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Archeological Site Survey of the Lower Kalamazoo River Basin: Results of the 1976 Field Season

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ARCHEOLOGICAL SITE SURVEY OF THE LOWER KALAMAZOO RIVER BASIN: RESULTS OF THE 1976 FIELD SEASON

by

Phillip D. Neusius

A Thesis
Submitted to the Faculty of The Graduate College in partial fulfillment of the Degree of Master of Arts

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Phillip D. Neusius
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CHAPTER I -- INTRODUCTION

During the last three decades American archeologists have become increasingly aware of the fact that archeology, as anthropology, must concern itself with the explanation of culture and human behavior. There has been an increase in the emphasis upon the evolutionary and ecological aspects of sociocultural systems, and many archeologists have focused on the study of the relationship between man and his environment, as well as the changes in this relationship through time.

The goal of explaining, and thereby predicting, the relationship between prehistoric man and his environment in the Eastern Woodlands has resulted in an increasing interest in the study of prehistoric settlement systems. The definition of settlement patterns has been expanded to include not only prehistoric dwellings and their relationship to other prehistoric dwellings or groups of dwellings, but the association of prehistoric settlements with the physical features of the environment as well.

In an attempt to understand the prehistoric settlement pattern in the Kalamazoo River Valley a systematic program of site survey and test excavation has been initiated under the direction of Drs. Elizabeth B.
Garland and William Cremin. During the 1976 field season, in conjunction with the Western Michigan University archeological field school excavations at the Hacklander site, it was decided to begin a program of archeological field reconnaissance which would attempt not only to discover prehistoric sites, but also delineate non-site areas as well. This was just the beginning of an ongoing program aimed at delineating and explaining prehistoric subsistence ecology and cultural dynamics in the Kalamazoo River Valley.

This thesis is the preliminary account of this initial survey effort. Besides being a descriptive account of the results, I will attempt to generate a predictive model for the association of prehistoric Indian sites in the Lower Kalamazoo River Basin with the physical features of this environment. The 1976 survey did not produce enough hard data on site location to warrant the use of statistical correlations. Rather, it is hoped that this somewhat subjective model will enable us to formulate more appropriate questions as the project continues.

In the first part of this paper I will briefly consider the topic of settlement pattern as a goal of survey research. In this section I will define this goal for research in the Lower Kalamazoo River Basin.
The second part of this paper will contain a description of the environmental setting for the survey area. This will include an attempt to establish environmental types for correlation with prehistoric site locations.

I will then give a brief review of previous survey work done in the area and a description of the survey conducted during the 1976 field season.

In the next section I will present a generalized description of all the sites located in the 1976 survey universe.

The final section will include a summary by cultural periods and preliminary correlations with environmental zones. This will include the use of a predictive model.
CHAPTER II

The traditional goal of archeological site survey has been the identification of settlement patterns. One of the first regional surveys to establish this goal was the Viru Valley study (Willey 1953). In his Viru Valley report Willey presented the first formal statement concerning the scope and utility of settlement studies. He defines "settlement patterns" as:

. . . the way in which man disposed himself over the landscape on which he lived. It refers to dwellings, to their arrangement, and to the nature and disposition of other buildings pertaining to community life. These settlements reflect the natural environment, the level of technology on which the builders operated, and various institutions of social interaction and control which the culture maintained. (1953:1)

In his introduction to Prehistoric Settlement Patterns in the New World (1956), Willey expands upon his previous discussion in emphasizing that:

. . . settlements are a more direct reflection of social and economic activities than are most other aspects of material culture available to the archeologist. Because of this, settlement investigations offer a strategic meeting ground for archeology and ethnology . . . (1956:1).

More recently Trigger has suggested that settlement archeology might be defined as " . . . the study of social relationships using archeological data" (1967:151). Trigger has further argued that archeological
settlement patterns can be analyzed on three levels: the individual structure; the local settlement; and the redistribution of settlements in a region (ibid.).

There are some problems with this traditional definition of settlement patterns as a goal for survey research. The first, as pointed out by both Plog (1968) and Struever (1968, 1971), is that this ideal definition of settlement encompasses many different variables. The fact of the matter is that few archeologists have either the time or money to carry out such ambitious schemes. One would be hard put indeed to conduct survey research which successfully integrated all three levels mentioned by Trigger. Rather, most archeologists are interested only in one or the other of these levels, or even some specific set of variables within these levels (for example, see Hill 1966; Parsons 1971; Robbins 1966; Sanders 1956).

A second problem is that the traditional definition stresses mere description of patterns. Emphasis is not placed upon the testing of hypotheses concerning human behavior. Brose (1976) has pointed out the "traditional" surveys are not amenable to testing a null hypothesis, which of course is a necessary step in following an explicitly scientific approach (Watson, LeBlanc, and
Redman 1971). Since traditional studies deal specifically only with the actual presence of sites, they tend to only, at best, test the hypothesis in an affirmative manner: "traditional archeological surveys could not utilize non-site areas to test predictive hypotheses derived from the model" (Brose 1976:4-5).

In an attempt to overcome these problems, Plog (1968) proposes a partial redefinition of the goals of survey research:

... survey archeology is the discovery and use of variation in the location of sites of prehistoric activity to test hypotheses concerning the cultural processes which produced the sites. Such a definition has two advantages.

First, it does not specify the variables with which a given surveyor should be concerned. It does not suggest that working with a certain set of problems constitutes good archeology. One variable in any hypothesis under investigation will be the location of sites. But the location of the sites may be analyzed with respect to a variety of other variables--ecozones, water resources, landforms, special architecture, other sites, etc.

Secondly, my definition recognizes that the survey is a kind of analysis of location. Locational analyses are new neither to archeology (see Binford and Binford, 1966; Freeman, 1962; Freeman and Brown, 1964; Hill, 1965; Longacre, 1963) nor to science as a whole (see Clark and Evans, 1954; Haggett, 1966). They are based upon the belief that the relative position in space of two or more objects is a bit of data which is valuable in testing hypotheses. The 'objects' may be plants in a field, villages in a region, or projectile points on a site. (Plog 1968:6)
The present study will attempt to utilize Plog's definition of the goal of survey research. The variable of site location will be investigated with respect to variables of the natural environment, such as vegetation and physiographic zones.

The importance of studying the variable of location within the natural environment in trying to understand human behavior in prehistory was first noted in American archeology by Thompson (1939). His consideration of the seasonal factor was elaborated by Chang (1962) in his concept of "annual subsistence region," i.e. the territory over which a group may range annually, occupying one or more different kinds of settlement locations in the course of this seasonal round of subsistence economy. This concept has been further refined and clarified as a "settlement system" by Winters (1967). A little later Winters made a formal distinction between the concepts of settlement "system" and settlement "pattern." He defines settlement pattern as "the geographic and physiographic relationships of a contemporaneous group of sites within a single culture," whereas the settlement system is "the functional relationships among the sites contained within the settlement pattern" (1969:110). The definition of the
settlement system is dependent upon being able to determine the season at which various settlement "types" were occupied and the kinds of activity performed at each site. The need to ascertain seasonality and function requires the systematic collection and analysis of a wide range of data. These data include a large number of variables often ignored or overlooked by archeologists, such as floral and faunal remains; behavior and availability of important plant and animal species; climatological considerations; organizational aspects of various subsistence techniques; architectural features; and precise knowledge of differential abundance and distribution of artifact types, especially those for which function is known or can be inferred (Parsons 1972).

