1982

12-An Archaeological Survey of the Thornapple River Basin in Hastings and Castleton Townships, Barry County, Michigan

William C. Cremin
Western Michigan University

Caven P. Clark

Report Number: 12

DEPARTMENT OF ANTHROPOLOGY
WESTERN MICHIGAN UNIVERSITY

ARCHAEOLOGICAL REPORT NO. 12
1982

AN ARCHAEOLOGICAL SURVEY OF THE THORNAPPLE RIVER BASIN IN HASTINGS AND CASTLETON TOWNSHIPS, BARRY COUNTY, MICHIGAN

WILLIAM M. CREMIN
CAVEN P. CLARK

DEPARTMENT OF ANTHROPOLOGY
WESTERN MICHIGAN UNIVERSITY

ARCHAEOLOGICAL REPORT NO. 12
1982

AN ARCHAEOLOGICAL SURVEY OF THE THORNAPPLE RIVER BASIN IN HASTINGS AND CASTLETON TOWNSHIPS, BARRY COUNTY, MICHIGAN
PROJECT NO. S81-158

WILLIAM M. CREMIN
CAVEN P. CLARK

ACKNOWLEDGEMENTS

This project has been funded, in part, through a grant from the United States Department of Interior, Heritage Conservation and Recreation Service (under the provisions of the National Historic Preservation Act of 1966) through the Michigan Department of State.

The authors wish to express their appreciation to Ms. Andrea Allen, the third member of our survey team, and to the residents of the Barry County research area who so willingly assisted us in the collection of information regarding the archaeological resources of the Thornapple River Basin.

CONTENTS

FIGURES

TABLES

1. Archaeological Research in the Thornapple River Basin of Barry County, Michigan

When the Thornapple Basin Survey program commenced in 1979, the Barry County site files indicated the presence of only 64 archaeological sites in this area of the state. However, it was also quite apparent from the available data in the site files as well as from information provided by the Michigan History Division that no program of systematic archaeological research had ever been conducted in the county. And, clearly, this was a situation that the MHD desired to have remedied.

Aside from the interest expressed by the State Archaeologist, Dr. John Halsey, and his staff in having a program of systematic site location survey initiated in the Thornapple River Basin, the senior author, Dr. William Cremin of Western Michigan University, also was anxious to expand WMU's survey activities beyond the nearby Kalamazoo River Basin. After four years of systematic survey in portions of this drainage, Cremin recognized the need for creating a data set for comparison with the growing body of information generated by the Kalamazoo Basin Survey; a need which has only increased with the recent completion of this survey program. Now, with a data set derived from more than 350 prehistoric sites occurring in 135 km^2 of the basin surveyed, it has become absolutely essential that comparative information from other drainages in southern Lower Michigan be made available in order that predictive models of prehistoric settlement and subsistence behavior emerging for this universe (and other areas in this portion of the state) might be rigorously tested.

With this thought in mind, and responding to the request of MHD that a proposal be submitted for initiating site survey in the Thornapple River Valley, Cremin and his associates began a literature/documents search and examination of the Barry County site files, evaluated the available information, and established a series of research objectives to guide TBS Phase I activities in 1979 as well as to provide a basis for long term systematic survey in this universe in future years.

2. The Project Area

Barry County is situated east of Allegan County and north of Kalamazoo County in southwest Michigan and encompasses an area of approximately 1480 km^2. The western and southern portions of the county lie in the Kalamazoo River Basin, and the remaining portion, aggregating 984 km^2 (66.5%), is drained by the Thornapple River and its tributaries.

The Thornapple River is 119 km long, having its source in Boody Lake about 10.5 km east-northeast of Charlotte in Eaton County. From here the river flows in a northwesterly direction across portions of Eaton, Barry, and Kent Counties before joining the Grand River approximately 16 km east of Grand Rapids. The Grand, in turn, empties into Lake Michigan at Grand Haven, some 43 km north of the mouth of the Kalamazoo River near Saugatuck.

Barry County is heavily dissected throughout, reflecting the presence of the Valpariso Moraine which enters the county from the southwest and expands to dominate the central portion before exiting near the northwest corner of the county. The southwest-northeast trending belts of morainal terrain thin along the western edge and also in the central portion of the county where outwash plains and glacial lake and channel deposits prevail. These areas are dotted with small lakes, most of which drain southward toward the Kalamazoo River.

The Thornapple River, to the north, enters the county on the east near Nashville and exits north of Middleville in northwestern Barry County. Throughout its course across the county, this river, and the smaller streams which are tributary to it, occupies ancient lake beds and glacial spillways. In

effect, this river "breaks the back" of the morainal system which dominates the county's landscape. In eastern Barry County, the Thornapple Valley is flanked by extensive areas of till plain deposits. These are especially prevalent north of the valley in Woodland and Carlton Townships and to the south of the river in Hastings and Maple Grove Townships.

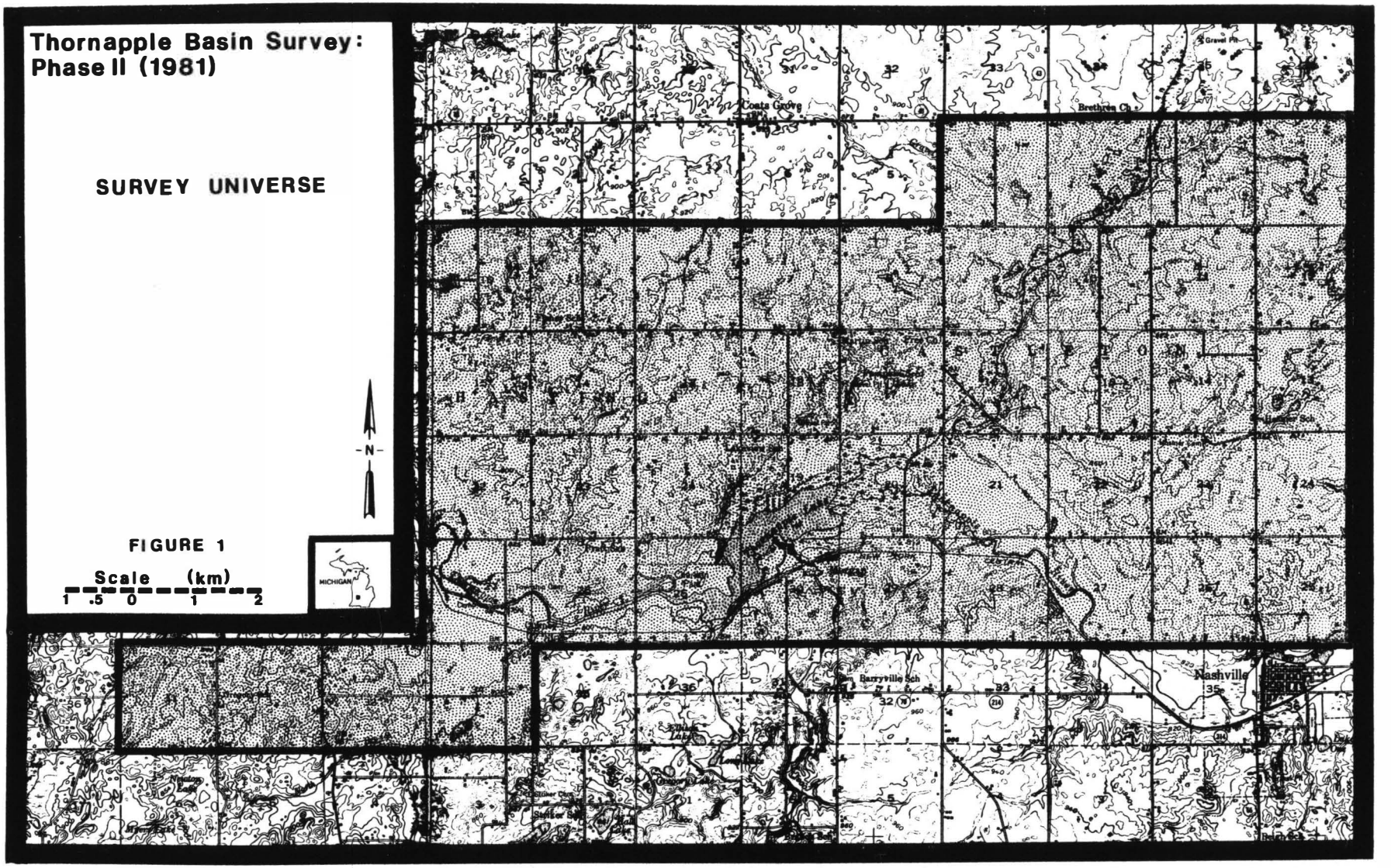
Floristically, at the time of Euro-American settlement the county was characterized by two major plant communities. These were beech-maple forest in the east and oak and oak-hickory forest in the west (Brewer 1979). The distribution of these native plant associations has been observed, in general, to correspond quite closely to the occurrences of till plains in the case of the former, and to moraines, sandy lake beds, and glacial channels and spillways in the case of the latter. However, TBS surveyors have noted that this correlation between landforms and plant communities does not hold for locales occurring within the 1981 research universe, as is clearly illustrated in the discussion of the various sampling strata established for this survey program.

