archaic), the pattern is reversed. Both Ridley and Bigby-Cannon are under represented and Fort Payne is over represented.

Table 2: Chi-square test of the distribution of Ridley, Bigby-Cannon, and Fort Payne by stratum.

STRATUM	Count Exp Val Row Pct Col Pct	RM RIDLEY	BIGBY-CANNON	FT. PAYNE	Row Total
	II	249 374.6 21.9% 16.4%	27 68.4 2.4% 9.7%	862 695.0 75.7% 30.6%	1138 24.7%
	III	1074 1026.1 34.5% 70.8%	224 187.4 7.2% 80.9%	1819 1903.5 58.4% 64.6%	3117 67.6%
	IV,A	194 116.2 55.0% 12.8%	26 21.2 7.4% 9.4%	133 215.6 37.7% 4.7%	353 7.7%
	Column Total	1517 32.9%	277 6.0%	2814 61.1%	4608 100.0%

	Value	DF	Significance
Chi-Square	205.26933	4	.00000

Minimum Expected Frequency - 21.220

Table 3 is another chi-square test, but only between Ridley and Fort Payne. The pattern is the same except for stratum III where the representation of Ridley and Fort Payne is fairly equal (Ridley is slightly over represented and Fort Payne is slightly under represented).

The differences noted in Tables 2 and 3 only reflect overall presence of the three main raw material types. The next section will provide a detailed description of the numbers and frequencies of the various artifact types present among Fort Payne, Ridley, and Bigby-Cannon by stratum. The results of the analysis are presented in Tables 4 through 9.

The next chapter will be a comparison of the assemblage composition between the three strata as well as a discussion of its implications on Middle and Late Archaic raw material procurement strategies.

Assemblage Composition within Individual Stratum

Stratum IV_2A (Middle Archaic)

Fort Payne

The artifact types represented by Fort Payne include: 2(22.2%) fire-cracked rocks (FCR), 4(80.0%) incipient cores, 1(25.0%) core fragments, 1(50.0%) core, 39(19.7%) pieces of blocky debris, and 70(56.9%) flakes (Table 4).

Table 3: Chi-square test of the distribution of Ridley and Fort Payne by stratum.

STRATUM	Count / Exp Val / Row Pct / Col Pct	RM: Ridley	Ft Payne	Row Total
	II	249	862	1111
		389.1	721.9	25.7%
		22.4%	77.6%	
		16.4%	30.6%	
	III	1074	1819	2893
		1013.3	1879.7	66.8%
		37.1%	62.9%	
		70.8%	64.6%	
	IV,A	194	133	327
		114.5	212.5	7.6%
		59.3%	40.7%	
		12.8%	4.7%	
	Column Total	1517	2814	4331
		35.0%	65.0%	100.0%

	Value	DF	Significance
Chi-Square	168.12242	2	.00000

Minimum Expected Frequency - 114.537

The flakes are further subdivided according to the attributes used to assign them to a particular reduction sequence. Their completeness (whole or broken) as well as cortex presence is also noted (Tables 6-9).

Very few complete flakes were present. Only 1(100.0%) retouch flake was recorded (Table 6) (Retouch flakes represent final thinning of a bifacial edge). There are 53 (58.2%) medial/distal fragments. Of these, 9(17.0%) possess cortex (Table 7). There are 12(57.1%) platform remnant bearing (PRB) flakes. Of these, 8(66.7%) possess cortex (Table 8). (Platform remnant bearing flakes are taken to represent either primary or secondary reduction). There are 4(80.0%) lipped platform flakes. Of these, 1 (25.0%) possess cortex (Table 9). (Lipped platforms represent bifacial thinning flakes).

Tables 7-9 show the actual percentage of cortex present on each flake type.

The tools represented by Fort Payne include: 3(100.0%) biface fragments, 1(100.0%) drill (a projectile point/knife modified into a drill), 6 (30.0%) core tools, 4 (28.6%) utilized flakes, and 2(40.0%) projectile points/knives (PP/K's) (Table 5). One of the projectile points/knives is a Benton.

Table 4: Artifact type frequencies by raw material and stratum.

		ARTIFACT TYPE FREQUENCIES						
STRATUM	RAW MATERIAL	FCR	INCIPIENT CORES	CORE FRAGMENTS	CORES	BLOCKY DEBRIS	FLAKE DEBRIS	TOTALS
II	FT. PAYNE	43 47.3%		1 100.0%		68 45.9%	696 80.6%	808 17.3%
	RIDLEY	40 44.0%	1 100.0%		1 50.0%	55 37.2%	138 16.0%	235 5.0%
	BIGBY-CANNON	2 2.2%			1 50.0%	7 4.7%	17 2.0%	27 0.6%
	CARTERS						1 0.1%	1 0.02%
	BRASSFIELD	1 1.1%				3 2.0%	3 0.3%	7 0.1%
	ST. LOUIS						1 0.1%	1 0.02%
	QUARTZITE							
	CHALCEDONY							
	UNKNOWN CHERT	5 5.5%				15 10.1%	7 0.8%	27 0.6%

Table 4: (cont.)

ARTIFACT TYPE FREQUENCIES								
STRATUM	RAW MATERIAL	FCR	INCIPIENT CORES	CORE FRAGMENTS	CORES	BLOCKY DEBRIS	FLAKE DEBRIS	TOTALS
III	FT. PAYNE	47 43.5%	3 60.0%	6 66.7%	1 50.0%	540 40.6%	1094 61.9%	1691 36.2%
	RIDLEY	48 44.4%	2 40.0%	3 33.3%	1 50.0%	488 36.7%	497 28.1%	1039 22.3%
	BIGBY-CANNON	2 1.9%				79 5.9%	132 7.5%	213 4.6%
	CARTERS					6 0.5%	13 0.7%	19 0.4%
	BRASSFIELD					1 0.1%	2 0.1%	3 0.06%
	ST. LOUIS					1 0.1%		1 0.02%
	QUARTZITE					1 0.1%	1 0.1%	2 0.04%
	CHALCEDONY							
	UNKNOWN CHERT	11 10.2%				213 16.0%	29 1.6%	253 5.4%

Table 4: (cont.)

ARTIFACT TYPE FREQUENCIES								
STRATUM	RAW MATERIAL	FCR	INCIPIENT CORES	CORE FRAGMENTS	CORES	BLOCKY DEBRIS	FLAKE DEBRIS	TOTALS
IV,A	FT. PAYNE	2 22.2%	4 80.0%	1 25.0%	1 50.0%	39 19.7%	70 56.9%	117 2.5%
	RIDLEY	6 66.7%	1 20.0%	1 25.0%		121 61.1%	40 32.5%	169 3.6%
	BIGBY-CANNON	1 11.1%		2 50.0%	1 50.0%	10 5.1%	9 7.3%	23 0.5%
	CARTERS					2 1.0%	1 0.8%	3 0.06%
	BRASSFIELD							
	ST. LOUIS							
	QUARTZITE							
	CHALCEDONY						1 0.8%	1 0.02%
	UNKNOWN CHERT					26 13.1%	2 1.6%	28 0.6%

Table 5: Tools by raw material and stratum.

TOOLS										
		BIFACES					FLAKE TOOLS			
STRATUM	RAW MATERIAL	FRAGMENTS	SOFT HAMMER	PP/K'S	DRILLS	CORE TOOLS	UTILIZED FLAKES	UNIFACES	MICRO-TOOLS	TOTALS
II	FT. PAYNE	4 100.0%	2 100.0%	10 100.0%		3 33.3%	32 78.0%		3 100.0%	54 18.5%
	RIDLEY				1 100.0%	6 66.7%	7 17.1%			14 4.8%
	BIGBY-CANNON									
	CARTERS									
	BRASSFIELD						2 4.9%			2 0.7%
	ST. LOUIS									
	UNKNOWN CHERT									

Table 5: (cont.)