In trying to come to grips with this vast array of variables, Winters (1969) has proposed the use of the "Systemic Index" as a quantitative measure of functional differences between sites. This index uses the proportion of fabricating, processing, and domestic implements to weapons which could be used for hunting as an implied measure of the functional differences between sites. The use of an index of proportions of stone tool types as a functional indicator of differences
between sites has commonly been used in Michigan archeology (Brose 1970; Fitting 1968 and 1969; Fitting and Sasse 1969; Taggert 1967; Weston 1975). Although this practice has found considerable precedent in the archeological literature, three problems should be kept in mind. One is that these various studies often lack consistency in terms of the identification of stone tools used in the study. A case in point is that Taggert's (1967) study does not include retouched flakes, while others (e.g. Fitting 1968) do. Fitting (1969) has attempted to come to grips with this problem, but it must be realized that the problem does exist. One man's "use-wear flake" is another man's "bifacial scraper."

Another problem is that the assumed direct one-to-one relationship between these variables represents a plausible, but untested, hypothesis. And it will remain so until someone undertakes a systematic test of this relationship using data which were not used to generate the hypothesis (Binford 1964). Any time one attempts to make comparisons between data sets one must first consider the comparability of the samples selected for study. In the use of a "systemic index" it must be noted whether that index is based upon a representative sample. One would be hard put to make reliable comparisons between lithic material collected in a
non-systematic manner from the surface of a site and lithic material recovered from the intensive excavation of a site. Since the representativeness of a sample is in part dependent upon its size, the use of a "systemic index" generated for material from a site which has been surface collected or only minimally tested must be considered to be a proposition or indicator which warrants further testing.

Another factor which must be considered in any attempt to establish prehistoric settlement patterns in a region is the variable of site size. Fitting (1969) has pointed out some of the problems in determining site size in the Great Lakes region. He proposes restricting categories of site size to "small" and "large." Small sites are those with definable (known) limits. Large sites are more "extensive" in nature and generally difficult to delimit. Unfortunately, as Fitting and Cleland (1969:292) state, this criterion ends up being primarily a subjective judgement based upon the investigator's expertise.

The variable of site density, although subject to disparities in sampling techniques and surface visibility, can be approximated through counts of items recovered (either per unit of excavation or per some standard unit
of time) and applied to quantities of artifacts, debitage, fire cracked rock, refuse bone, etc. But this, too, is often influenced by subjective interpretation, since you would expect a continuum of the number of items to occur. Although it may be an easy matter to differentiate very intensively occupied sites from very extensively occupied sites, those intermediate sites must be evaluated according to additional criteria.

The seasonality of an occupation can often be ascertained from non-artifactual material, specifically, plant and animal remains. But an adequate sample of these sorts of data requires fairly extensive excavation of the site (if you have adequate preservation) and usually cannot be applied to surface survey materials alone. Site location can sometimes be used to infer season of occupation. For example, one would not expect winter occupations to occur in exposed areas subject to prevailing westerly winds (Fitting and Cleland 1969). But, of course, such a determination is tenuous at best. And although one may be able to infer that an exposed location was occupied during the milder season, one cannot use this reasoning to infer that sheltered locations are winter season occupations.

These sorts of variables will admittedly be used in a subjective manner since this is a preliminary report,
and as such is not based upon any sort of systematic testing of the sites discovered during the course of the survey. Thus, in the following discussion these variables will be presented as plausible but untested assumptions regarding the sites involved. It is hoped that these sorts of subjective interpretations can be used to generate testable propositions which will provide direction for future research in the ongoing survey of the Kalamazoo River Basin.
CHAPTER III

The Kalamazoo River Valley is characterized by a youthful topography developed on glacial drift of Wisconsin age. The headwaters of the river are found in western Jackson and Hillsdale Counties. From there the river traverses Calhoun, Kalamazoo, and Allegan Counties to empty into Lake Michigan near the town of Saugatuck some 100 miles west of its source. The Lower Kalamazoo River Valley can be delimited on the basis of natural vegetation zones (Kenoyer 1934) and soil types as beginning in the area of the border of Allegan and Kalamazoo Counties, and extending from this point in a northwesterly direction through Allegan County to the river's mouth.

This region is characterized by varied topography, consisting of plains and low rolling hills, interspersed with higher morrainic ridges. As a result of the youthful nature of the Lower Kalamazoo River Valley, itself, there is a notable lack of well developed terraces or floodplains. The mouth of the Kalamazoo River is located in an area of extensive sand dune formations. As a result, the first two to three miles of the river valley were subject to a great deal of
stream meandering before the Army Corps of Engineers constructed a reinforced channel about one mile north of the town of Saugatuck. Abandoned stream channels near the lake were fairly quickly covered by the extensive dune activity.

The width of the stream channel varies from a few hundred feet to $1\frac{1}{2}$ miles at its widest points. These broader areas are characterized by extensive swamp and marshland development, with one or more deeper stream channels meandering through them.

The middle and upper portions of the valley are located within the Carolinian Biotic Province (Cleland 1966), while the lower valley falls within an area defined as a transition zone by Cleland (ibid.) and others. Whereas the presettlement forests of the Carolinian Biotic Province are commonly classified as oak-hickory (Veatch 1959), the arboreal vegetation of the Lower Kalamazoo Valley is characterized by oak-pine or beech-maple forests with hemlock cropping up along the Lake Michigan shoreline.

The mosaic of plant associations found within the lower valley would have provided a favorable environment for a wide variety of animal species. The edge areas created by this mosaic pattern would have provided
adequate browse for deer and elk. The stream and marsh areas would have attracted large quantities of migratory waterfowl such as ducks and geese, as well as numerous aquatic fauna such as sturgeon and other fishes, mussels and turtles. The heavy forest cover of the uplands would have provided adequate cover for bird life, particularly turkey and passenger pigeon. Thus, the area would have provided a fairly rich and varied supply of game and plant life necessary for human settlement.

In the uplands of the Lower Kalamazoo Valley there are large stands of white pine occurring on areas of sandy soil. This region represents the southernmost extension of white pine, but this community or forest type does not constitute the climax vegetation of the area. Rather, its occurrence is restricted to soils which are unstable and present little chance for climax forest growth (Shelford 1963). The soils on which white pines tend to dominate are the Oakville-Chelsea-Oshtemo association, the Tedrow-Augres-Morocco association, and to some extent the Kalamazoo-Oshtemo-Brady association (U.S.D.A. Soil Conservation Service Maps 1976). The areas of more loamy soils contain increasing numbers of such climax species as red oak, white oak, black oak, sugar maple, beech, elm, cherry, ash, basswood and
variable proportions of black walnut, hickory, butternut, tulip poplar, sycamore and black cherry.

In an attempt to correlate site location with the various types of natural vegetation, I have recognized four major vegetal resource zones in the Lower Kalamazoo River Basin: 1) White Pine; 2) Pine-Oak; 3) Beech-Maple; and 4) Beech-Maple-Hemlock along the lake shore. In addition, two other zones are occasionally represented: 1) Oak-Hickory and 2) Swamp associations.

There are some obvious problems in trying to correlate more recent vegetation zones with prehistoric site locations. One cannot assume that vegetal resource zones delineated on the basis of observations made in the nineteenth century or even more recently have remained unchanged for thousands of years. Wood (1976) and King (1977) have recently commented on some of the problems encountered in using United States General Land Office survey data to reconstruct pre-Euro-American plant communities. Zawacki and Hausfater (1969) provide a good discussion of the comparability of climate between prehistoric and more recent times. They conclude that the vegetational patterns in Woodland times are essentially the same as those observed in the nineteenth century for the Lower Illinois Valley. There are two
major problems with accepting that assumption for the present study. The first involves the fact that the Lower Kalamazoo River Valley lies within a tension zone separating two major biotic provinces. Therefore, relatively small variations in, for example, temperature would tend to have a greater effect on the plant communities in this area than it would in other areas.