In marked contrast to the situation observed in Allegan County, the Thornapple Basin of Barry County is not noted for extensive swamp associations flanking stream courses. And, when compared with Kalamazoo County, native prairie is almost nonexistent. Furthermore, white pine, which was observed in scattered stands throughout Allegan County and extending into northwestern Kalamazoo County at the time of settlement, has not been recorded in Barry County prior to the recent establishment of pine plantations (Brewer 1979).

Perhaps the most important "environmental" consideration

with respect to the county's potential for archaeological research is the fact that only 15% of the area is developed in ways which effectively prohibit site survey, and that water covers but 3% of the land surface. The remainder is either in forest (26%) or in agricultural production (56%). The specific target for intensive surveyor evaluation during the TBS project, the antecedents of which are to be found in the research design of the Kalamazoo Basin Survey program, is the acreage currently under cultivation; the land which could be anticipated to afford optimal conditions for research employing the methods of walk-over or surface reconnaissance survey.

Within the general area described above, the survey area established for TBS Phase II encompasses approximately 114 km^2 of Hastings and Castleton Townships (Figure 1). The transect commences at the Barry-Eaton County line near Nashville on the east and extends almost to Hastings on the west, providing an overall length of 19.3 km. North-south dimensions vary from 1.6 km to 8.0 km, with the average width of the transect being 5.9 km. Throughout this entire area, surveyors found small to moderately sized fields which afforded reasonably good surface visibility and were accessible to them.


Thornapple Basin Survey:
Phase II (1981)
SURVEY UNIVERSE
N
FIGURE 1
Scale (km)
1 .5 0 1 2
MICHIGAN
Coats Grove
Brethren Ch
Barryville Sch
Nashville

3. Previous Archaeological Research

Prior to the commencement of TBS Phase I in 1979, no significant archaeological research had been undertaken in this drainage or, for that matter, in all of Barry County. A thorough examination of the site files at the University of Michigan (Great Lakes Laboratory, Museum of Anthropology) at that time revealed that a total of only 64 sites had been recorded. Of these, 26 were located and recorded on the basis of brief descriptions in old documents and local histories (Bernard 1967; Johnson 1880; Potter 1912; Weissert 1932); 19 sites were included in Hinsdale's (1931) Archaeological Atlas of Michigan; 17 had been provided by avocational archaeologists, collectors, and individuals affiliated with the Charlton Park Museum, Grand Valley State Colleges, and the University of Michigan; and the remaining two sites were derived from unknown sources.

WMU's program of research in 1979 set out to accomplish three basic objectives. First, the research team was charged with getting data regarding current land use practices and determining the potential for more intensive and systematic archaeological research in the future. Secondly, surveyors were to attempt to confirm/relocate all previously recorded sites and also gather any information regarding the whereabouts of sites and collections which might be known only to area residents and collectors. In this regard, the survey team received information on 25 collector sites in the county, of which a total of six were subsequently confirmed and reported to the state. Finally, surveyors were to undertake limited

surface reconnaissance in selected portions of the basin and county. During this phase of the research, 4.0 km^2 were intensively evaluated with the result being that 22 additional sites were located and collected. Thus, in aggregate, 28 new archaeological sites were recorded with the state as a direct result of the TBS Phase I program in the county (Cremin and McAllister 1980).