TOOLS										
		BIFACES					FLAKE TOOLS			
STRATUM	RAW MATERIAL	FRAGMENTS	SOFT HAMMER	PP/K'S	DRILLS	CORE TOOLS	UTILIZED FLAKES	UNIFACES	MICRO-TOOLS	TOTALS
III	FT. PAYNE	50 90.9%		15 88.2%	2 100.0%	9 45.0%	46 60.5%	2 66.7%	4 80.0%	128 43.8%
	RIDLEY	4 7.3%		1 5.9%		7 35.0%	22 28.9%	1 33.3%		35 12.0%
	BIGBY-CANNON	1 1.8%				3 15.0%	6 7.9%		1 20.0%	11 3.8%
	CARTERS					1 5.0%				1 0.3%
	BRASSFIELD									
	ST. LOUIS			1 5.9%						1 0.3%
	UNKNOWN CHERT						2 2.6%			2 0.7%

Table 5: (cont.)

TOOLS										
		BIFACES					FLAKE TOOLS			
STRATUM	RAW MATERIAL	FRAGMENTS	SOFT HAMMER	PP/K'S	DRILLS	CORE TOOLS	UTILIZED FLAKES	UNIFACES	MICRO-TOOLS	TOTALS
IV,A	FT. PAYNE	3 100.0%		2 40.0%	1 100.0%	6 30.0%	4 28.6%			16 5.5%
	RIDLEY		1 100.0%	3 60.0%		13 65.0%	8 57.1%			25 8.6%
	BIGBY-CANNON					1 5.0%	2 14.3%			3 1.0%
	CARTERS									
	BRASSFIELD									
	ST. LOUIS									
	UNKNOWN CHERT									

Table 6: Whole flakes by raw material and stratum. (Ridley, Bigby-Cannon, Fort Payne)

WHOLE FLAKES							
STRATUM	RAW MATERIAL	PRIMARY	SECONDARY	INTERIOR	BIFACIAL THINNING	RETOUCH	TOTALS
II	FT. PAYNE				37 69.8%	1 100.0%	38 55.9%
	RIDLEY		3 50.0%	3 100.0%	12 22.6%		18 26.5%
	BIGBY-CANNON		3 50.0%		4 7.5%		7 10.3%
III	FT. PAYNE			1 33.3%			1 1.5%
	RIDLEY			2 66.7%			2 2.9%
	BIGBY-CANNON						
IV_1A	FT. PAYNE					1 100.0%	1 1.5%
	RIDLEY						
	BIGBY-CANNON		1 100.0%				1 1.5%

Table 7: Medial/distal flakes by raw material and stratum. (Ridley, Bigby-Cannon, Fort Payne)

BROKEN FLAKES							
		MEDIAL/DISTAL CORTEX					
STRATUM	RAW MATERIAL	NONE	<50%	>50%	FULL	ARRIS	TOTAL
II	FT. PAYNE	464 88.5%	8 53.3%	3 30.0%			475 23.6%
	RIDLEY	55 10.5%	7 46.7%	5 50.0%			67 3.3%
	BIGBY-CANNON	5 1.0%		2 20.0%			7 0.3%
III	FT. PAYNE	755 66.7%	95 54.3%	34 63.0%	8 100.0%	4 100.0%	896 44.5%
	RIDLEY	303 26.8%	57 32.6%	14 25.9%			374 18.6%
	BIGBY-CANNON	74 6.5%	23 13.1%	6 11.1%			103 5.1%
IV_2A	FT. PAYNE	44 62.0%	8 53.3%	1 20.0%			53 2.6%
	RIDLEY	25 35.2%	6 40.0%	2 40.0%			33 1.6%
	BIGBY-CANNON	2 2.8%	1 6.7%	2 40.0%			5 0.2%

Table 8: Platform Remnant Bearing flakes by raw material and stratum. (Ridley, Bigby-Cannon, Fort Payne)

BROKEN FLAKES							
		PLATFORM REMNANT BEARING CORTEX					
STRATUM	RAW MATERIAL	NONE	<50%	>50%	FULL	ARRIS	TOTAL
II	FT. PAYNE	7 38.9%	1 20.0%	1 20.0%			9 3.4%
	RIDLEY	10 55.6%	4 80.0%	4 80.0%			18 6.7%
	BIGBY-CANNON	1 5.6%					1 0.4%
III	FT. PAYNE	52 43.0%	42 52.5%	4 33.3%	1 33.3%		99 36.9%
	RIDLEY	61 50.4%	26 32.5%	6 50.0%	2 66.7%	1 33.3%	96 35.8%
	BIGBY-CANNON	8 6.6%	12 15.0%	2 16.7%		2 66.7%	24 8.9%
IV_1A	FT. PAYNE	4 36.4%	5 100.0%	3 60.0%			12 4.5%
	RIDLEY	5 45.5%		1 20.0%			6 2.2%
	BIGBY-CANNON	2 18.2%		1 20.0%			3 1.1%

Table 9: Lipped Platform flakes by raw material and stratum. (Ridley, Bigby-Cannon, Fort Payne)

BROKEN FLAKES							
		LIPPED PLATFORM CORTEX				RETOUCH CORTEX	
STRATUM	RAW MATERIAL	NONE	<50%	>50%	FULL	NONE	TOTAL
II	FT. PAYNE	164 85.4%	1 20.0%	1 100.0%		7 63.6%	173 50.4%
	RIDLEY	28 14.6%	4 80.0%		1 100.0%	2 18.2%	35 10.2%
	BIGBY-CANNON					2 18.2%	2 0.6%
III	FT. PAYNE	92 78.6%	1 20.0%	1 100.0%		4 80.0%	98 28.6%
	RIDLEY	22 18.8%	3 60.0%				25 7.3%
	BIGBY-CANNON	3 2.6%	1 20.0%			1 20.0%	5 1.5%
IV,A	FT. PAYNE	3 75.0%	1 100.0%				4 1.2%
	RIDLEY	1 25.0%					1 0.3%
	BIGBY-CANNON						

Ridley

The artifact types represented by Ridley include: 6(66.7%) FCR, 1(20.0%) incipient core, 1(25.0%) core fragment, 121(61.1%) pieces of blocky debris, and 40 (32.5%) flakes (Table 4).

Within the flake category, there are 33(36.3%) medial/distal fragments. Of these, 8(24.2%) possess cortex (Table 7). There are 6(28.6%) platform remnant bearing flakes. Of these, 1(16.7%) possess cortex (Table 8). There is 1(20.0%) lipped platform flake (Table 9). No whole flakes were present.

The tools represented by Ridley include: 1(100.0%) biface exhibiting predominantly soft hammer flaking (preform), 13 (65.0%) core tools, 8(57.1%) utilized flakes, and 3(60.0%) projectile points/knives (Table 5). Two of the projectile points/knives are assigned to the Sykes/White Springs type cluster.

Bigby-Cannon

The artifact types represented by Bigby-Cannon include: 1(11.1%) FCR, 2(50.0%) core fragments, 1(50.0%) core, 10(5.1%) pieces of blocky debris, and 9(7.3%) flakes (Table 4).

Within the flake category, there is 1(100.0%) complete secondary reduction flake (Table 6). There are 5(5.5%) medial/distal fragments. Of these 3(60.0%) possess cortex

(Table 7). There are 3(14.3%) platform remnant bearing flakes. Of these 1(33.3%) possess cortex (Table 8). No lipped platform flakes were present.

The tools represented by Bigby-Cannon are few and include 1(5.0%) core tool and 2(14.3%) utilized falkes (Table 5). No formalized tools, such as bifaces, were present.

Other raw material types present in stratum IV_2A include: Carters, represented by 2(1.0%) pieces of blocky debris and 1(0.8%) flake; chalcedony, represented by 1 (0.8%) flake; and unknown chert type represented by 26 (13.1%) pieces of blocky debris and 2(1.6%) flakes (Table 4).

Stratum III (Late Middle Archaic)

Stratum III is the shell bearing deposit. It consists of almost 2 meters of fill, representing approximately 1,200 years of occupation (Morey 1988:30). It also contains both Benton and Ledbetter projectile points/knives.

The focus of this research is to attempt to identify lithic resource procurement and utilization strategies carried out by Middle and Late Archaic inhabitants of the Hayes site. The extraordinary time span represented by stratum III, and the presence of both Late Middle Archaic and Late Archaic projectile points/knives warranted a closer examination, within the stratum, of the distribution of the various artifact types by raw material.