Secondly, the Zawacki and Hausfater study is limited to the more recent Woodland period, while the periods of occupation in the Lower Kalamazoo River Valley with which I am concerned extend back as far as the Paleo-Indian period. As the Holo-Pleistocene boundary is approached, one is obviously going to be dealing with more drastic changes in climate, geomorphology, and resultant vegetational patterns within this transition zone.

Since there are problems in trying to correlate more recent vegetal resource zones with prehistoric site locations, this study will also focus upon the relationship existing between site locations and major physiographic features of the Lower Kalamazoo River Basin. A generalized typology of physiographic zones can be seen as representing distinctive microenvironmental niches, each with its own variation in terms of the
resources available to prehistoric groups (see Coe and Flannery 1964; Hardesty 1977; Hole, Flannery and Neely 1969; Zawacki and Hausfater 1969). The manner in which various prehistoric groups have exploited these micro-environments has changed through time. The explanation for changing resource use schedules has been a focal point for many studies undertaken on a regional scale in archeology (for example, the Rio Grande Region, Dickson 1975; the Deh Luran Plain, Hole, Flannery and Neely 1969; the Tehuacan Valley, MacNeish 1972; and the Pomme de Terre River Valley, Wood and McMillan 1976).

The microenvironment can be defined as a "micro-habitat or smallest natural area or space characterized by a particular environment" (Cain 1966:47). Thus, the microenvironment can be seen to include not only the vegetation, but the variables of distance to water, elevation, faunal resources, etc. In order to implement this concept in the present study a generalized description of physiographic zones will be used. These are: 1) River Shoreline; 2) Tributary Shoreline; 3) River Bluff Crest; 4) Tributary Bluff Crest; and 5) Dissected Uplands.
CHAPTER IV

Prior to the 1976 archeological site survey, the collection of site location data had been limited to informal site survey and testing in cooperation with the Kalamazoo Valley chapter of the Michigan Archeological Society and one four-week informant survey conducted by the Western Michigan University field school under the direction of Dr. Elizabeth B. Garland. Although these efforts produced a considerable site file for the Kalamazoo River Valley, no attempt had been made to conduct a systematic on-ground survey which would provide data on non-site areas as well as site locations.

In an attempt to generate hard data which could be used to develop sound research designs and predictive models for Western Michigan University's program in the Kalamazoo River Valley, a systematic transect survey was conducted in conjunction with the excavation of the Hacklander site by the 1976 archeological field school. The survey universe constituted ten sections of Manlius Township and six sections of Saugatuck Township (Figure 1). On its eastern edge the transect crossed the Kalamazoo River five miles above the confluence of the Kalamazoo and Rabbit Rivers. The western extension of
the transect encompassed both the north and south banks of the Kalamazoo River for a distance of four and one half miles downstream from the junction of these streams.

The primary goal of this survey was to come as close as possible to 100% coverage of the 16 sections included in the transect. The determination of areas where sites were not located was considered to be as important an objective as the locating of prehistoric sites themselves. Due to limitations in time and personnel, as well as the problem of determining the reliability for surveys in woodland environments, it was decided to limit the survey to areas with good to excellent visibility. Areas which were heavily forested or for other reasons afforded low surface visibility were not surveyed. No attempt was made to conduct subsurface testing during this survey. Given these limitations, a crew of four students and one supervisor was able to survey approximately 66% of the land within the survey area (Figure 2).

During the course of this survey, 24 new sites were located, in addition to the 13 sites previously recorded in the Western Michigan University site files (Figures 3 and 4). Of these 37 sites only 20 have produced diagnostic artifacts, allowing us to place the sites in
Figure 2
KALAMAZOO BASIN SURVEY 1976

PREVIOUSLY KNOWN ARCHAEOLOGICAL SITES

CONTOUR INTERVAL 10 FEET
SCALE 1:62000

Figure 3
some sort of temporal framework. Obviously this is not a large enough sample to make possible any sort of meaningful statistical correlation. In particular, once the sites are broken down into chronological periods we have fewer sites than we have environmental variables with which to correlate them. Therefore, the following discussion of the results of this initial systematic survey will serve primarily as a basis for directing future research, since little interpretation is possible at this time.

Three of the sites previously recorded within the transect area had undergone some degree of excavation prior to our survey. The Fennville site is located on the south side of the Kalamazoo River at the edge of a steep ravine which has a spring at the bottom. The site is bisected by the boundary line between Sections 19 and 20 of Manlius Township along the northern edge of these two sections. The site was excavated on weekends by the Kalamazoo Valley chapter of the Michigan Archeological Society under the direction of Dr. Garland from 1967-1970. In addition, the 1968 Western Michigan University field school spent four days excavating the site under Dr. Garland's direction. The ceramics from the site were analyzed by Margaret B. Rogers (1972). There were no
features encountered during the excavations and Rogers feels, based on the ceramic typology, that the site was occupied about 700-800 A.D. There are later ceramics present also, and the site was apparently a multi-component early and middle Late Woodland campsite (personal communication, E. Garland, 1978). It is possible that this site is the same as KBS-76-15.

The Jacobs site (20-AE-65) is located north of the Kalamazoo River along the north bank of a small intermittent creek which joins the river about one half mile south of the site. The site is located in the SE¼ of the SW¼ of Section 7, Manlius Township. The site lies on a sand ridge some 20 feet above the creek. The site was tested by the Kalamazoo Valley Chapter of the Michigan Archeological Society under the supervision of Dr. Garland. Although the material from this site has not been analyzed, it is apparently a Late Woodland short-term campsite. This location was extensively occupied, with an area of some 500 square yards yielding large quantities of debris exposed in numerous sand blowouts.

The Hacklander site (A18) is located on the south bank of the Kalamazoo River alongside a small creek which borders the site on the east. Excavation of this site
was conducted during the 1975 and 1976 field seasons under the direction of Dr. Garland. The analysis of data from this site has been the topic of several Masters Theses at Western Michigan University (Kingsley 1977; Martin 1976; and Sorenson N.D.). The site appears to have seven different components, with prehistoric occupations ranging from Middle to Late Woodland times. The most important component appears to be an early Late Woodland occupation. At that time the site was apparently occupied during the spring, summer and fall seasons of the year.

There were ten other sites which had been previously recorded, but had not yet been tested at the time of the survey. The Indian Point, or Webster, site (20-AE-24 and A26) is located due north of the Hacklander site on the north side of the Kalamazoo River. The river flood bottom narrows to less than 100 yards at this point, as compared to widths of one half to one mile just up- or downstream. A large concentration of lithic debris, fire cracked rock, bone and ceramics occurs on the sandy area paralleling the river shoreline. Additional areas of prehistoric cultural debris have been noted on the sandy bluffs just above the shoreline. The site has yielded large amounts of grit-tempered, cord-marked Late Woodland pottery.
The Voss site (A24) is located on a ridge of Rimer Sandy Loam along the south bank of the Kalamazoo River. The area has been land mined, destroying the site. However, a small amount of lithic scatter can still be found here. The site is located in the NW $\frac{1}{4}$ of Section 24, Saugatuck Township. It has yielded cord-marked ceramics as well as several contracting-stemmed and side-notched projectile points, indicating that this was probably a Late Woodland occupation. The 1976 survey crew recovered one end scraper from this location.