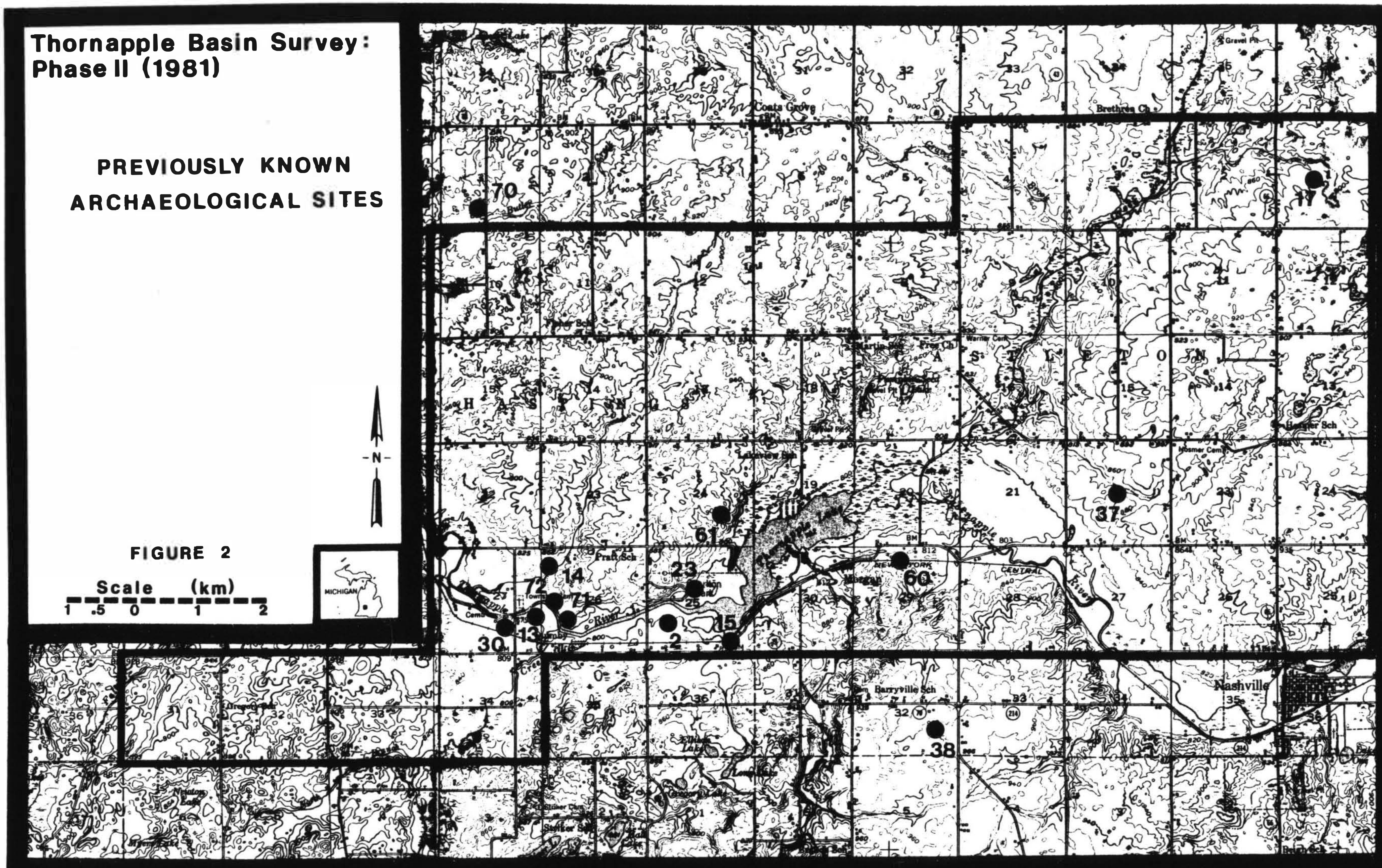
When TBS Phase II commenced last year, the state site files, now maintained by the MHD, contained 100 Barry County sites. Following establishment of the 1981 survey transect, it was observed that 14 previously recorded sites occurred within transect limits or very near to the research universe (Figure 2). These sites are summarized as follows:

20 BA 2 — This Hinsdale (1931) site is located near Thornapple Lake in the SW 1/4 of Section 25, Hastings Township, T3N R8W, Barry County, Michigan. According to the information in the site files, it represents a village site that produced a dugout canoe (UMMA catalog no. 22203). This site has never been relocated and confirmed.

20 BA 13 — This village site is reported to be situated northwest of the Village of Quimby and between the railroad tracks and the Thornapple River in Section 26, Hastings Township, T3N R8W, Barry County, Michigan. Insufficient provenience and current land use precluded efforts to relocate and confirm this site during the 1979 survey.

20 BA 14 — A cemetery is reported to be located along an unnamed creek in the NW 1/4 of Section 26, Hastings Township, T3N R8W, Barry County, Michigan. Area landowners and collectors interviewed in 1979 insisted that they had never observed anything in this quarter section, and surveyor evaluation of the parcel turned up nothing. This site remains unconfirmed.

20 BA 15 — A mound has been reported along a trail southwest of Thornapple Lake in Section 25, Hastings Township, T3N R8W, Barry County, Michigan. Surveyors seeking to confirm this site in 1979 concluded that the location might more properly be west of the lake in Charlton Park. During the 1981 field season, several



Thornapple Basin Survey: Phase II (1981)

PREVIOUSLY KNOWN ARCHAEOLOGICAL SITES

FIGURE 2

informants referenced this same feature and placed it in Section 30 near Bank Creek (specifically in the SE 1/4 of this section). This area is today completely overgrown with tall grasses and second growth deciduous forest, and surveyors were unable to adequately investigate it for evidence of the presence of the mound.

20 BA 17 This mound is placed south of Mud Creek in the southern portion of Section 1, Castleton Township, T3N R7W, Barry County, Michigan. Inadequate provenience discouraged the 1979 survey team from undertaking anything more than a cursory examination of the area, with the result being that this feature was not confirmed. Intensive coverage of 119 ha of field in this section during 1981, also failed to provide confirmation.

20 BA 23 This site is reported to be located in present-day Charlton Park. The documents indicate that this site represents an historic mission-trading post. No other pertinent information exists. The growth and development of this community over the S 1/2 of the N 1/2 of Section 25, Hastings Township, T3N R8W, Barry County, Michigan, in all probability ensures that the mission-trading post will never be confirmed through survey.

20 BA 30 An historic period village, the Upper Thornapple Indian Settlement, has been located in the SE 1/4 of Section 27, Hastings Township, T3N R8W, Barry County, Michigan. Originally reported in Weissert (1932), this site has long eluded archaeologists. The 1979 survey team was unable to confirm this site due to inadequate provenience and dense ground cover, and no attempt was made to relocate it during 1981.

20 BA 37 This site is a Johnson (1880) listing and is thought to be located somewhere in Section 22, Castleton Township, T3N R7W, Barry County, Michigan. The 1979 team did not even attempt to find this site, given the very inadequate provenience information available to them. In 1981, surveyors intensively examined the SE 1/4 of Section 22, covering 52.6 ha of corn and soybean fields. Although the area contained one very likely setting for a site, on a high knoll overlooking a series of small ponds which gives rise to an unnamed tributary of the Thornapple River, the team was not able to identify more that a scatter of fire-cracked rock without clear cultural context.

20 BA 38 According to Johnson (1880), there was once located in the SE 1/4 of Section 32, Castleton Township, T3N R7W, Barry County, Michigan, an historic period maple sugaring camp. Called the Mudge Farm Sugar

Camp, this site was located in a very prominent grove of sugar maples. The general area was examined in 1979 without success, and surveyors at that time suggested that it may more properly be located in the SW 1/4, SE 1/4 of the section. Be that as it may, this sugaring camp must still be regarded as being unconfirmed.

20 BA 60 This site possibly represents a village in the NW 1/4 of Section 29, Castleton Township, T3N R7W, Barry County, Michigan. The survey team in 1979 did examine the collection from this site in the Charlton Park Museum and also visited the property in question. Although more precise provenience is still lacking, the site is regarded as being confirmed.

20 BA 61 This site is situated in the SE 1/4 of Section 24, Hastings Township, T3N R8W, Barry County, Michigan. Again, the 1979 team examined the extant collection in the Charlton Park Museum, and contact with the landowner/collector was arranged. This site is now regarded as being confirmed, albeit a more precise location is still lacking.

20 BA 70 The Garrison site is represented by a standing log cabin dating to the early 18th century and located in the NE 1/4, SE 1/4, SW 1/4 of Section 3, Hastings Township, T3N R8W, Barry County, Michigan. Examination of the structure and grounds by the 1979 survey team did not result in a collection of associated cultural material.