First, the lithic material recovered within the entire stratum III fill will be presented. Then a more detailed analysis of the artifact distribution between Fort Payne and Ridley, within the five substrata, will be discussed.

Fort Payne

The artifact types represented by Fort Payne include: 47(43.5%) FCR, 3(60.0%) incipient cores, 6(66.7%) core fragments, 1(50.0%) core, 540(40.6%) pieces of blocky debris, and 1094(61.9%) flakes (Table 4).

Within the flake category, there is 1 (33.3%) complete interior flake (Table 6). There are 896(65.3%) medial/distal fragments. Of these, 137(15.3%) possess cortex. Of the total medial/distal fragments, 4 are core rejuvenation arris (Table 7). (Core rejuvenation arris are flakes that exhibit old striking platforms on their dorsal surface. They are removed to create a new edge on a core). There are 99(45.2%) platform remnant bearing flakes. Of these, 47(47.5%) possess cortex (Table 8). There are 94 (76.4%) lipped platform flakes. Of these, 2(2.1%) possess cortex. There are 4(80.0%) retouch flakes (Table 9).

The tools represented by Fort Payne include: 50 (90.9%) biface fragments, 2(100.0%) drills, 2(66.7%)

unifaces, 4(80.0%) microtools, 9(45.0%) core tools, 46 (60.5%) utilized flakes, and 15 (88.2%) projectile points/knives (Table 5). Six of the projectile points/knives are Benton and 2 are Ledbetter.

Ridley

The artifact types represented by Ridley include: 48 (44.4%) FCR, 2(40.0%) incipient cores, 3(33.3%) core fragments, 1(50.0%) core, 488(36.7%) pieces of blocky debris, and 497(28.1%) flakes (Table 4).

Within the flake category, there are 2(66.7%) complete interior flakes (Table 6). There are 374(27.2%) medial/distal fragments. Of these, 71(19.0%) possess cortex (Table 7). There are 96(43.8%) platform remnant bearing flakes. Of these, 34(35.4%) possess cortex. Of the total platform remnant bearing flakes, 1 is a core rejuvenation arris (Table 3). There are 25(20.3%) lipped platform flakes. Of these, 3(12.0%) possess cortex (Table 9).

The tools represented by Ridley include: 4(7.3%) biface fragments, 1(33.3%) uniface, 7(35.0%) core tools, 22 (28.9%) utilized flakes, and 1(5.9%) projectile point/knife (Table 5). It is a Benton.

Bigby-Cannon

The artifact types represented by Bigby-Cannon include: 2(1.9%) FCR, 79(5.9%) pieces of blocky debris, and 132(7.5%) flakes (Table 4).

Within the flake category, there are 103(7.5%) medial/distal fragments. Of these, 29(28.2%) possess cortex (Table 7). There are 24(11.0%) platform remnant bearing flakes. Of these, 14(58.3%) possess cortex. Of the total platform remnant bearing flakes, 2 are core rejuvenation arris (Table 8). There are 4(3.3%) lipped platform flakes. Of these, 1(25.0%) has cortex. There is 1(20.0%) retouch flake (Table 9).

The tools represented by Bigby-Cannon include: 1 (1.8%) biface fragment, 1(20.0%) microtool, 3(15.0%) core tools, and 6(7.9%) utilized flakes (Table 5).

Other raw material types present in stratum III include: Carters, represented by 6(0.5%) pieces of blocky debris, 13(0.7%) flakes and 1(5.0%) core tool; Brassfield, represented by 1(0.1%) piece of blocky debris and 2(0.1%) flakes; St. Louis, represented by 1(0.1%) piece of blocky debris and 1(5.9%) Benton projectile point/knife; Quartzite, represented by 1(0.1%) piece of blocky debris and 1(0.1%) flake; and unknown chert type represented by 11 (10.2%) FCR, 213(16.0%) pieces of blocky debris, 29(1.6%) flakes and 2(2.6%) utilized flakes (Tables 4 and 5).

Substrata within Stratum III

Fort Payne and Ridley are the only two raw material types looked at within the substrata because they represent the dichotomy between local (Ridley) and non-local (Fort Payne) resources.

The previous section revealed that within the entire stratum III fill, Fort Payne was in the majority for all artifact categories, except FCR, where Ridley outnumbers Fort Payne by only one. However, due to the extraordinary time span of occupation represented by stratum III, is this a true representation?

Tables 10 and 11 show the results of chi-square tests conducted on the blocky debris and flake debris between Fort Payne and Ridley by substrata. The two tests reveal a statistically significant difference.

In both cases, blocky debris and flake debris, Ridley is over represented in the four lower substrata (IIIB, IIIC, IIID, and IIIE) and Fort Payne is under represented. (One exception to this patterning, within the blocky debris category, is in substratum IIID, where Ridley is underrepresented and Fort Payne is over represented). In substratum IIIA, the pattern is reversed. Fort Payne is now over represented and Ridley is under represented.

Substratum IIIA is approximately 60cm deep and ranges in age from 5140±185 (lower 10cm) to 4390±170 (upper 10cm)

Table 10: Chi-square test of the distribution of blocky debris by substrata. (Ridley, Fort Payne)

STRATUM	Count / Exp Val / Row Pct / Col Pct	RM: Ridley	Ft Payne	Row Total
	III A	153 162.8 44.6% 31.4%	190 180.2 55.4% 35.2%	343 33.4%
	III B	98 91.6 50.8% 20.1%	95 101.4 49.2% 17.6%	193 18.8%
	III C	84 68.4 58.3% 17.2%	60 75.6 41.7% 11.1%	144 14.0%
	III D	76 94.0 38.4% 15.6%	122 104.0 61.6% 22.6%	198 19.3%
	III E	77 71.2 51.3% 15.8%	73 78.8 48.7% 13.5%	150 14.6%
	Column Total	488 47.5%	540 52.5%	1028 100.0%

	Value	DF	Significance
Chi-Square	16.24263	4	.00271

Minimum Expected Frequency - 68.358

Table 11: Chi-square test of the distribution of flake debris by substrata. (Ridley, Fort Payne)

STRATUM	Count / Exp Val / Row Pct / Col Pct	RM: Ridley	Ft Payne	Row Total
	III A	164 231.2 22.2% 33.0%	576 508.8 77.8% 52.7%	740 46.5%
	III B	92 64.0 44.9% 18.5%	113 141.0 55.1% 10.3%	205 12.9%
	III C	57 52.5 33.9% 11.5%	111 115.5 66.1% 10.1%	168 10.6%
	III D	110 88.1 39.0% 22.1%	172 193.9 61.0% 15.7%	282 17.7%
	III E	74 61.2 37.8% 14.9%	122 134.8 62.2% 11.2%	196 12.3%
	Column Total	497 31.2%	1094 68.8%	1591 100.0%

	Value	DF	Significance
Chi-Square	58.49959	4	.00000

Minimum Expected Frequency - 52.480

years B.P. (Morey 1988:27). It was distinguished from the rest of the shell midden deposit by an increased presence of bivalves. Substratum IIIA is also where both Benton and Ledbetter points were recovered (Morey 1988:32). Therefore, it was felt that a closer look within substratum IIIA would aid in the interpretation of Middle and Late Archaic resource procurement and utilization, as well as attempt to delineate Middle and Late Archaic occupational horizons.

Tables 12 and 13 show the results of chi-square tests conducted on the blocky debris and flake debris between Fort Payne and Ridley, by level, within substratum IIIA. The two tests reveal a statistically significant difference.

The patterning revealed in the blocky debris category (Table 12) is not so clear. The representation of Ridley and Fort Payne alternates within the substratum. The flake debris (Table 13), on the other hand, reveals a consistent pattern. Ridley is over represented in the lower five levels (9D, 10D, 11D, 12D, 13D) while Fort Payne is under represented. In the uppermost 10cm level (8D), the pattern is reversed. Fort Payne is now over represented and Ridley is under represented.