The Valdes site (A23) consists of a fair amount of chippage and fire cracked rock exposed in a blowout located on a sand ridge along the south bank of the Kalamazoo River. The 1973 informant survey recovered one broken projectile point, type indeterminate, from this site. The 1976 survey crew did not relocate this site.

A site (A58) was recorded in the SE $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Section 24, Saugatuck Township. This location was recorded as the Collis site (KBS-76-21) by the 1976 survey (see below for description).

The Kool and Brink sites (A27 and A28) may actually be the same site. Within the last few years a road has been built through the reported site areas. Both of the original survey records mention a large concentration of
debris occurring within a large sand blowout in the vicinity of the current road (58th Street). The only diagnostic material reported was a "Madison-like" projectile point from the Brink site. The 1976 survey crew located a large concentration of fire cracked rock and lithic debris in a blowout of Plainfield Loamy Sand along the east side of 58th Street, overlooking the Kalamazoo River to the south. The only artifact recovered was a projectile point fragment of an indeterminate type. Since our survey crew was not able to locate any other sites in the immediate vicinity it seems probable that the Kool and Brink sites are one and the same.

The Gercy site (A29) actually consists of four separate sites (KBS-76-23, 24, 25, and 26) located along a ridge of Plainfield Loamy Sand in Section 7 of Manlius Township. A description of these four sites will be presented below in the chapter on 1976 survey results.

The Graves site (A30) was found in the NW of the SE1/4 of Section 6, Manlius Township at an elevation of 750 feet. The 1973 survey reported finding a small lithic scatter on a sandy knoll on the Graves property. The owner had a large collection of projectile points, but the 1973 survey could not ascertain whether any of
the projectile points actually came from this location. The 1976 survey crew was not able to get permission from the new land owner to relocate the site.

A site (20-AE-15) was reported in the NW \( \frac{1}{4} \) of the NW \( \frac{1}{2} \) of Section 6, Manlius Township. The 1976 survey crew was not able to relocate this site, but its reported location is just north of the Yates site (KBS-76-22B). Due to the proximity of this reported location to the Yates site it seems quite likely that they are actually one and the same.

The Nordhof site (20-AE-13) occurs along the base of the bluff on the north side of the Kalamazoo River. It was not relocated by the 1976 survey crew.
CHAPTER V

The 1976 survey located 24 previously unreported archeological sites, or in some cases revised site locations which had not been previously field checked. The following sites are discussed in the order of their Kalamazoo Basin Survey file numbers. These site locations are illustrated in Figure 4.

KBS-76-1 Saugatuck Twp., SE\(\frac{1}{4}\) of the NW\(\frac{1}{4}\), Section 23, T3N, R16W

The site is located on a sandy bluff overlooking a small, unnamed creek which feeds into the Kalamazoo River. The Kalamazoo River is approximately 700 yards to the north of the site. The elevation of the site is 620 feet above sea level. The site is located on Plainfield Loamy Sand, which is associated with climax vegetation consisting of oak and mixed hardwoods. However, the site occurs within a general soil association supporting large stands of white pine. There was a scatter of lithic debris over an area of approximately 100 square yards. One broken projectile point tip (type indeterminate) was found, representing a broad (3 cm.) bifacial tool. Two flakes had been unifacially
retouched. The chert debitage is all white-to-blue grey local varieties.

There was not enough diagnostic material recovered to allow for temporal assignment. Based upon its small size, this site probably represents a short-term hunting camp.

KBS-76-2 Saugatuck Twp., SE\textsubscript{\%}, NW\textsubscript{\%}, Section 23, T3N, R16W

The site is represented by a few flakes and fire cracked rock scattered along the west side of 63\textsuperscript{rd} Street. This location is approximately 3,000 feet south of the Hacklander site, which is located on the Kalamazoo River. The site lies in a fallow field of Plainfield Loamy Sand. This site occurs at 615 feet of elevation and covers an area of approximately 200 square yards. This was apparently a campsite, but nothing can be said of its temporal placement or cultural affiliations. The site was reported by Craig Steketee, a Western Michigan University student and long-time resident of the area, who commented that he had never recovered any actual artifacts from this site.

KBS-76-3 Saugatuck Twp., SW\textsubscript{\%}, SW\textsubscript{\%}, Section 22, T3N, R16W

KBS-76-3 is located at the northeast corner of the intersection of 66\textsuperscript{th} and 128\textsuperscript{th} Streets. The 1976 survey
crew was led to the site by Craig Steketee. Several blowouts of Plainfield Loamy Sand, located within an area of pine trees, yielded a light scatter of chippage and fire cracked rock. The site is located within 50 feet of an intermittent creek bed and at an elevation of 670 feet. The site area of approximately 1,000 square yards did not contain any artifacts. There were no apparent concentrations of material. The site was probably occupied intermittently as a campsite, although it cannot be assigned to any temporal position.

KBS-76-4 Saugatuck Twp., SE\% \text{, SW\%}, Section 22, T3N, R16W

Craig Steketee reported finding a kaolin pipe in this blowout of Plainfield Loamy Sand located at the northwest corner of the intersection of 65^{th} and 128^{th} Streets. The site, which is at an elevation of 670 feet, contained only three flakes and several unidentifiable bone fragments. The nearest source of water is an intermittent creek about 50 feet northwest of the site. The site was probably an overnight campsite of the Historic period.

KBS-76-5 Saugatuck Twp., SW\%, SE\%, Section 15, T3N, R16W

This site, which is located north of 130^{th} Street at the end of 65^{th} Street, was identified by Craig Steketee.
He reported finding several corner- and side-notched projectile points. The site area is about 400 yards south of the Kalamazoo River in a fallow sandy field. The survey crew was able to find only a single flake and could not determine the areal extent of the site. Based upon Mr. Steketee's description (we were unable to examine his collection) the site was probably a short-term Late Archaic hunting camp.

KBS-76-6 Saugatuck Twp., NE1/4, SE1/4,
Section 22, T3N, R16W

The Wolbrink site is located high on a sandy bluff forming the west bank of Peach Orchard Creek. The 5,000 square yards of scatter constituting this site were found between 64th Street and the bank of the creek. The sandy (Plainfield Loamy Sand) bluff is 20 to 30 feet above the creek at an elevation of 630 feet above sea level. This location is about 4,000 feet south and upstream from the confluence of this creek and the Kalamazoo River. According to Craig Steketee most of the site area had been previously covered by climax hardwood forest, but had been cleared recently for a powerline. A large amount of chippage, fire cracked rock and some ground stone materials were recovered from the surface.

The artifacts recovered from the site include a corner-notched projectile point, Meadowood-like, which
had been reworked into a hafted scraper, two convex-based knife fragments, two bifacial preforms, one projectile point tip, and one parallel-sided bifacial fragment. There were 11 flakes exhibiting a small amount of unifacial retouch, as well as nine cores and core fragments. A pitted mano and a sandstone abrader were also recovered from this site. It probably represents an intensively occupied Late Archaic base camp.