20 BA 71 Lenz #1 is a campsite in the SE 1/4, NW 1/4, SW 1/4 of Section 26, Hastings Township, T3N R8W, Barry County, Michigan. Here, on a hill overlooking the Thornapple River, the 1979 survey team observed about 40 m^2 of prehistoric debris including a bifacial and a unifacial implement, two pieces of chert, and a light scatter of fire-cracked rock. Cultural affiliation and temporal placement of this site are unknown.

20 BA 72 Lenz #2 is located downstream from 20 BA 71 in the NW 1/4, NW 1/4, SW 1/4 of Section 26, Hastings Township, T3N R8W, Barry County, Michigan. About 100 m^2 of cultural debris was observed in an area of beech-maple forest occupying a small bluff above the Thornapple River. Aside from fire-cracked rock, this site yielded one piece of chert and an historic gun flint.

4. Survey Methodology

A. Research Design

The research proposal called for systematic pedestrian survey of the 114 km^2 transect in three field weeks. In order to achieve this objective, a 10% stratified random sample of quarter sections (64.75 ha) was generated through application of the following criteria:

1. the distribution of physiographic features (landforms) as determined from topographic and geologic maps;
2. rank ordering of all permanent streams flowing through the transect; and
3. plotting the distribution of the two major plant communities found in the Thornapple Basin at the time of Euro-American settlement, as determined from the fieldnotes and plats of the original land surveys and other documents (Brewer 1979).

Features on the landscape fall into three distinct categories. These are: sandy lake beds and glacial spillways (1); till plains (2); and moraines (3). The areas occupied by each of the above landforms were delineated on the project base map and then subdivided on the basis of whether or not permanent streams were present and, if present, their rank order relative to one another. For those areas lacking permanent streams, the number of the landform type (e.g. moraine - 3) is followed by a "zero". If an area characterized by morainal topography flanks the Thornapple River, the numbers 3-2 are used to distinguish this sampling stratum; 3-3, third order stream; and 3-4, fourth order stream. Inasmuch as the Thornapple is tributary to the Grand River (rank order - 1), no stream in the survey universe

has a ranking greater than "2".

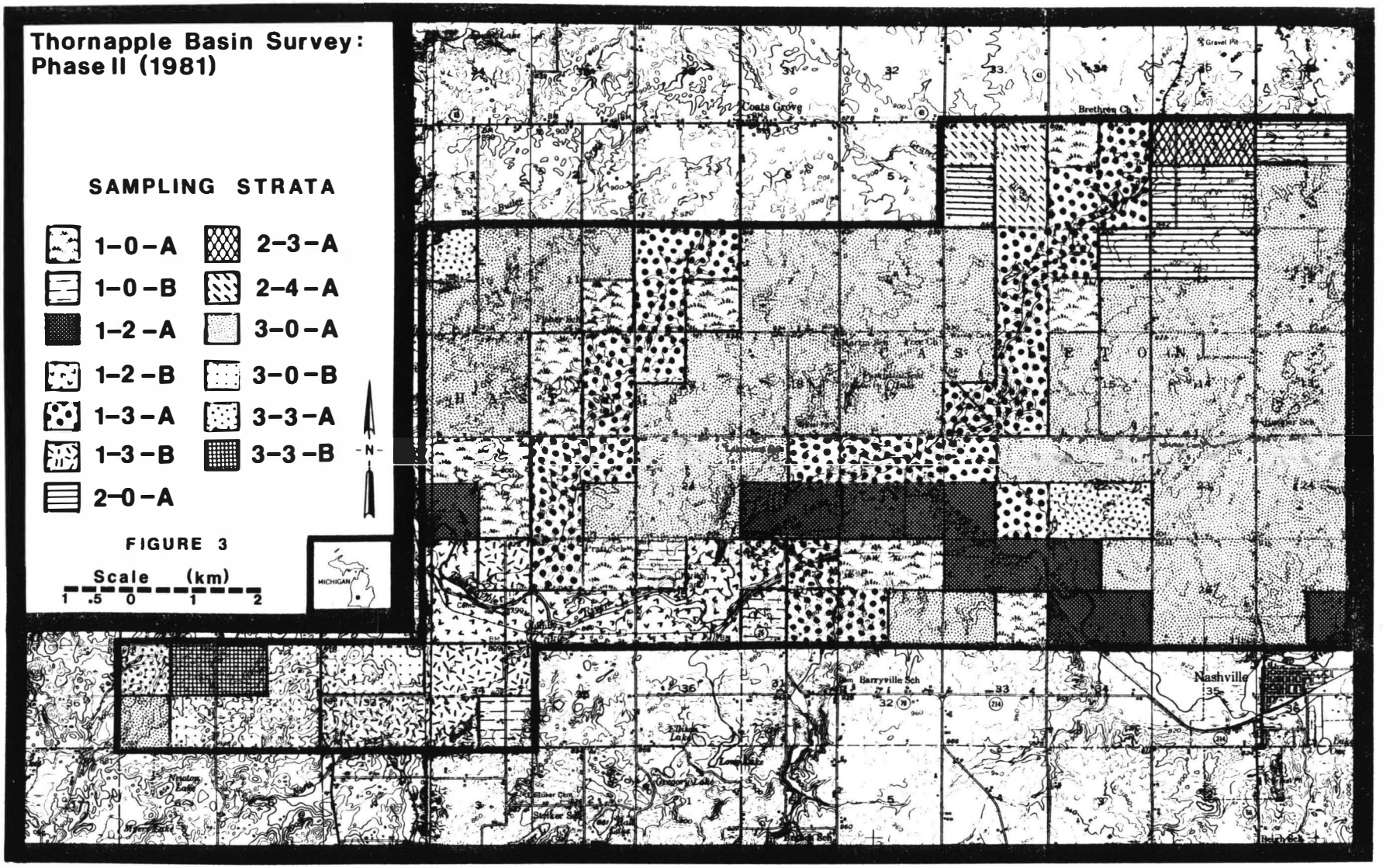
Finally, each sampling stratum designation ends with either the letter "A" or "B", refering to areas supporting beech-maple forest and oak and oak-hickory forest, respectively. When all these data are taken together, for example, an area of morainal terrain bordering the Thornapple River and supporting beech-maple forest at the time of Euro-American settlement would be assigned to sampling stratum 3-2-A.

In aggregate, 13 different sampling strata have been delineated in that portion of the Thornapple Basin included within the survey transect through the application of the aforementioned criteria (Figure 3). Briefly, these are (with the proportion of the transect occupied by each):

Stratum 1-O-A: This stratum comprises areas of ancient sandy lake beds and glacial spillways which lack permanent streams and support a forest cover dominated by beeches and sugar maples. In aggregate, this stratum encompasses 841.8 ha, or 7.4% of the transect.

Stratum 1-O-B: Same as above, but with oak and oak-hickory forest cover. This stratum constitutes a mere 194.3 ha (1.7%) of the survey universe.

Stratum 1-2-A: This sampling stratum includes areas of lake bed and spillway deposits flanking the Thornapple River and supporting beech-maple forest. It aggregates 777.0 ha, or 6.8% of the study area.