The two Ledbetter points recovered from substratum IIIA were recovered from the uppermost 10cm level. Of the

Table 12: Chi-square test of the distribution of blocky debris by level in substratum IIIA. (Ridley, Fort Payne)

	RIDLEY		FT. PAYNE		
	observed	expected	observed	expected	TOTALS
8D	35	(30.3)	33	(37.7)	68
9D	43	(39.2)	45	(48.8)	88
10D	6	(8.0)	12	(10.0)	18
11D	10	(16.5)	27	(20.5)	37
12D	12	(19.1)	31	(23.9)	43
13D	48	(40.9)	44	(51.0)	92
TOTALS	154		192		346

Chi-square=14.45, df=5, p=0.01

Table 13: Chi-square test of the distribution of flake debris by level in substratum IIIA. (Ridley, Fort Payne)

	RIDLEY		FT. PAYNE		
	observed	expected	observed	expected	TOTALS
8D	36	(66.8)	263	(232.2)	299
9D	49	(35.3)	109	(122.7)	158
10D	19	(14.5)	46	(50.5)	65
11D	23	(19.2)	63	(66.8)	86
12D	13	(13.0)	45	(45.0)	58
13D	24	(15.2)	44	(52.8)	68
TOTALS	164		570		734

Chi-square=34.46, df=5, p=.000

eight Benton points recovered from stratum III, none were recovered from the uppermost 10cm level.

Tables 10, 11, and 13 reveal a consistent pattern within the blocky debris and flake debris throughout the shell bearing deposit. Ridley is over represented up until the top 10cm level, while Fort Payne is under represented. Then, in the top 10cm level, Fort Payne is over represented and Ridley is under represented.

The discussion so far has centered on the blocky and flake debris. An examination of the distribution of the various tool types, by raw material, shows different results.

Table 14 presents the number of the various tool types by raw material and substrata. No chi-square tests were run due to the low frequency of occurrence in the various tool categories. However, Table 14 clearly shows that for every tool type, Fort Payne is the dominant raw material type. It also shows that the frequency of occurrence of at least three tool types, represented by Fort Payne, are fairly consistent throughout the entire stratum III deposit (projectile points/knives, bifaces, and utilized flakes).

A more detailed discussion of the above results will be presented in the next chapter.

Table 14: Distribution of tool types by substrata. (Ridley, Fort Payne)

	FT. PAYNE SUBSTRATA					RIDLEY SUBSTRATA				
TOOLS	IIIA	IIIB	IIIC	IIID	IIIE	IIIA	IIIB	IIIC	IIID	IIIE
PP/K'S	4	2	5	2	2					1
BIFACES	12	9	3	14	12	1		1	2	
DRILLS	1			1						
UNIFACES	2									1
MICRO-TOOLS	2			1	1					
UTILIZED FLAKES	11	5	11	12	7	1	1	3	10	7
TOTALS	32	16	19	30	22	2	1	4	12	9

Stratum II (Late Archaic)

Fort Payne

The artifact types represented by Fort Payne include: 43(47.3%) FCR, 1(100.0%) core fragment, 68(45.9%) pieces of blocky debris, and 696(80.6%) flakes (Table 4).

Within the flake category, there are 37(69.8%) complete bifacial thinning flakes (1 had cortex), and 1 (100.0%) complete retouch flake (Table 6). There are 475 (86.5%) medial/distal fragments. Of these, 11(2.3%) possess cortex (Table 7). There are 9(32.1%) platform remnant bearing flakes. Of these, 2(22.2%) possess cortex (Table 8). There are 166(83.4%) lipped platform flakes. Of these, 2(1.2%) possess cortex. There are 7(63.6%) retouch flakes (Table 9).

The tools represented by Fort Payne include: 4 (100.0%) biface fragments, 2(100.0%) bifaces exhibiting predominantly soft hammer flaking, 3(100.0%) microtools, 3 (33.3%) core tools, 32(78.0%) utilized flakes, and 10 (100.0%) projectile points/knives (Table 5). Four of these projectile points/knives are Ledbetter.

Ridley

The artifact types represented by Ridley include: 40 (44.0%) FCR, 1(100.0%) incipient core, 1(50.0%) core, 55 (37.2%) pieces of blocky debris, and 138(16.0%) flakes (Table 4).

Within the flake category, there are 3 (50.0%) complete secondary reduction flakes, 3(100.0%) complete interior flakes, and 12(22.6%) complete bifacial thinning flakes (1 had full cortex cover) (Table 6). There are 17(12.2%) medial/distal fragments. Of these, 12(17.9%) possess cortex (Table 7). There are 18(64.3%) platform remnant bearing flakes. Of these 8(44.4%) possess cortex (Table 8). There are 33(16.6%) lipped platform flakes. Of these 5(15.2%) possess cortex. There are 2(18.2%) retouch flakes (Table 9).

The tools represented by Ridley include: 1(100.0%) drill, 6(66.7%) core tools, and 7(17.1%) utilized flakes (Table 5).

Bigby-Cannon

The artifact types represented by Bigby-Cannon include: 2(2.2%) FCR, 1(50.0%) core, 7(4.7%) blocky debris, and 17(2.0%) flakes (Table 4).

Within the flake category, there are 3(50.0%) complete secondary reduction flakes and 4(7.5%) complete bifacial thinning flakes (1 had cortex) (Table 6). There are 7 (1.3%) medial/distal fragments. Of these, 2(28.6%) possess cortex (Table 7). There is 1(3.6%) platform remnant bearing flake (Table 8). There are 2(18.2%) retouch flakes (Table 9). No lipped platform flakes were present. No tools represented by Bigby-Cannon were present.

Other raw material types present in Stratum II include: Brassfield, represented by 1(1.1%) FCR, 3(2.0%) pieces of blocky debris, 3(0.3%) flakes and 2(4.9%) utilized flakes; Carters, represented by 1(0.1%) flake; St. Louis, represented by 1(0.1%) flake; and unknown chert type represented by 5(5.5%) FCR, 15(10.1%) pieces of blocky debris, and 7(0.8%) flakes (Tables 4 and 5).

The discussion so far has been a presentation of the assemblage compositions within the three strata of the 'Block' area, at the Hayes site. The next chapter will present a comparison of the assemblage compositions between the three strata, as well as interpretations concerning Middle and Late Archaic raw material procurement strategies. The last chapter will incorporate the lithic data, faunal data, paleobotanical data, and environmental data to postulate an hypothesis concerning site function, and its implications on Middle and Late Archaic settlement/subsistence organizations.

Chapter III

MIDDLE AND LATE ARCHAIC ASSEMBLAGE COMPOSITION

In the previous chapter, the assemblage composition within the three strata represented by the 'Block' area of the Hayes site was presented. The purpose of this chapter is to present a comparison of the assemblage compositions between the three strata. The information will be presented with regard to Amick's (1984) proposed hypotheses concerning the use of non-local versus local raw material and its implications on Middle and Late Archaic settlement/subsistence organizations. Before presenting the data from the Hayes site, a brief outline of Amick's hypotheses, test implications and conclusions will be discussed.

Amick (1984) proposes two interrelated hypotheses concerning expected assemblage composition of non-logistically organized groups. The first hypothesis states that "If bands are non-logistically organized, then more intensive exploitation of local resources is expected" (1984:107). The archaeological implications of this hypothesis are that assemblages should contain high frequencies of local material, with selective processes toward obtaining the highest quality local material, and assemblages should contain a variety of raw material types (1984:108). The second hypothesis states that "If bands are non-logistically organized, then technologies are expected to be more expediently organized" (1984:108). The archaeological implications of this hypothesis are that assemblages should contain high frequencies of early stage reduction debris, reflected by high cortex presence, and the majority of the tools should be made from the poorer quality local material (1984:109).

The results of Amick's analysis on seven assemblages revealed that the Middle Archaic components did contain higher frequencies of local material (Ridley), early stage reduction debris and a variety of raw materials. The majority of tools, however, were made of higher quality local material. The Late Archaic assemblages, on the other hand, revealed a higher frequency of non-local material (Fort Payne), and a higher frequency of late stage reduction debris (bifacial thinning flakes) (1984:224-231).