KBS-76-8 Manlius Twp., NE\( _4 \), SW\( _4 \), Section 8, T3N, R15W

The Malus site is located on a sandy knoll in the middle of a cultivated field, approximately 100 yards north of the bluff overlooking the Kalamazoo River. Although this 250 square yard knoll was composed of very fine loamy sand, the surrounding area was overlain by an imperfectly drained loamy material. The scatter of fire cracked rock and lithic debris was limited to the knoll itself. The site was about one third of a mile north of the Kalamazoo River at an elevation of 750 feet. The artifacts recovered include a large expanding-stemmed projectile point, two small pieces of grit-tempered pottery (one cord-marked and the other plain), one sloping retouch end scraper, a small wedge with unifacial
retouch along one edge, one core fragment and two flakes showing slight unifacial retouch. There were several smooth stones which exhibited varying degrees of battering and/or pitting. This site was probably used as a short-term hunting camp during Woodland times. There is not enough evidence to ascribe this site to a specific Woodland period.

KBS-76-10 Manlius Twp., SE¼, SW¼, Section 8, T3N, R15W

The Mallis site is located in a low area of sandy loam at the base of a steep bluff on the north side of the Kalamazoo River across from New Richmond. The bluff is stabilized by climax vegetation consisting of hardwoods, predominantly oak. This site lies near the mouth of an unnamed creek, but today is separated from that creek by railroad tracks. The creek currently occupies the western border of the Rabbit River's glacial channel. The old channel of the Rabbit River is predominantly swamp forest with swamp oak, soft maple, elm and sycamore. The site was located within a small garden plot, 400 square yards in size, which had recently been plowed. The scatter was very light, only a dozen flakes and artifacts occurring within the plowed area. The artifacts include one core and two core
fragments as well as two gravers, one large perforator made from a block core fragment and a smaller one made from an extensively reworked triangular, side-notched projectile point. The site was probably a short-term campsite occupied during the Late Woodland period. Its location would suggest the utilization of this site for the exploitation of seasonally available resources associated with the alluvial bottomland environment.

KBS-76-11 Saugatuck Twp., NE\(\frac{1}{4}\), SW\(\frac{1}{4}\), Section 24, T3N, R16W

The Johnson site is located on a sandy bluff overlooking the Kalamazoo River to the north and a small unnamed creek to the east. The area of the site is currently under cultivation, and had recently been plowed. The site is approximately 100 yards from the creek and 700 yards from the Kalamazoo River, at an elevation of 620 feet. The lithic scatter covered an area of 56 acres, paralleling the bluff line adjacent to the Kalamazoo River. Although the cultural debris covered a large area, the density of material was relatively light. This type of continuous linear scatter may reflect "repeated reoccupation or continuing occupation over some time of the same locality (that is, the sand ridge) but not reoccupation of a specific site.

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locus" (Struever 1968:292). There was a field stone house located on the northwest corner of the site around the turn of the century. A large amount of cultural debris was present at this locus, including several kaolin pipe fragments and an 1862 five-cent piece.

Artifacts recovered from the prehistoric components of the site include: two side-notched projectile points with convex bases; one stemmed projectile point with a broken tip; one large corner-notched projectile point; one large triangular projectile point tip; one large ovate projectile point tip with a nipple; two simple tapered drills; three bifacial preforms; five bifacial knives; two end scrapers; one unifacial tool with four beaker-like facets; two gravers; and four wedges. In addition there were 40 flakes exhibiting small amounts of unifacial retouch and 23 cores and core fragments. There were very few groundstone tools and these were very fragmented as a result of fire cracking.

The fact that cores and preforms make up 27% of the total artifact assemblage collected from the surface of this site would argue that a fair amount of flint knapping was being performed at this location. The nature of the lithic industry combined with the extensive (diffuse) nature of the settlement, itself, seems to
parallel the situation proposed by Taggart (1967) for the Feeheley site. Taggart infers a summer season occupation for the Feeheley site. The location of the Johnson site on an exposed sandy bluff overlooking the Kalamazoo River, with its continuous linear scatter, would favor the conclusion that this site represents repeated reoccupation, during the summer season, by a relatively small band.

KBS-76-12 Manlius Twp., SW¼, NE¼, Section 17, T3N, R15W

Site KBS-76-12 was found on a high bluff of Plainfield Loamy Sand overlooking the Kalamazoo River, which lies to the north of the site. The site is about 50 feet above the river, at an elevation of 625 feet above sea level. The area is characterized by climax oak forest with some pockets of pine. The ground cover was fairly dense. The cultural material was limited to the backfill from a foundation which had recently been excavated for the owner's small fabricated metal cottage. It was not possible to accurately assess the areal extent of the site. It appears that the site is buried and the owner happened to put his cottage on part of the site. The artifacts recovered include: two pieces of grit-tempered pottery, one cord-marked and one plain
sherd; a small projectile point with convex sides and concave base; two flakes with a small amount of bifacial battering; and three flakes showing slight unifacial retouch.

Since it was not possible to determine the areal extent or approximate debris density for this site, little can be said concerning its functional context. It is a Woodland site, quite possibly Late Woodland. There was one piece of historic pottery found at the site, a blue print bordered dish fragment.

KBS-76-13 Manlius Twp., NE¼, SW¼, Section 17, T3N, R15W

The Lamoreaux site is located within a series of sand blowouts on a high Plainfield Loamy Sand bluff overlooking the Kalamazoo River floodplain to the north and west. Situated at an elevation of 650 feet, the site is within 1,000 feet of the river itself. The site contained a light scatter of chippage and fire cracked rock. The only artifacts recovered were a wedge and a flake with a slight amount of retouch along one edge. The site may have been reoccupied periodically as an overnight hunting camp, but cannot be tied to any specific prehistoric period.
KBS-76-14 Manlius Twp., SE%, NW%, Section 20, T3N, R15W

KBS-76-14 is located within a heavily forested area of climax vegetation, primarily oak, on Plainfield Loamy Sand. The site was found within a wide cut through the area for the Consumers Power Company line. There were only 19 flakes found under the power line at a location 2,000 feet southeast of the Fennville site (20-AE-54). The location of the Fennville site is also the nearest source of water. The site is at an elevation of 630 feet and was probably a short-term campsite. There were no artifacts found at this location. The scatter was limited to an area of 400 square yards. It was not possible to ascertain whether or not the site extended into the adjacent forest due to the low visibility.

KBS-76-15 Manlius Twp., NW%, NE%, Section 19, T3N, R15W

The Weiderhamer site is located on a high sandy bluff overlooking the Kalamazoo River floodplain to the north and east. The area is currently a pine tree plantation. The only open ground was a footpath along the bluff between the rows of trees and the bluff's edge. A small amount of chippage and two plain pieces of grit-tempered pottery were found on the footpath, as
was a triangular projectile point tip. The areal extent of the site was not determined due to the heavy ground cover of pine needles. It appears to have been a short-term Late Woodland campsite, occurring at an elevation of 630 feet. This site could be a western extension of the Fennville site.

KBS-76-16 Manlius Twp., NE₁⁄₄, SW₁⁄₄, Section 19, T3N, R15W

KBS-76-16 is located along a sand ridge on the south bank of the Kalamazoo River at an elevation of 625 feet. A large amount of fire cracked rock and lithic debris was found within a series of blowouts extending nearly a quarter of a mile along this ridge. The present day river channel is approximately one mile to the north, separated from the site by marshland. The artifacts recovered from the site include five cores or core fragments, 14 flakes showing a slight amount of unifacial retouch, two end scrapers, two wedges, three bifacial scrapers (or knives), and the base from a side-notched projectile point. The lack of projectile points recovered from this site is probably due to extensive collecting by local relic hunters.

The site appears to have been a seasonally reoccupied campsite for the exploitation of the adjacent
marshland. The occupation appears to have been extensive rather than intensive. The site could represent a Late Archaic summer campsite, given its location on an exposed sand ridge along the high banks of the Kalamazoo River.