Thornapple Basin Survey:
Phase II (1981)
SAMPLING STRATA
1-0-A
1-0-B
1-2-A
1-2-B
1-3-A
1-3-B
2-0-A
2-3-A
2-4-A
3-0-A
3-0-B
3-3-A
3-3-B
N
FIGURE 3
Scale (km)
1 .5 0 1 2
MICHIGAN
Coats Grove
Brethren Ch
Barryville Sch
Nashville

Stratum 1-2-B: Same as above, but with oak and oak-hickory forest. This stratum comprises 582.8 ha, or 5.1% of the transect.

Stratum 1-3-A: In terms of area, this sampling stratum represents the largest proportion of lake bed and spillway deposits in the transect. Those quarter sections assigned to it flank streams which are tributary to the Thornapple and support beech-maple forest. In aggregate, this stratum totals 1,748.3 ha, or 15.3% of the study area.

Stratum 1-3-B: Same as above, but with the forest cover being oak and oak-hickory rather than beech-maple. It constitutes 388.5 ha (3.4%) of the survey area.

Stratum 2-0-A: This stratum is characterized by till plain deposits and an absence of permanent streams. The dominant plant community is beech-maple forest. Quarter sections aggregating 518.0 ha (4.5%) are assigned to this sampling stratum.

Stratum 2-3-A: Same as above, but including areas of the transect which are proximal to third order streams and support beech-maple forest. This stratum occupies but 129.5 ha, or 1.2% of the transect.

Stratum 2-4-A: Same as above, but confined to areas of the transect which border fourth order streams. This stratum comprises 194.3 ha (1.7%).

Stratum 3-0-A: This stratum comprises those quarter sections having morainal topography, but lacking permanent streams. The dominant plant community is beech-maple forest. It constitutes the single largest portion of the transect, with 5,244.8 ha (46%) being assigned to this stratum.

Stratum 3-0-B: Same as above, but with oak and oak-hickory forest cover. This stratum aggregates 388.5 ha, or 3.4% of the universe.

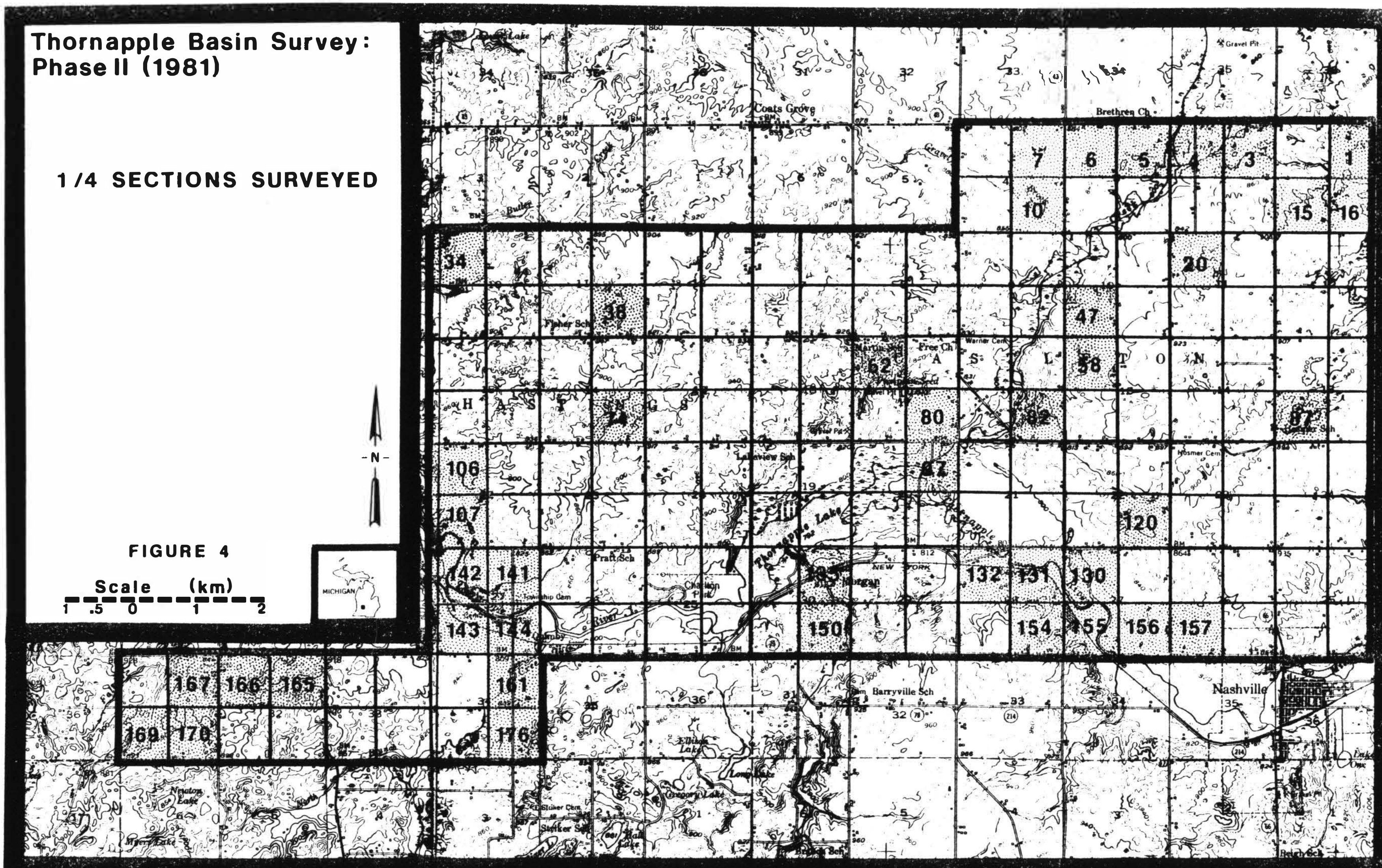
Stratum 3-3-A: This stratum, characterized by morainal terrain supporting beech-maple forest cover, consists of quarter sections flanking third order streams. A total of 259.0 ha (2.3%) are included.

Stratum 3-3-B: Same as above, but comprising areas proximal to tributaries of the Thornapple River that have an oak and oak-hickory forest cover. It constitutes 129.5 ha, or 1.2% of the research universe.

Following delineation of all 13 sampling strata on the base map, a 10% sample of the quarter sections occurring within each stratum was generated. Inasmuch as the survey team could not really anticipate having access to 100% of the land in a targeted sampling unit, and in order to ensure that the desired coverage in each stratum would be attained, quarter sections in addition to those which were originally selected for investigation were also frequently used in this study. Since such "alternate"

units had also been randomly selected, the integrity of the research design has not been compromised.

The 114 km^2 transect contains a total of 176 quarter sections/sampling units. Twenty-four of these, aggregating almost 15.5 km^2 (13.6%) of the transect, were targeted for intensive pedestrian survey. During the course of fieldwork, however, 43 units were actually evaluated, with surveyor coverage by stratum ranging from 40.6% to 141.4%, or 93.6% on the average for the 13 sampling strata (Figure 4). Surveyor coverage of 12.2 km^2 represents 78.6% of the total area targeted for investigation, but 10.7% of the 114 km^2 research universe. Table 1 summarizes surveyor coverage in the transect by stratum and random sampling unit.