On the basis of these results, Amick characterizes the Late Archaic assemblages as reflecting 'gearing up' (1984:230) activities, meaning the initial reduction of bifaces took place at another location. He further states that the keying in on one specific resource (Fort Payne), and evidence of 'gearing up', represents site specialization (1984:234).

> Site specialization is related to greater labor differentiation, less expedient technology, greater task group organization, and more logistical settlement strategies (Amick 1984:234).

Amick characterizes the Middle Archaic assemblages as reflecting

> long trajectory length and procurement of local materials with little evidence of staged manufacture suggests a low degree of site specialization. Expedient technology and little evidence of site specialization indicates highly mobile residential groups. The absence of special-purpose limited activity assemblages implies a low degree of task group organization and labor differentiation (1984:233).

The data from the Hayes site will be presented according to the hypotheses proposed by Amick (1984). Discussion will center on the assemblage composition between Ridley (local) and Fort Payne (non-local) among the three strata. Other raw material types will be discussed when appropriate.

Flake Debris

The different types of flakes represented in the flake category have already been discussed in the previous chapter, however, a brief review is warranted.

Medial/distal flakes cannot be accurately assigned to a particular reduction stage, however, it is felt that they are the product of bifacial reduction (Sullivan 1985:773; Tomka 1989:139). Platform remnant bearing flakes represent either primary or secondary stage reduction. Bifacial thinning flakes are characterized by flakes possessing lipped platforms. They represent final stages in the thinning and shaping of a biface. And finally, retouch flakes represent final thinning of a bifacial edge.

There are a total of 1860 Fort Payne flakes present in the 'Block' stratigraphic sequence. Of this total, 76.6% (n=1424) are medial/distal flakes, 6.5%(n=121) are platform remnant bearing flakes, 16.2%(n=301) are bifacial thinning flakes, and 0.7%(n=13) are retouch flakes. There are a total of 675 Ridley flakes present. Of this total, 70.2% (n=474) are medial/distal flakes, 128(19.0%) are platform remnant bearing flakes, 10.5%(n=71) are bifacial thinning flakes, and 0.3%(n=2) are retouch flakes (Tables 6-9).

Medial/Distal Flakes

Fort Payne

In stratum IV_2A (Middle Archaic), there are 53(3.7%) medial/distal flakes. Of this number, 17.0% (n=9) possess cortex. In stratum III (Late Middle Archaic), there are 896(62.9%). Of this number, 15.3%(n=137) possess cortex. In stratum II (Late Archaic), there are 475(33.4%). Of this number, 2.3%(n=11) possess cortex (Table 7).

Ridley

In stratum IV_2A, there are 33(7.0%) medial/distal flakes. Of this number, 24.2%(n=8) possess cortex. In stratum III, there are 374(79.0%). Of this number, 19.0% (n=71) possess cortex. In stratum II, there are 67 (14.1%). Of this number, 17.9%(n=12) possess cortex (Table 7).

Platform Remnant Bearing Flakes

Fort Payne

In stratum IV_2A, there are 12(9.9%) platform remnant bearing flakes. Of this number, 66.7%(n=8) possess cortex. In stratum III, there are 100(82.6%). Of this number, 47.0%(n=47) possess cortex. In stratum II, there are 9 (7.4%). Of this number, 22.2%(n=2) possess cortex (Table 8).

Ridley

In stratum IV_2A, there are 6(4.7%) platform remnant bearing flakes. Of this number, 16.7%(n=1) possess cortex. In stratum III, there are 98(76.6%). Of this number, 34.7% (n=34) possess cortex. In stratum II, there are 24 (18.7%). Of this number, 45.8%(n=11) possess cortex (Table 8).

Bifacial Thinning Flakes

Fort Payne

In stratum IV_2A, there are 4(1.3%) bifacial thinning flakes. Of this number, 25%(n=1) possess cortex. In stratum III, there are 94(31.2%). Of this number, 2.1% (n=2) possess cortex. In stratum II, there are 203 (67.4%). Of this number, 1.0%(n=2) possess cortex (Tables 6 and 9).

Ridley

In stratum IV_2A, there is 1(1.4%) bifacial thinning flake. In stratum III, there are 25(35.2%). Of this number, 12.0%(n=3) possess cortex. In stratum II, there are 45(63.4%). Of this number, 11.1%(n=5) possess cortex (Tables 6 and 9).

Retouch Flakes

Fort Payne

In stratum IV_2A, there is 1(7.7%) bifacial thinning flake. In stratum III, there are 4(30.8%). In stratum II, there are 8(61.5%) (Tables 6 and 9).

Ridley

There were only two retouch flakes of Ridley recovered. They are both in stratum II (Table 9).

The low representation of retouch flakes by both raw materials could be a result of size. Retouch flakes are typically small, thin, and/or short. They would, therefore, fall through a 1/4" mesh screen.

Summary of Flake Debris

Medial/distal flake fragments are the highest represented flake category for both chert types (Fort Payne - 76.6%, Ridley - 70.2%). Their occurrence stratigraphically, is also similar. Stratum III contains the highest percentage of medial/distal flake fragments, while stratum IV_2A contains the least.

Platform remnant bearing flakes exhibit an interesting patterning between the two chert types. The presence of this flake type, for both chert types, is fairly equal (Fort Payne n=121, Ridley n=128). However, their occurrence stratigraphically is dissimilar. For Fort

Payne, stratum II contains the lowest representation of platform remnant bearing flakes, while the lowest representation for Ridley is in stratum IV_2A. In stratum III, the representation for both chert types if fairly equal. The presence of cortex in this flake category is the highest for all flake types. This is not surprising because platform remnant bearing flakes represent either primary or secondary stage reduction. What is interesting, is that for Ridley, cortex presence increases from stratum IV_2A to stratum II. For Fort Payne, cortex presence decreases from stratum IV_2A to stratum II.

Bifacial thinning flakes exhibit the most profound difference between the two chert types. The presence of bifacial thinning flakes increases from stratum IV_2A to stratum II for both chert types. However, Fort Payne greatly exceeds Ridley in frequency of occurrence, especially in stratum II (Fort Payne n=203, Ridley n=45).

The low occurrence of retouch flakes has already been discussed. However, Fort Payne does exhibit a gradual increase in the presence of retouch flakes from stratum IV_2A to stratum II.

Cores and Blocky Debris

Blocky debris is characterized as representing a by-product of early stage core reduction (Amick 1984:179;

Tomka 1989:139). The representation of blocky debris for both chert types is fairly equal (Fort Payne n=647, Ridley n=664). In stratum IV_2A, Fort Payne is represented by 68 (10.5%) pieces, along with 4 incipient cores, 1 core fragment, and 1 core. In stratum III, Fort Payne is represented by 540 (83.5%) pieces of blocky debris, along with 3 incipient cores, 6 core fragments, and 1 core. In stratum II, Fort Payne is represented by 68 (10.5%) pieces, along with 1 core fragment (Table 4).

In stratum IV_2A, Ridley is represented by 121(18.2%) pieces of blocky debris, along with 1 incipient core, and 1 core fragment. In stratum III, Ridley is represented by 488(73.5%) pieces, along with 2 incipient cores, 3 core fragments, and 1 core. In stratum II, Ridley is represented by 55(8.3%) pieces of blocky debris, along with 1 incipient core, and 1 core (Table 4).

In summary, stratum III exhibits the highest frequency of blocky debris, as well as cores, for both chert types. Stratum IV_2A exhibits the next highest frequency of blocky debris for Ridley. For Fort Payne, the next highest frequency of blocky debris is in stratum II. Stratum II also exhibits the lowest frequency of cores for Fort Payne. Stratum IV_2A exhibits the next highest frequency of cores for Fort Payne. The frequency of cores for Ridley is the same for both stratum IV_2A and stratum II.

Cortex Type Frequencies

Table 15 presents the cortex type frequencies for all raw material types present in the 'Block' unit sample, by stratum. In stratum IV_2A, 22.1% (n=85) of Fort Payne debris possess no cortex, and 12.5%(n=48) possess waterworn cobble cortex. For Ridley debris, 25.4%(n=98) possess no cortex, 16.4%(n=63) possess matrix/residual cortex, and 8.6%(n=33) possess waterworn cobble cortex.