KBS-76-18 Manlius Twp., SW¼, NW¼, Section 18, T3N, R15W

KBS-76-18 is a sand blowout along a ridge situated on the north bank of the Kalamazoo River at an elevation of 630 feet. It is located within 100 yards of the Kalamazoo River. Only a light scatter of lithics and fire cracked rock was found at this site, confined to an area of 500 square yards. The only artifact recovered was a flake showing unifacial retouch on the distal end. The site was probably a short-term campsite, but it is not possible to assign it to any temporal period. The chert all appears to be from local deposits of glacial drift.

KBS-76-19 Saugatuck Twp., SE¼, NE¼, Section 13, T3N, R16W

The Schwerdt site is located on a high sand bank on the outside of a meander bend in the Kalamazoo River, at an elevation of 620 feet. The site is presently
eroding out of the bank, about 30 feet above the river. There is a very distinct midden deposit buried beneath more than a foot of sterile Plainfield Loamy Sand. The midden itself is two to nine inches thick and extends at least 125 yards along the bank. The owner would not permit any sub-surface testing. Therefore, the survey crew could not determine how far back from the bank the site extended. A cultivated field commencing 130 feet north of the bank did not contain any cultural debris, except for one Levanna point found in the northeast corner of the field approximately 640 yards away from the bank. Thus, its association with the site is uncertain. The lack of material in the plowed field may indicate that the site does not continue far inland, but it is also possible that the midden is below the plow zone in this area.

There were very few surface indications of the site. All of the material collected was found eroding out of the bank. The material collected includes four plain, grit-tempered body sherds; eight cord-marked, grit-tempered body sherds; one thickened lip, grit-tempered sherd; the base of a large biface (perhaps a knife); and a wedge. Several pieces of bone were found in the bank, including the pelvis and femur of an opossum and a deer.
bone. The site appears to be an extensively occupied Late Woodland encampment. It appears that hunting was one of the subsistence activities, and based on its exposed location it can be inferred to be a summer season occupation.

KBS-76-21 Saugatuck Twp., SE¼, SE¼, Section 24, T3N, R16W

The Collis site is located on an upland plateau of Rimer Sandy Loam approximately 3,000 feet south of the Kalamazoo River. An intermittent creek is located 1,000 feet due west of the site. The site exhibits a light scatter of chippage, covering an area of 400 square yards at an elevation of 640 feet. The area is currently under cultivation. The artifacts recovered from this site include: a side-notched, basally ground, ovate projectile point; two unifacial scrapers; and a block core. KBS-76-21 probably represents a short-term Late Archaic hunting camp.

KBS-76-22A Manlius Twp., SW¼, NW¼, Section 6, T3N, R15W

KBS-76-22A is located on a pine forested sandy ridge which runs along a north-south axis through Section 6. The fields on both sides of this ridge are
unsorted glacial till with a fairly heavy clay content and imperfect drainage. The nearest permanent source of water is the Kalamazoo River, two miles to the south. The site is at an elevation of 735 feet. The scatter of chippage and fire cracked rock is limited to an area of 250 square yards. There are several blowouts in the vicinity of the site. The artifacts include three plain, grit-tempered sherds; three wedges; four flakes exhibiting slight unifacial retouch; and a large ovate, basally ground, biface made of slate. This ridge may have been used as a temporary hunting campsite during the Woodland period.

KBS-76-22B Manlius Twp., SW\%, NW\%, Section 6, T3N, R15W

The Yates site is located to the north of KBS-76-22A along the same sandy ridge at an elevation of 735 feet. There was a scatter of lithics and fire cracked rock in a plowed field covering an area of 300 square yards. The artifacts recovered include: three bifacial knives; two wedges; 11 flakes exhibiting varying degrees of unifacial retouch; two crude bifaces; and four core fragments. The nearest source of permanent water is two miles away at the Kalamazoo River. There was a fairly extensive scatter of chippage indicating that this site
was repeatedly occupied for short periods of time. It was probably used as a hunting campsite during the Archaic period.

KBS-76-23 Manlius Twp., SE¼, NW¼, Section 7, T3N, R15W

KBS-76-23 is located in an area of sand blowouts just south of man-made Sharp's Lake. The site is represented by about a 100 square yard scatter of fire cracked rock and chippage within a blowout. The blowout is near a tree line of hardwoods, predominantly oak. There was approximately twice as much fire cracked rock as lithic debris. There were no artifacts recovered from this site. The nearest source of permanent water is the Kalamazoo River a mile to the south. The elevation at this site is 735 feet. The area is part of a north-south oriented sand ridge of Plainfield Loamy Sand. This is the same ridge mentioned above for sites KBS-76-22A and 22B. The site was probably utilized as a short-term campsite for a small group. The absence of artifacts and little lithic debris observed may be due to the activity of local collectors.

KBS-76-24 Manlius Twp., SE¼, NW¼, Section 7, T3N, R15W

The Sharp's Lake site is located on a sand ridge amongst a group of pine trees on the north side of this
man-made lake. The 1928 USGS quadrangle map shows the area of Sharp's Lake to have been a depression; probably a large blowout. A scattering of fire cracked rock and chippage covered an area of 400 square yards, at an elevation of 740 feet. Two small grit-tempered sherds and one flake showing a slight amount of unifacial retouch were recovered from this site. One chert core was also found. Given the relatively light amount of scatter, this site was probably occupied for only a short period of time by a small group. It appears to have been a Late Woodland hunting camp.

KBS-76-25 Manlius Twp., SE₁, NW₂, Section 7, T3N, R15W

KBS-76-25 is located along the same sand ridge as the four previously mentioned sites. The fairly light scatter of chippage and fire cracked rock was found in a plowed field northeast of Sharp's Lake, at an elevation of 735 feet. The scatter was extensive in nature covering an area of 200 square yards. The artifacts recovered include: a convex-based projectile point; another biface fragment; a chert wedge; and three chert flakes exhibiting a small amount of unifacial retouch. This site was probably a seasonally reoccupied hunting camp for a small group or a short-term campsite for a somewhat larger band during the Late Archaic.

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KBS-76-26 is located on a wooded sandy ridge running along the southern border of the Brink property. This is the same ridge of Plainfield Loamy Sand which has been noted above. The site consists of a series of small blowouts within the trees along this ridge. Since visibility was limited to the blowouts themselves, it is difficult to determine whether this is one continuous, extensive occupation or several separate campsites. Given the overall pattern of sites located on this ridge and the fact that the nearest source of permanent water is the Kalamazoo River, a mile or more to the south, the later alternative appears to be the most likely. A relatively light scatter of chippage and fire cracked rock was found within six different blowouts at an elevation of 740 feet. The only artifacts collected were a chert drill; ten chert cores; and eight chert flakes with a small amount of unifacial retouching. This site was probably repeatedly occupied (as apparently was the entire sand ridge) during the Late Archaic period. The area was probably favored for use as a temporary hunting campsite. The ridge itself marks the boundary between the sandy soils associated with the lake shore to the
west and the more stable, and fertile, loamy soils to the east. The sandy soils were generally limited to the non-climax white pine forests while the loamy soils generally supported a climax oak-pine forest. Thus, the location of these sites along this ridge would provide ready access to two quite different vegetal resource zones.