Thornapple Basin Survey: Phase II (1981)
1/4 SECTIONS SURVEYED
FIGURE 4
Scale (km)
1 .5 0 1 2
-N-
MICHIGAN
Coats Grove
Brethren Ch
Gravel Pit
Fisher Sch
Lakeview Sch
Free Ch
Warner Cem
Hosmer Cem
Pratt Sch
Thornapple Lake
Morgan
NEW YORK
Barryville Sch
Nashville
Striker Cem
Striker Sch
Long Lake
Gregory Lake
H A S T I N G S
C A S T L E T O N
7 6 5 4 3 1
10 15 16
34 20 38 47 62 58 80 82 87 106 97 107 120
142 141 132 131 130 143 144 135 150 154 155 156 157
167 166 165 161 169 170 176

Table 1: Survey Coverage by Stratum and Random Sampling Unit (¼ Section or 64.75 ha)

Stratum 1-0-A: N = 13 (2 targeted) Objective - 129.5 ha

RS#	Coverage
6	16.2
38	15.4
47	44.5
106	36.4
154	14.6
5	127.1

Achieved - 98.1%

Stratum 1-0-B: N = 3 (1 targeted) Objective - 64.8 ha

RS#	Coverage
176	26.3
1	26.3

Achieved - 40.6%

Stratum 1-2-A: N = 12 (2 targeted) Objective - 129.5 ha

RS#	Coverage
107	46.6
130	8.1
131	32.4
132	28.3
155	11.3
156	16.2
6	142.9

Achieved - 110.3%

Stratum 1-2-B: N = 9 (1 targeted) Objective 64.8 ha

RS#	Coverage
142	36.4
143	32.4
144	20.2
3	89.0

Achieved - 137.4%

Stratum 1-3-A: N = 27 (3 targeted) Objective - 194.3 ha

RS#	Coverage
5	31.6
74	37.6
82	22.3
97	8.1
135	26.3
150	8.9
6	134.8

Achieved - 69.4%

Stratum 1-3-B: N = 6 (1 targeted) Objective - 64.8 ha

RS#	Coverage
141	28.3
161	45.0
2	73.3

Achieved - 113.2%

Stratum 2-0-A: N = 8 (1 targeted) Objective - 64.8 ha

RS#	Coverage
1	50.6
20	12.1
2	62.7

Achieved - 96.8%

Stratum 2-3-A: N = 2 (1 targeted) Objective - 64.8 ha

RS#	Coverage
3	32.4
4	27.5
2	59.9

Achieved - 92.5%

Stratum 2-4-A: N = 3 (1 targeted) Objective - 64.8 ha

RS#	Coverage
7	32.4
10	41.7
2	74.1

Achieved - 114.4%

Stratum 3-O-A: N = 81 (8 targeted) Objective - 518.0 ha

RS#	Coverage
15	20.6
16	47.8
58	18.2
62	11.7
80	36.8
87	51.8
157	32.4
169	19.4
8	238.7

Achieved - 46.1%

Stratum 3-O-B: N = 6 (1 targeted) Objective - 64.8 ha

RS#	Coverage
165	24.3
170	24.3
2	48.6

Achieved - 75.1%

Stratum 3-3-A: N = 4 (1 targeted) Objective - 64.8 ha

RS#	Coverage
34	39.3
120	52.6
2	91.9

Achieved - 141.8%

Stratum 3-3-B: N = 2 (1 targeted) Objective - 64.8 ha

RS#	Coverage
166	32.4
167	20.2
2	52.6

Achieved - 81.2%

Totals:

Sampling Universe	176 quarter sections (11,396 ha)
Targeted Units	24 quarter sections (1,554 ha)
Surveyed Units	43 quarter sections, with coverage of 1,222 ha (78.6%)

Summary by Stratum

Stratum 1-0-A:	5 quarter sections/127.1 ha (98.1%)
Stratum 1-0-B:	1 quarter section/26.3 ha (40.6%)
Stratum 1-2-A:	6 quarter sections/142.9 ha (110.3%)
Stratum 1-2-B:	3 quarter sections/89.0 ha (137.4%)
Stratum 1-3-A:	6 quarter sections/134.8 ha (69.4%)
Stratum 1-3-B:	2 quarter sections/73.3 ha (113.2%)
Stratum 2-0-A:	2 quarter sections/62.7 ha (96.8%)
Stratum 2-3-A:	2 quarter sections/59.9 ha (92.5%)
Stratum 2-4-A:	2 quarter sections/74.1 ha (114.4%)
Stratum 3-0-A:	8 quarter sections/238.7 ha (46.1%)
Stratum 3-0-B:	2 quarter sections/48.6 ha (75.1%)
Stratum 3-3-A:	2 quarter sections/91.9 ha (141.8%)
Stratum 3-3-B:	2 quarter sections/52.6 ha (81.2%)

Average coverage for 13 sampling strata = 93.6% of the land in the sample from each stratum.

B. Survey Field Procedures

Methods employed to locate and collect sites were essentially those of the Kalamazoo Basin Survey program. The team consisted of the Project Director and two assistants with experience in site location survey. Fieldwork was carried out during a three week period in July, 1981.

Guided by the list of randomly selected quarter sections, the team sought access to parcels of land which were then under cultivation or otherwise afforded reasonably good surface visibility. Because the corn plants in many of the fields that were investigated were on occasion taller than the surveyors and frequently very closely spaced, movement through a field was often difficult. Rather than cross the field in zigzag fashion, it was usually necessary to walk the rows. And to compensate for the fact that visibility was reduced by the maturity of the crop in many fields investigated, the interval between surveyors was much smaller than would have been the case had fieldwork been conducted earlier in the year. On no occasion was the interval between surveyors greater than 15 m, and as a rule the spacing is estimated to have been more on the order of 5-8 m.

Aside from the mature condition of the corn crop, it is noteworthy that rainfall was a definite "plus" during the time of fieldwork. The surface of the ground beneath and between plants was frequently washed by rain in the evenings, making surveyor efforts on the following day much more fruitful than they might otherwise have been given the typically dry conditions of July in this part of the Midwest.

As a final comment regarding the conditions under which fieldwork was conducted and their influence on the results of research, it should be noted that surveyors, in their concern for variable surface conditions from field to field, did frequently observe that fields in which the soil had only recently been turned or in which plant growth was retarded or sparce consistently yielded results that were on the whole very compatible with those derived from fields supporting rigorous crops and affording surveyors more limited visibility.

Parcels of land not under cultivation but which afforded some surface visibility (e.g. areas of sparce vegetative cover, erosional features) were also examined as the opportunity arose. And surveyors had with them on a daily basis a tubular soil probe and shovels in the event that a situation of high site potential requiring subsurface examination presented itself and there existed adequate time to permit some surveyor evaluation of the situation. However, as a rule, those quarter sections lacking sufficient cultivated acreage were simply replaced by a randomly selected alternate sampling unit from the same stratum.