In stratum III, 40.9%(n=1391) of Fort Payne debris possess no cortex, 12.5%(n=425) possess waterworn cobble cortex, and 0.1%(n=3) possess matrix/residual cortex. For Ridley debris, 22.1%(n=750) possess no cortex, 5.8%(n=196) possess waterworn cobble cortex, and 3.8%(n=128) possess matrix/residual cortex.

In stratum II, 70.7%(n=832) of Fort Payne debris possess no cortex, 2.2%(n=26) possess waterworn cobble cortex, and 0.3%(n=4) possess matrix/residual cortex. For Ridley debris, 14.8%(n=174) possess no cortex, 3.2%(n=38) possess matrix/residual cortex, and 3.1%(n=37) possess waterworn cobble cortex.

A significant aspect of the types of cortex present, is the appearance of matrix/residual cortex, on Fort Payne debris, in stratum III (Late Middle Archaic).

Table 15: Cortex type frequencies by raw material and stratum.

CORTEX TYPE FREQUENCIES				
STRATUM	RAW MATERIAL	MATRIX/ RESIDUAL	WATERWORN	NONE
II	FT. PAYNE	4 0.3%	26 2.2%	832 70.7%
	RIDLEY	38 3.2%	37 3.1%	174 14.8%
	BIGBY-CANNON		8 0.7%	19 1.6%
	CARTERS			1 0.1%
	BRASSFIELD	1 0.1%	2 0.2%	6 0.5%
	ST. LOUIS			1 0.1%
	QUARTZITE			
	CHALCEDONY			
	UNKNOWN CHERT	2 0.2%	14 1.2%	11 0.9%

Table 15: (cont.)

CORTEX TYPE FREQUENCIES				
STRATUM	RAW MATERIAL	MATRIX/ RESIDUAL	WATERWORN	NONE
III	FT. PAYNE	3 0.1%	425 12.5%	1391 40.9%
	RIDLEY	128 3.8%	196 5.8%	750 22.1%
	BIGBY-CANNON		85 2.5%	139 4.1%
	CARTERS		1 0.03%	19 0.6%
	BRASSFIELD			3 0.1%
	ST. LOUIS			2 0.1%
	QUARTZITE			2 0.1%
	CHALCEDONY			
	UNKNOWN CHERT	17 0.5%	122 3.6%	116 3.4%

Table 15: (cont.)

CORTEX TYPE FREQUENCIES				
STRATUM	RAW MATERIAL	MATRIX/ RESIDUAL	WATERWORN	NONE
IV_2A	FT. PAYNE		48 12.5%	85 22.1%
	RIDLEY	63 16.4%	33 8.6%	98 25.4%
	BIGBY-CANNON		16 4.2%	10 2.6%
	CARTERS			3 0.8%
	BRASSFIELD			
	ST. LOUIS			
	QUARTZITE			
	CHALCEDONY			1 0.3%
	UNKNOWN CHERT		18 4.7%	10 2.6%

Tools

Fort Payne

There are a total of 198 tools of Fort Payne. Stratum IV_2A contains 8.1%(n=16). These include, 3 biface fragments, 2 projectile points/knives (1 Benton), 1 drill (modified projectile point/knife), 6 core tools, and 4 utilized flakes. Stratum III contains 64.6%(n=128). These include 50 biface fragments, 15 projectile points/knives (6 Benton, 2 Ledbetter), 2 drills, 9 core tool, 46 utilized flakes, 2 unifaces, and 4 microtools. Stratum II contains 27.3%(n=54). These include 4 biface fragments, 2 soft hammer bifaces, 10 projectile points/knives (4 Ledbetter), 3 core tools, 32 utilized flakes, and 3 microtools (Table 5).

Ridley

There are a total of 74 tools of Ridley. Stratum IV_2A contains 33.8%(n=25). These include 1 soft hammer biface, 3 projectile points/knives (2 Sykes/White Springs), 13 core tools, and 8 utilized flakes. Stratum III contains 47.3% (n=35). These include 4 biface fragments, 1 projectile point/knife (Benton), 7 core tools, 22 utilized flakes, and 1 uniface. Stratum II contains 18.9%(n=14). These include 1 drill, 6 core tools, and 7 utilized flakes (Table 5).

In summary, Ridley comprises the majority of the tools in stratum IV_2A. However, there are more bifaces represented by Fort Payne. Stratum III contains the largest number of tools, as well as a wider variety of tool types. Fort Payne comprises the majority of the tool types, especially in bifaces and projectile points/knives. Also present in stratum III is a biface fragment made of Bigby-Cannon, and one projectile point/knife (Benton) made of St. Louis chert. In stratum II, Fort Payne comprises the majority of the tool types. An interesting aspect of the tools present in stratum II is the lack of bifaces represented by Ridley. The bifaces represented by Fort Payne include fragments, preforms, as well as final products. There is also a reduction in the variety of tool types present in stratum II. Two utilized flakes of Brassfield chert are also present in this stratum.

Summary

Stratum IV_2A (Middle Archaic)

The assemblage composition reflects the use of locally available material. The raw materials present include Fort Payne, Ridley, Bigby-Cannon, Carters, and Chalcedony. Carters is represented by only 2 pieces of blocky debris and 1 flake. Chalcedony is represented by only 1 flake. The procurement of locally available sources of Fort Payne and Bigby-Cannon is evidenced by the presence of only waterworn cobble cortex. The flake and blocky debris reflect all stages in the reduction sequence for both Fort Payne and Ridley. However, late stage reduction flakes are represented in very low proportions. Bigby-Cannon, on the other hand, is represented exclusively by early reduction stage debris. There is not a wide variety of tool types present in stratum IV_2A. The presence of five complete projectile points/knives, and an extremely low proportion of late stage reduction debris, suggests these points were manufactured at some other location and transported to the Hayes site. No formalized tools of Bigby-Cannon were present.

On the basis of the assemblage composition in stratum IV_2A, it appears that both Fort Payne and Ridley were selected and used similarly. The modification of a Fort Payne projectile point/knife into a drill reflects recycling of a high quality material that is available in limited quantity and size (Binford 1979:267). The projectile points/knives of Ridley do show a selection for the higher quality material available in the river gravels (Amick 1984:47). The lack of formalized tools, and only early reduction stage debris, for Bigby-Cannon suggests that it was used for expedient purposes.

The above results appear to support Amick's (1984) hypotheses concerning relatively small, non-logistically organized Middle Archaic groups.

Stratum III (Late Middle Archaic)

The lithic assemblage in stratum III represents the largest sample size, the widest variety of raw material types and the widest variety of tool types. Stratum III is the shell bearing deposit and represents the longest span of occupation. The raw materials present in this stratum include Fort Payne, Ridley, Bigby-Cannon, Carters, Quartzite, Brassfield and St. Louis. However, the raw material types with the highest frequency of occurrence are Fort Payne, Ridley, and Bigby-Cannon.

The flake and blocky debris of the three main raw material types reflect all stages in the reduction sequence. However, in all the tool type categories, Fort Payne is the most predominant raw material. The lack of more formalized tools represented by Ridley and Bigby-Cannon may be the result of differential use of raw material based on quality (Binford 1979; Straus 1980; Johnson 1984b; Hassen 1987). The higher quality Fort Payne was used to produce implements that may have been intended for use over a long period of time (Kelly 1988:718), whereas, the poorer quality Ridley and Bigby-Cannon were used as secondary resources for expedient purposes (Johnson 1984b; Hassen 1987).

The presence of a wide variety of tool types, suggestive of a wide variety of activities, and a variety of raw materials, reflecting all stages in the reduction sequence, conform to what Amick (1984:233) and Johnson (1984a:231) refer to as 'long trajectory' sites. Another aspect of long trajectory sites is the concept of aggregation (Conkey 1980). Conkey (1980) discusses several archaeological conditions that may indicate an aggregate site. These include length of occupation, greater diversity of activities, as represented by a greater diversity in tool types, presence of burials (ritual), and the abundant availability of a subsistence resource (Conkey 1980:612-613). All of these conditions are met at the Hayes site during the Late Middle Archaic period.