KBS-76-27 Manlius Twp., SW¼, SE¼, Section 7, T3N, R15W

Although KBS-76-27 is also located on the Plainfield sand ridge, there is a significant difference between this site and the others found on this landform. This site is located on the west bank of an unnamed creek which runs directly into the Kalamazoo River. Chippage and fire cracked rock were scattered lightly over an area of 100 square yards within a blowout, at an elevation of 685 feet. Three small fragments of mussel shell were found on the surface of the site. In addition, one thumbnail scraper and two unifacially retouched flakes of chert were collected. This site is located along the western edge of the ridge at an elevation some 50 to 60 feet lower than the crest of the ridge where the other campsites were found. Therefore, it was situated well within the white pine forest which would not have
provided as many hunting and gathering opportunities as the climax forest to the east. The site appears to have been a short-term campsite for the specific purpose of exploiting the resources of the small creek.

KBS-76-29 Saugatuck Twp., NE¼, NW¼,
Section 22, T3N, R16W

The Bild site is located within a sand blowout along the east bank of a small unnamed creek which flows into the Kalamazoo River to the north. Although there is a plowed field just to the east, the survey crew was not able to find any cultural debris in this field. Therefore, the site itself is restricted to a stand of pines at an elevation of 620 feet. A light scatter of chippage, fire cracked rock and some ground stone fragments was found within an area of 500 square yards. A chert wedge, a chert core, and three flakes of chert exhibiting a slight amount of unifacial retouch were collected from the site. The site was probably a short-term campsite, perhaps seasonally reoccupied, which was utilized to exploit the resources associated with the creek, during the Late Archaic period.
CHAPTER VI

Paleo-Indian

The only evidence for Paleo-Indian occupation of the survey area was the identification of a "Clovis" point in a farmer's collection. The collection was owned by J. Kollar who reported finding the point in the steep bank of a tributary to the Kalamazoo River. This location in the SE\(\frac{1}{4}\) of the NW\(\frac{1}{4}\) of the NW\(\frac{1}{4}\) of Section 30, Manlius Township, was investigated by the 1976 survey crew. A Consumers Power Company line crossed the creek at this location, but the area was heavily overgrown and the site could not be verified.

Archaic

There was a notable lack of sites from the Early and Middle Archaic periods. There are collectors in the area who possess artifacts from these cultural periods, but the 1976 survey was unsuccessful in identifying the location of sites from these periods.

There is a recognizable increase in the number of sites attributable to the Late Archaic time period. The sites found during the 1976 survey which contained Late
Archaic components include:

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<tr>
<td>A27</td>
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<td>KBS-76-6</td>
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<td>KBS-76-26</td>
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<td>KBS-76-29</td>
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There are also a large number of aceramic sites which may actually be Late Archaic sites. 100% of the positively identified Late Archaic sites were located on a loamy sand soil, either the Plainfield or Rimer association. Six of these sites were situated on either a ridge or bluff top overlooking the Kalamazoo River or one of its tributaries (A27, KBS-76-5, 6, 11, 16, and 29). Sites KBS-76-22B, 25, and 26 were located along a ridge of Plainfield Loamy Sand which marked the boundary between the sandy soils associated with the lake shore to the west and the more stable, and fertile, loamy soils to the east. Thus these sites would have been located between two distinct vegetal resource zones; the white pine and Beech-Maple-Hemlock associations toward the lake and the climax hardwood forests to the east, such as the Pine-Oak and occasional pockets of Oak-Hickory forest. This would allow for an effective utilization of a broad range of plant and animal resources associated with these distinctive zones and would lend support to the idea that Late Archaic people in the Kalamazoo Basin employed a broad-spectrum economy. The
Collis site (KBS-76-21) was the only site not located along a ridge or bluff crest, yet it is still within the Plainfield Loamy Sand association and is within a few thousand feet of the bluff crest overlooking the Kalamazoo River.

The occurrence of long linear scatters along sand ridges during the Late Archaic/Early Woodland period has been noted by Struever (1968). He maintains that the occurrence of these site loci on sand ridges within the Lower Illinois River Valley floodplain does not represent an intent to exploit, intensively, the aquatic resources of the river valley. Indeed the excavation of the Black Sand component at the Peisker site lacks fish remains and indicates a heavy reliance on a wide variety of land mammals. Thus, this seems to demonstrate the existence of a diffuse economy during the Late Archaic/Early Woodland. The occupation of the sand ridges themselves represents an attempt to occupy high well-drained ground.

In the Saginaw area of Michigan, the fish bone remains from the Feeheley and Hart sites indicate a seasonal fishing pattern during the Late Archaic. The Schmidt site evidence indicates a seasonal pattern of hunting during the same period. On the basis of the
evidence, Cleland (1966) has labeled this adaptation as being diffuse. This diffuse economy is based upon an ability to exploit a variety, or broad spectrum, of resources. Unfortunately we still do not have excavated data concerning Late Archaic subsistence practices in southwest Michigan. But given the occurrence of diffuse economics being employed to the west (Saginaw) and to the south (the Illinois River Valley) in similar biotic zones, it can be inferred that the Late Archaic populations in the Kalamazoo River Valley were also employing a diffuse economy.

The use of a broad-spectrum resource base would imply a pattern of seasonal movements (or rounds) for the exploitation of seasonally available food resources. Fitting (1969) suggests a pattern involving winter population concentrations and summer population dispersions for the Late Archaic period to accommodate an overall population increase. Although the majority of the Late Archaic sites in the survey area appear to be a series of light scatters indicating repeated occupations over longer periods of time, the Wolbrink site (KBS-76-6) would seem to fit Fitting's idea of a winter encampment. Its occurrence along a sheltered bank of Peach Orchard Creek well upstream from its confluence
with the Kalamazoo River would seem to be an ideal location during the harsh winter months. The large amount of debris over a moderately sized area indicates a relatively stable occupation by a somewhat larger group. The occurrence of a series of smaller sites (i.e. KBS-76-22B, 25, and 26) along an upland sand ridge separating two distinct micro-environments would seem to indicate a period of dispersion, perhaps during the summer months.

It can thus be proposed that during the Late Archaic/Early Woodland period in the Lower Kalamazoo Valley there was an overall population increase. During this period, perhaps in response to population pressure, there was a seasonal pattern involving population concentrations in the winter months and dispersal in the summer months. This pattern would have involved the utilization of a diffuse economy for harvesting a wide range of seasonally available plant and animal foods. Locational analysis alone can do little to verify or refute these propositions. We still need to collect hard data concerning specific plant and animal exploitation patterns at individual loci.

Middle Woodland

Our 1976 survey did not identify any recognizable Middle Woodland sites in the transect area. The
excavations at the Hacklander site did indicate a limited Middle Woodland component. During the Middle Woodland period there was a shift from the "broad spectrum system" to a system of "maximizing adaptations" (Struever 1968). This shift involved the selective exploitation of those natural plants and animals that could be harvested efficiently and with resulting high yields. This system during the Middle Woodland appears to be limited to those riverine environments with extensive floodplains, shallow river channels, low gradients and poorly developed natural levees. In these situations you would get annual flooding. These conditions are much more closely approximated in the Grand, St. Joseph, and Muskegon River Basins than in the Kalamazoo Basin. This may have a direct bearing on the apparent lack of recognizable Middle Woodland sites in the Kalamazoo Basin as opposed to the other river basins. This could be the result of a partial abandonment of the Kalamazoo Basin in preference for those river valleys where "intensive harvest collection" could be more efficiently practiced, or it may be that the Middle Woodland period occupations in the Lower Kalamazoo Basin are not easily distinguished from Early and/or Late Woodland occupations on the basis of current artifact typologies.
Late Woodland

There were eight sites identified as Late Woodland in the 1976 survey area:

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<th>A26</th>
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<td>KBS-76-24</td>
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<td>A24</td>
<td>KBS-76-19</td>
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In addition three "Woodland" sites are very likely Late Woodland campsites (KSB-76-8, 10, and 12). All 11 of these sites were found in association with a sandy loam soil. Of these sites, five appear to have been somewhat more intensively occupied campsites (A15, 18, 26, KBS-76-15 and 19) while the others appear to be short-term campsites. Two of the larger sites are located along the shoreline of the Kalamazoo River, two others are located on the river bluff crests, with the third situated on a tributary bluff crest. Half of the short-term campsites were located within the dissected uplands away from the river basin. Two of the short-term campsites were located along the river bluff crest, with a third being located along the river shoreline.