Surveyors carefully examined the landscape for any evidence suggesting a former occupation or activity area. If debris was observed along one line of survey in a parcel, the entire team assembled in the area of the find and spread out in an attempt to locate additional evidence and delineate the extent of the site. Archaeological sites were identified and recorded on the basis of observed lithic material, stone tools and tool fragments, potsherds and exposed features. A scatter of fire-cracked rock, in and of itself, was not regarded as being sufficient for

purposes of defining a site. Inasmuch as we seldom entered a field which was devoid of FCR, in essence our task became one of seeking the "elusive" flake, sherd or stone tool which would validate our interpretation of an FCR scatter as being indicative of a human presence.

In addition to field reconnaissance, the TBS survey team visited an important area institution housing archaeological collections from the county, the Charlton Park Museum, and interviewed many collectors active in the general area. Whenever possible, informant sites with adequate provenience were visited in an attempt to provide confirmation of the site. Private collections of artifacts were also photographed for the TBS records.

Daily survey activity was recorded in the project log kept by the director. Entries included comments regarding: field conditions and observations; site locations; acreage covered; local topography, drainage and vegetation; informant data and site collections; and vehicle mileage. In addition to these comments, the log became the recepticle for various ideas, thoughts, and speculations regarding the nature of the fieldwork and the potential significance of observations derived from our efforts.

In addition to log entries, site data were entered on a specially prepared TBS site form that included a detailed sketch map of the quarter section in which the site was located. Any cultural material collected from the site was inventoried on this form prior to being placed in a bag labeled with the appropriate provenience information.

C. Curation of Cultural Material

All cultural debris recovered during the survey was cleaned, labeled with a temporary TBS site number (TBS-81-___), examined and identified by the junior author, Mr. Clark, and prepared for accessioning into the archaeological collections housed in the Department of Anthropology. Finally, each site was registered with the Michigan History Division, and the state number assigned to the site was affixed to the cultural items recovered from it.

5. Description of Sites Recorded and Catalog of Surface Collections

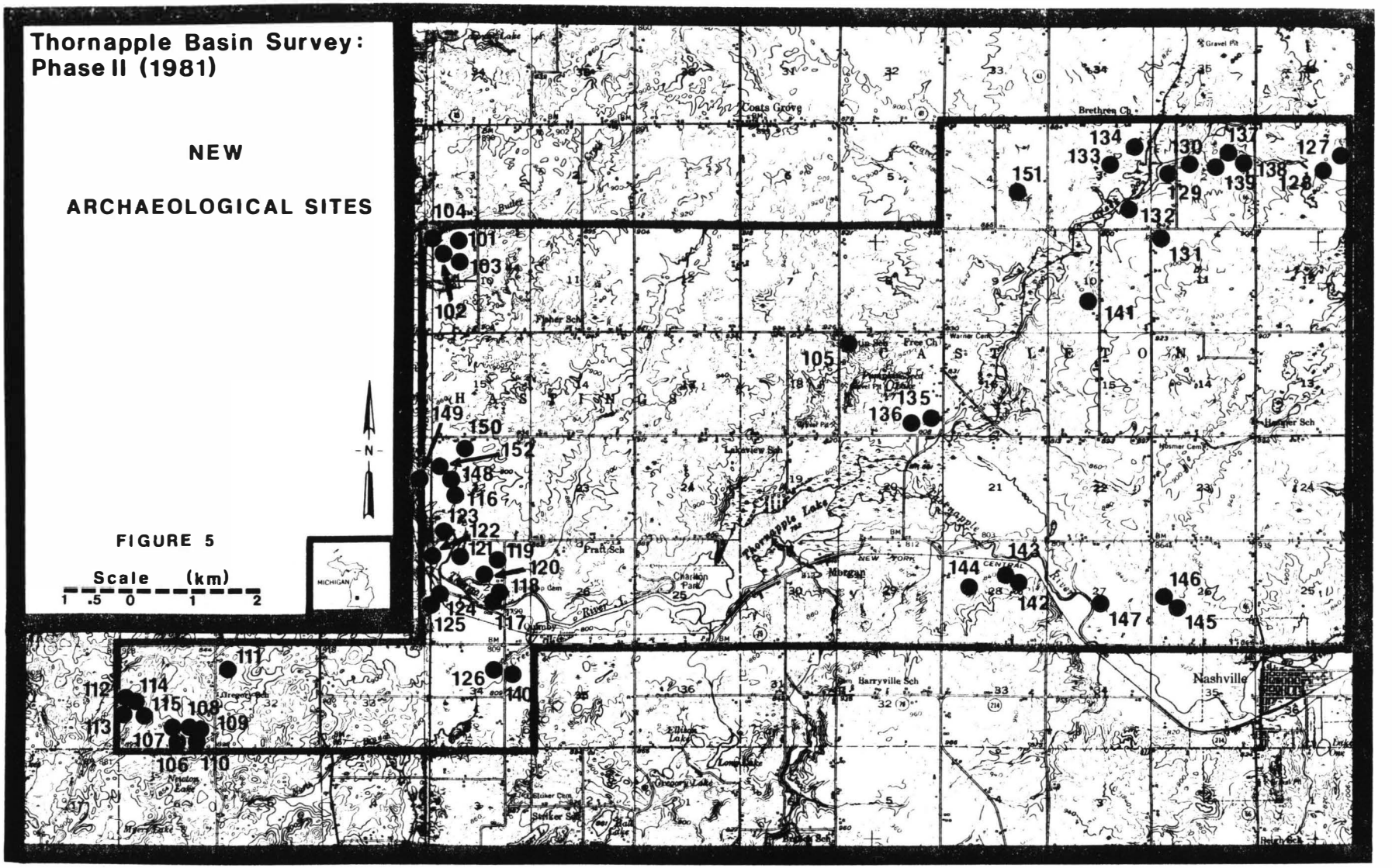
TBS Phase II resulted in the recovery of data from 51 previously unknown sites in the 1981 transect. In addition, one other site (20 BA 149) was located just outside the western limits of the transect on the banks of the Thornapple River about 5 km upstream from Hastings. These 52 sites are located in Figure 5.

With respect to the brief site descriptions which follow, the cultural affiliation/ temporal placement, when provided, is based upon an assessment of diagnostic artifacts and/or ceramic pieces in the site collections. The relative importance assigned to each site reflects our evaluation of each site's potential interpretive value with respect to chronological reconstruction and the delineation of prehistoric settlement and subsistence patterns in the Thornapple River Basin of Barry County. In accordance with these objectives, a "low, moderate, or high priority" is assigned to each site described.

Unless otherwise indicated, the data acquired through surface reconnaissance and inventoried below are at this time regarded as being inadequate or insufficient for purposes of making an assessment of a site's eligibility for inclusion in the National Register of Historic Places.

20 BA 101
(TBS-81-1) The Davis #1 site represents an isolated point find in an area of muck soils about 300 m south of Butler Creek in the SW 1/4, NE 1/4, NW 1/4 of Section 10, Hastings Township, T3N R8W, Barry County, Michigan. This artifact is of Middle Woodland (Hopewell) affiliation. Low priority.