Stratum III is characterized by a dense concentration of shell, representing approximately 1,200 years of occupation (5600-4400 B.P.) (Morey 1988:30). There were five burials recovered dating to this time period (burial information was obtained from burial forms). Two dog burials were also recovered.

Many archaeologists feel that shell midden sites represent seasonal aggregates of people exploiting the wide variety of resources available at a particular time of year

(Claassen 1986, 1991; Hofman 1984, 1985; Jefferies and Lynch 1983; Jenkins 1974; Marquardt and Watson 1983; Peacock 1988; Smith 1986). These researchers also state, that when climatic conditions prohibit the exploitation of aquatic resources, the group splits into smaller segments to exploit other areas of the region.

In stratum III, the high proportion of bifaces represented by Fort Payne, and the presence of matrix/residual cortex, suggests that Late Middle Archaic people were obtaining at least some of the material from source areas outside the Inner Basin. The presence of other more distant raw materials, Brassfield and St. Louis (1 Benton point), indicate that the Late Middle Archaic people were, at some point, exploiting the Outer Basin and Highland Rim physiographic zones. This supports the idea of smaller groups, from around the region, aggregating at a particular time of the year, and then splintering off at other times. The use of a variety of raw materials has been suggested as representing an increase in population size (Andrefsky 1984:228).

The presence of two temporally distinct point types (Benton and Ledbetter) in stratum III, warranted a closer examination of the assemblage composition within the stratum. The results have already been presented in chapter II, but will be briefly reviewed below.

As has already been stated, Fort Payne is the predominate raw material among all tool types. The distribution of the various tool types is fairly consistent throughout the stratum (Table 14). The most significant characteristic within the assemblage, is shown by the results of chi-square tests on the distribution of the flake debris between Fort Payne and Ridley. Among the five substrata represented in stratum III, Ridley flake debris is over represented in the four lower substrata, and Fort Payne is under represented. Then, in the uppermost substratum (IIIA), the pattern is reversed. Fort Payne flake debris is now over represented and Ridley is under represented (Table 11).

Substratum IIIA represents approximately 750 years of occupation. It is distinguished from the rest of the midden deposit by an increase in the presence of bivalves. It is also where both Benton and Ledbetter points were recovered (Morey 1988:27-32). Among the six arbitrary 10cm levels, Ridley flake debris is over represented in the five lower levels, and Fort Payne is under represented. Then, in the uppermost 10cm level, the pattern is reversed. Fort Payne flake debris is now over represented and Ridley is under represented (Table 13). This uppermost level is where the two Ledbetter points were recovered. Of the eight Benton points recovered from stratum III, none were recovered from the uppermost 10cm level. One possible Late Archaic burial was recovered from the uppermost portion of the midden.

The implications of these results will be discussed later in the chapter.

Stratum II (Late Archaic)

Stratum II is distinguished from the rest of the deposit by the absence of shell, and the presence of only Ledbetter points. The raw material types present include Fort Payne, Ridley, Bigby-Cannon, Carters, Brassfield and St. Louis. The three main raw material types are Fort Payne, Ridley, and Bigby-Cannon.

The flake and blocky debris reflect all stages of reduction for the three major chert types. However, the flake debris represented by Fort Payne reflect a much higher proportion of later reduction stage debris. Most significant, is the dramatic increase in the number of bifacial thinning flakes.

There is a decrease in the diversity of tool types present in stratum II. There is also a decrease in the representation of Ridley tool types. The most significant being the absence of bifaces. The bifaces represented by Fort Payne include fragments, preforms, and finished products. Fort Payne also predominates in the flake tool category.

Fort Payne being the most predominate raw material type, the increase in bifacial thinning flakes, and intermediate bifacial preforms, conforms to Amick's notion of 'gearing up' activities (1984:230). A corollary to this activity is the use of bifaces as cores as well as tools (Kelly 1988:719-720). Initial manufacture of bifacial forms would be carried out at a location where the material is most abundant. (In the case of Hayes, this would be the Highland Rim). This reduces the amount of material needed to be carried while "maximizing the total amount of stone cutting edge" (Kelly 1988:719). Upon reaching the desired destination, the bifacial forms are further reduced, according to task requirements. The result would be the predominance of bifacial forms, increase in bifacial thinning flakes, and a higher percentage of utilized flakes (Kelly 1988:719-721). 'Gearing up' activities are indicative of logistical, special purpose sites located in resource poor areas (Kelly 1988:719; Mague 1989:22). The Inner Basin is a resource poor area, and it is not unreasonable to postulate that the locally available Fort Payne could have been depleted over the long span of occupation represented by the 'Block' deposit (Dibble 1991).

Comments and Interpretations

The results of the analysis of the lithic assemblage composition between the three main stratigraphic sequences at the Hayes site, shows a change in the exploitation and use of various raw material resources. The Middle Archaic sequence (6000-5800 B.P., 5500-5400 B.P.) is represented by the exclusive use of locally available material. The Late Middle Archaic sequence (5600-4400 B.P.) reflects the continual use of locally available material, but with the addition of non-locally available material. The Late Archaic sequence (4270 ± 155 B.P.) witnesses a shift to a predominate use of a single, non-local material.

The data from the Hayes site supports Amick's (1984) contention that Late Archaic groups were more logistically organized than Middle Archaic groups. It is interesting to note that the dates for Amick's sites (Middle Archaic 7500-6000 years B.P., Late Archaic 4000-3000 years B.P.) (1984:134) fall beyond the extreme dates at the Hayes 'Block' area. However, the presence of the Late Middle Archaic Benton phase provides an opportunity to see the gradual shift in settlement/subsistence organization over an approximate 2,000 year period of occupation at a single location.

The Middle Archaic sequence represents a small group of people occupying the site, and exploiting a variety of resources, including aquatic resources. The Late Middle Archaic sequence represents a continued, but increased, utilization of the Hayes site for exploiting aquatic resources. More and more smaller groups from around the region are aggregating, on a seasonal basis, at a location which provides a wide variety of resources. The uppermost portion of the shell midden, where the two Ledbetter points were recovered and there was an increase in Fort Payne flake debris, indicate that Late Archaic people were still utilizing the Hayes site to exploit aquatic resources, but increasing the use of non-locally available Fort Payne, possibly due to the depleting availability of the material in the river gravels. The Late Archaic sequence represents a shift to a more specialized use of the Hayes site.

Amick (1984) contends that the reason Middle Archaic groups were non-logistically organized and relied on aquatic resources was due to environmental stress caused by the hypsithermal climatic interval. He feels this climatic episode restricted the movement of people across the landscape, forcing them to rely on a broader range of subsistence resources. Then as the climate became more temperate, there was more freedom of movement and groups became more logistically organized (Amick 1984:236-267).

An alternative hypothesis for the changes observed between Middle and Late Archaic settlement/subsistence organization is the repositioning of residential sites on the landscape. The lithic data from the Hayes site does show a change in site function from the Middle to the Late Archaic.

To more fully understand the changing role of the Hayes site in Middle and Late Archaic settlement/subsistence strategies, the integration of other archaeological data with the lithic data is necessary.

Chapter IV

ENVIRONMENTAL, FAUNAL AND BOTANICAL DATA

There is evidence of increased utilization of the floodplain, and adjoining terraces, during the Middle Archaic period in Middle Tennessee (Faulkner and McCollough 1973; Johnson 1977; Prescott 1978; Turner and Klippel 1989). The reason for this increased use has been attributed to the hypsithermal climatic interval (8000 - 5000 B.P.).

The hypsithermal is characterized by a warming and drying trend. The effect of this climatic episode was an increase in the presence of more xeric forest taxa (oak, ash, hickory), and a decrease in the presence of pre-existing mesic deciduous forest taxa (Delcourt 1979: 271; Crites and Clebsch 1986:175; Crites 1987: 12; Turner and Klippel 1989: 49). The analysis of various insectivore species at Cheek Bend Cave, revealed an increase in species preferring a more open habitat during this time period (Klippel and Parmalee 1982). Another effect of the hypsithermal was "river aggradation and stabilization" (Smith 1987: 27). This increased the presence of certain aquatic species (Smith 1987: 27).