Superficially, this collection of sites would seem to resemble the Ottawa settlement pattern proposed by Fitting and Cleland (1969) for the transition zone between the Carolinian and Canadian biotic provinces. The pattern is represented by larger agricultural
villages, which were occasionally moved, and smaller limited activity sites for hunting and/or fishing. The smaller hunting and fishing camps would have been occupied by a predominantly male group during either winter or summer. Thus, the larger base camp would be occupied by women, children and older men year round, with the males only occupying the camp occasionally. The predominantly male hunting and fishing parties would be expected to bring meat back to the base camp in a processed form. Fitting and Cleland feel that the archeological evidence for this sexual imbalance in population composition would be revealed in the ratio of ceramics to stone tools and cores. Thus the base camp would be expected to have a preponderance of ceramic vessels as compared to stone tools, while the male hunting and fishing camps would have little or no ceramics at all.

There are some problems in terms of trying to describe the pattern of site locations in the 1976 Kalamazoo Basin survey area with respect to the Fitting and Cleland model. There does not appear to be a sexual imbalance in terms of the composition of any of these sites. To the extent that such ratios can be applied to data from surface collections, the ratio of ceramics to
stone tools seems to indicate a relatively homogeneous population at these sites. Secondly, we do not as yet have any strong evidence for the use of agriculture at any of these somewhat larger campsites. Thirdly, it appears, based upon excavated data from the Hacklander site, that even these larger campsites were occupied seasonally. The early Late Woodland component at the Hacklander site appears to have been occupied during the late spring-summer-early fall seasons.

The Lower Kalamazoo River Valley is, even by modern standards, submarginal for agricultural purposes. Therefore, it is quite likely that early attempts at agriculture in the area may have been abandoned. As a result, the settlement pattern of the Lower Kalamazoo River may have more closely resembled the Chippewa pattern described by Quimby (1962) and elaborated by Fitting and Cleland (1969). This pattern involves the summer season occupation of larger base camps centered around the exploitation of aquatic resources of the lakes and rivers. These camps would have been occupied by a number of families with individuals of both sexes being present. In the winter and early spring the smaller family units would occupy smaller sites at a variety of locations which tended to be further inland away from
lakes and major river valleys. These smaller camps would still maintain a balance between numbers of males and females.

Although we lack the necessary data to accurately determine either seasonality or mode of subsistence for most of these sites, the Hacklander and Schwerdt sites would seem to fit the Chippewa pattern for the larger base camps occupied during the summer. Based on excavations at the Hacklander site and preliminary testing of the Schwerdt site conducted since the 1976 survey, it appears that both sites contain Late Woodland components which were occupied during the summer season and were centered around the exploitation of aquatic resources (Cremin 1977, Kingsley 1977, and Martin 1977). Since we have not done any subsurface testing of the smaller Late Woodland hunting camps discovered within the transect area we cannot make any statements concerning seasonality or subsistence activities. But Rogers (1972) identifies a Late Woodland village a few miles upstream as belonging to the Chippewa winter settlement pattern. The 46th Street site is a fairly small site, comprising an area of about 34,000 square feet as compared to nearly 130,000 square feet for the Schwerdt site. The 46th Street site appears to have been a winter hunting
camp. Thus, initially, there appears to be some evidence to indicate that the Late Woodland occupants of the Lower Kalamazoo River Valley had adopted the Chippewa settlement pattern, which was more commonly found to the north in the Canadian biotic province. It should be noted that alternative models for the Late Woodland settlement patterns of this region have been proposed (Cremin 1977, Fitting and Cleland 1969). Unfortunately the scant data available at this time do not verify one model over the others. Further testing of the smaller Late Woodland campsites found in the valley will be necessary, with an eye to acquiring information concerning specific subsistence practices and season of occupation.

Aceramic

In addition to the 20 sites discovered which could be assigned to a specific cultural period, there were 15 sites which yielded varying amounts of lithic debris, but no diagnostic artifacts or pottery. Since these sites did not contain any ceramic material it is, of course, tempting to write them off as Archaic hunting camps. But this would be a serious bias against the possibility of primarily male hunting groups occurring in the Woodland period. It can be noted that these 15
sites all tended to be rather small in area with only a light amount of lithic debris occurring on the surface. Furthermore, these sites tended to occur within any and all physiographic and vegetal resource zones, although they were all associated with sandy soil types such as Plainfield Loamy Sand.
CHAPTER VII--CONCLUSION

The prehistoric inhabitants of the Kalamazoo River Valley have displayed a wide variety of settlement patterns in response to changing natural environments and changing patterns of cultural complexity in the Eastern Woodlands as a whole. We still have little hard data upon which to base our interpretations, but the settlement patterns I have presented for the Lower Kalamazoo River Valley can be summarized below:

1. Paleo-Indian settlements tend to be located in open parklands of spruce, where band groups would gather for hunting activities (Fitting 1969). Unfortunately, our initial survey has not shed any further light on Paleo-Indian settlement in the Kalamazoo River Valley.

2. Early and Middle Archaic settlement patterns remain unknown in the valley, probably because of sparse population at that time.

3. Late Archaic/Early Woodland settlement systems indicate a preference for locating sites along the sand ridges which occur in both the upland and river bluff crest contexts. A diffuse economy was employed which utilized a seasonal pattern involving population concentrations in the winter months and group dispersal in the summer months.

4. Middle Woodland sites were not identified by the 1976 survey. There was a general shift to a system of "maximizing adaptations" which was specifically suited to riverine environments with extensive floodplains, shallow river channels, low gradients, poorly developed natural levees and annual flooding.
The lack of these features in the Lower Kalamazoo River Basin may have kept recognizable Middle Woodland populations employing this system to a minimum in the valley.

5. The Late Woodland settlement system appears to most closely resemble the Chippewa pattern more commonly associated with the Canadian biotic province to the north. The lack of agricultural potential may have forced the prehistoric inhabitants to adopt this pattern of larger summer base camps centered around the exploitation of aquatic resources and winter dispersal into small bands exploiting a variety of available resources.

This series of propositions concerning prehistoric settlement patterns in the Lower Kalamazoo River Valley can be seen as a somewhat speculative model. As such it is not intended as a definitive statement for the valley. Rather it can be seen as a set of specific questions to be answered during the course of future research in the Kalamazoo Basin. As this work continues certain propositions hopefully will be replaced by more up-to-date questions in the ongoing process of scientific inquiry.

It is apparent that the attempt to delineate prehistoric settlement systems as adaptations to the natural environment has just begun. Not only do we need more data concerning specific subsistence activities at various locations during well defined cultural periods,
but we will have to generate a better ecological data base in order to come to grips with the interactions between prehistoric societies and the environmental variables which make up the settlement system.
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