After 5000 B.P., mesic deciduous forest taxa predominate. "By 2000 yr. B.P. the pollen spectra are similar to those of 200 yr. B.P. reflecting increased precipitation during the late Holocene" (Delcourt 1979: 271).

The hypsithermal has been credited with causing stress on Middle Archaic people, forcing them to move into the Inner Basin and rely on low nutrient, secondary resources (shellfish), due to population pressure (Amick 1984: 236-267).

As has already been stated, the Late Middle Archaic sequence (stratum III) at the 'Block' area of the Hayes site, is represented by a dense concentration of shell. Research on shell midden sites suggest a late summer/early fall period of most abundant, easily accessible exploitation of aquatic resources (Claassen 1986:29-30, 1991:284; Hofman 1984:159; Jefferies and Lynch 1983:314-316; Jenkins 1974:188; Klippel and Morey 1986:809; Marquardt and Watson 1983:330; Peacock 1988:21; Smith 1986:24, 1987:28). This time of the year is also the optimum time to harvest plant food (especially nuts) (Faulkner and McCollough 1973: 47; Bowen 1979: 148; Kelly 1983: 287; Hofman 1984: 159; Smith 1987: 28). In the fall, deer are in their best physical condition (large and plump), and would be attracted to the abundant nut crops

(Faulkner and McCollough 1973: 47; Kelly 1983: 287; Hofman 1984: 164).

The results of the faunal analysis from stratum III indicate that deer is the most predominate faunal resource. There were also other smaller vertebrates recovered (Morey 1988:94). The results of the botanical analysis, revealed that hickory shells comprised the majority of the nut remains. There were also walnut, hazel nut, and acorn shells recovered. A variety of seeds were also recovered (Crites 1987: 8-10).

There appears to be, on a seasonal basis, a wide variety of resources available in the Inner Basin, during the hypsithermal, that were exploited by Late Middle Archaic people. Brown and Vierra (1983: 169) state:

> an increase in the relative abundance of preferred resources in a single geographic zone will pull the efforts of foragers to that zone to the exclusion of other zones because of increases in logistic efficiencies in the pursuit, capture, and processing of food.

Therefore, it is felt that the use of shellfish is not the result of environmental stress. It was probably used as a secondary resource in response to an increased population base. Increased population resulted from various smaller groups aggregating in a single location to exploit the wide variety of resources available.

The exploitation of other areas in the region, during this time period, is evidenced by the presence of Brassfield (Outer Basin), St. Louis (Highland Rim), and matrix/residual cortex on Fort Payne debitage (Highland Rim) in stratum III. The low representation of Brassfield chert, and a complete St. Louis Benton point, with no bifacial thinning flakes present, indicate that Late Archaic people were obtaining the material during normal seasonal rounds (Binford 1979: 259-261).

The earlier Middle Archaic sequence (stratum IV_2A) reveals the presence of the same type of faunal remains as in stratum III (Morey 1988: 96). The botanical remains consist mainly of hickory nuts and some seeds (Crites 1987: 8-10). The frequency of all subsistence resources, including shell, is much lower than in stratum III. This is not surprising due to the small size of the population present, as indicated by the lithic assemblage composition.

An interesting discovery in stratum IV_2A and stratum III, is the presence of *Cucurbita* rinds. The date of the rinds in stratum IV_2A is 5430 $\pm$ 120 B.P. This is the earliest known occurence of *Cucurbita* in North America (Crites 1987: 10). Crites (1987: 13) states that the *Cucurbita* recovered probably represents a weedy gourd and not a domesticated variety. He goes on to say that the significance of its presence during the Middle Holocene, is "the coevolutionary process underlying the appearance of native eastern North American domesticates and development of food production" (1987: 13).

Smith (1987) discusses the coevolutionary processes which may have lead to the domestication of plants. Smith (1987: 28) states "the coevolutionary trajectory leading to domestication originates and progresses within continually disturbed anthropogenic habitat patches." He, therefore, views the increased reoccupation of floodplain zones, over a long period of time, as a contributing factor leading to plant cultivation and domestication (1987: 31).

From the above discussion, it does not appear that the hypsithermal induced stress on Middle Archaic people. Instead, it created a heterogeneous environmental situation which allowed the exploitation of various resources in one geographical location. It may have also helped to promote the eventual domestication of plants.

After 5000 B.P. (post-hypsithermal), the climate became more temperate and the upland forests were again dominated by mesic deciduous taxa (Delcourt 1979: 271). During the Late Archaic, there is evidence of a decrease in activity on the floodplain and adjoining terraces, and increased activity in the uplands (Faulkner and McCollough

1973: 421; Cook 1976: 119-120; Prescott 1978: 388). No large residential Late Archaic sites have been identified in the Central Duck River Basin (Hofman 1984: 133). The Late Archaic sites, located on the floodplain terraces in the Upper Duck River Valley, appear to be small, seasonal base camps (Bowen 1979: 153).

The analysis of the faunal remains from the Late Archaic sequence (stratum II) of the 'Block' area of the Hayes site, revealed the presence of the same major vertebrate taxa as in the two other strata (Morey 1988: 96). The botanical remains consist mainly of hickory nuts, with some acorn and seeds (Crites 1987: 8-10). Therefore, the general subsistence practices observed during the Middle Archaic are similar to those of the Late Archaic. The major difference is the lack of shellfish in stratum II.

The lithic assemblage, in stratum II, revealed the predominate use of a single raw material resource (non-local Fort Payne), a reduction in the diversity of tool types, and evidence of 'gearing-up' activities. 'Gearing-up' activities are conducted at the residential site, where resources are abundant, before going on a logistical foray into a resource poor area (Kelly 1988: 719). The Highland Rim contains the most abundant source of high quality Fort Payne. The Inner Basin is a resource poor area.

On the basis of the changes in lithic assemblage composition, it appears that the Late Archaic component (present in stratum II) represents a shift in the use of the Hayes site from a seasonal aggregate site to a temporary seasonal base camp (Binford 1982). The absence of shellfish does not represent a "narrow spectrum economy" as suggested by Amick (1984: 252). It simply reflects a change in site function, with a corresponding reduction in population size at the Hayes site. As a matter of fact, it is suggested that the location of larger Late Archaic sites, in a wider variety of environmental and geographical zones than the Middle Archaic, "indicate an overall subsistence shift to a broader economy" (Mitchell 1985: 77).

Conclusion

This study has shown that the identification of a 'Middle Archaic' or 'Late Archaic' lithic resource procurement and utilization strategy is very complex. Each cultural component, represented at the Hayes site, exhibited the curation and expedient use of various raw material types based on quality. The variability in the proportions of various raw material types reflects the scale of the habitat exploited (Binford 1979: 261).

Therefore, the exclusive use of local raw materials is not indicative of an expediently organized technology. It suggests that the scale of the habitat exploited was more limited during the earlier Middle Archaic, became progressively larger during the later Middle Archaic, and reached a maximum during the Late Archaic.

There is little question that Late Archaic people were logistically organized compared to Middle Archaic people. However, the differences in assemblage composition, at the Hayes site, is more a reflection of changing site function, population size, and depleting availability of local high quality material, than a technological change.

Changes in environmental conditions seem to have had an affect on Middle and Late Archaic people. The result was not one of stress and then no stress, but rather, a preference in the location of larger sites on the basis of the availability of resources.

The long span of occupation represented at the 'Block' area of the Hayes site, provides an excellent opportunity to view the gradual change from Middle Archaic to Late Archaic times. It should be stressed that the information presented in this report is not meant to reflect overall characteristics of Middle and Late Archaic lithic resource procurement strategies, and settlement/subsistence patterns. It simply represents the changing role of a single location that is part of a much broader and more complex system.

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VITA

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Since 1979, the author has been involved with numerous archaeological projects in the Southeastern United States, as well as Puerto Rico and Hawaii. The various positions held on these projects include field technician, laboratory supervisor, assistant field director and lithic analyst. In 1984, Ms. Juchniewicz began taking classes toward a Master's degree at the University of Tennessee, Knoxville. During that time she worked on various projects to finance her way through school. In December 1991, Ms. Juchniewicz was awarded the Master of Arts degree in Anthropology.