1 projectile point (Manker/Snyders Cluster)


Thornapple Basin Survey:
Phase II (1981)
NEW
ARCHAEOLOGICAL SITES
FIGURE 5
Scale (km)
1 .5 0 1 2
MICHIGAN
N
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
Coats Grove
Brethren Ch
Fisher Sch
Free Ch
Lakeview Sch
Pratt Sch
Charlton Park
Morgan
Barryville Sch
Nashville
Thornapple Lake
Gravel Pit

20 BA 102 (TBS-81-2)

The Davis #2 site is a lithic scatter occupying a prominent ridge south of Butler Creek and about 200 m southwest of 20 BA 101 in the NE 1/4, SW 1/4, NW 1/4 of Section 10, Hastings Township, T3N R8W, Barry County, Michigan. Several artifacts, some chert debitage, and a light scatter of fire-cracked rock occur over an area of about 4,000 m^2. Nothing in this collection is diagnostic, and the cultural affiliation of the site is unknown. Low priority.

1 distal biface fragment
1 utilized chert cobble
2 secondary flakes, one of purple chert
1 possibly utilized granite cobble fragment (FCR)
2 fragments of chert

20 BA 103 (TBS-81-3)

Davis #3 is represented by a preform found on a low ridge about 120 m east of 20 BA 102 in the NW 1/4, SE 1/4, NW 1/4 of Section 10, Hastings Township, T3N R8W, Barry County, Michigan. Some FCR was also observed to occur on the ridge, but in a concentration somewhat removed from the artifact findspot. This site is of Middle Woodland (Hopewell) affiliation. Low priority.

1 Snyders preform

20 BA 104 (TBS-81-4)

Davis #4 represents yet another isolated find of a Middle Woodland artifact. This findspot is situated about 35 m north of Butler Creek in the NW 1/4, NW 1/4, NW 1/4 of Section 10, Hastings Township, T3N R8W, Barry County, Michigan. The setting is once again a low lying area of muck soils, only downstream and across the creek from 20 BA 101. Low priority.

1 projectile point (Manker/Snyders Cluster)

20 BA 105 (TBS-81-5)

The Barry #1 site consists of a light scatter of lithic debris and FCR in a field located about 900 m northwest of Pumpkin Seed Lake in the NW 1/4, NW 1/4, NW 1/4 of Section 17, Castleton Township, T3N R7W, Barry County, Michigan. Surveyors were directed to this location following examination of some chert flakes and projectile points in the landowner's collection. Nothing in Mr. Barry's possession or in the WMU collection from this site is diagnostic, and the cultural affiliation of Barry #1 is unknown. Low priority.

1 possible hammerstone
1 tertiary flake of quartzite

20 BA 106 (TBS-81-6)

Slocum #1 represents the isolated occurrence of an argillite tool at an elevation of 264 m above sea level in a corn field about 100 m north of Sanger Road in the SE 1/4, SW 1/4, SE 1/4 of Section 31, Hastings Township, T3N R8W, Barry County, Michigan. Cultural affiliation of this site is unknown. Low priority.

1 uniface on a long argillite slough

20 BA 107 (TBS-81-7)

The Slocum #2 site records the finding of a probable flake together with some FCR on the south edge of a ridge along this same 264 m contour and about 200 m north of 20 BA 106 in the NE 1/4, SW 1/4, SE 1/4 of Section 31, Hastings Township, T3N R8W, Barry County, Michigan. The cultural affiliation of this site is not known. Low priority.

1 probable chert flake

20 BA 108 (TBS-81-8)

Slocum #3 represents the occurrence of a quartzite flake together with FCR at a location along this same contour and 150 m east and north of 20 BA 107 in the NW 1/4, SE 1/4, SE 1/4 of Section 31, Hastings Township, T3N R8W, Barry County, Michigan. The cultural affiliation of this item is not known. Low priority.

1 bifacial retouch flake of quartzite exhibiting an abraded platform

20 BA 109 (TBS-81-9)

Slocum #4 is the find spot of a chert pebble which appears to exhibit unifacial use-wear. It is situated along the same 264 m contour in the NW 1/4, SE 1/4, SE 1/4 of Section 31, Hastings Township, T3N R8W, Barry County, Michigan. The cultural affiliation of this site cannot be determined. Low priority.

1 chert pebble fragment with possible unifacial use-wear

20 BA 110 (TBS-81-10)

The site identified as Slocum #5 is noted for the occurrence of an argillite flake together with FCR along the same contour and about 150 m south of 20 BA 109 in the SW 1/4, SE 1/4, SE 1/4 of Section 31, Hastings Township, T3N R8W, Barry County, Michigan. The cultural affiliation of this site cannot be determined from the contents of the surface collection.

Low priority.

1 argillite flake with bifacial-bilateral retouch and water or wind abraded surfaces

20 BA 111 (TBS-81-11)

The Slocum #6 site records the isolated occurrence of a projectile point of probable Middle Woodland affiliation on a slight rise in a low lying field located about 240 m south of Fall Creek in the SW 1/4, NW 1/4, NW 1/4 of Section 32, Hastings Township, T3N R8W, Barry County, Michigan. As was the case with the isolated projectile point finds of Middle Woodland age on the Davis property near Butler Creek, this site is associated with (specifically surrounded by) soils which were formerly frequently inundated and supported wetland vegetation. Low priority.

1 projectile point with an expanding stem

20 BA 112 (TBS-81-12)

Parker #1 is a lithic scatter occupying about 40 m^2 of a ridge paralleling Fall Creek, which passes by the site at a distance of about 300 m to the west. It is located in the NE 1/4, NW 1/4, SW 1/4 of Section 31, Hastings Township, T3N R8W, Barry County, Michigan. The items recovered from the site are not diagnostic, and the cultural affiliation is not known. Low priority.

1 possible uniface on a slate pebble fragment
1 distal fragment of a secondary chert flake
1 possible primary chert flake

20 BA 113 (TBS-81-13)

The Parker #2 site defines the occurrence of a celt fragment, a possible hammerstone, and a diffuse scatter of FCR over an area of 100 m^2 on the same ridge as 20 BA 112 in the SE 1/4, NW 1/4, SW 1/4 of Section 31, Hastings Township, T3N R8W, Barry County, Michigan. The cultural affiliation and/or temporal placement are not known. Low priority.

1 celt fragment
1 possible hammerstone

20 BA 114 (TBS-81-14)

Parker #3 represents two ground stone tools occurring in association with FCR at a point intermediate between and 150 m east of the above two sites. The site appears to cover no more than 20 m^2 of the prominent ridge in the NE 1/4, NW 1/4, SW 1/4 of Section 31,

Hastings Township, T3N R8W, Barry County, Michigan. Neither artifact is diagnostic, and the cultural affiliation of this site is not known. Low priority.

2 cobble manos/hammerstones

20 BA 115 (TBS-81-15)

Parker #4 is located downslope and to the south and east of 20 BA 112-114 in the SW 1/4, NE 1/4, SW 1/4 of Section 31, Hastings Township, T3N R8W, Barry County, Michigan. Here considerable quantities of FCR, scattered over an area of 200 m^2, are associated with several pieces of lithic debitage and an historic artifact. The knoll which the site occupies in turn overlooks a small marsh and meadow to the east. The identification of the component(s) other than the historic one is not precisely known, albeit Upper Mercer chert is suggestive of a late Middle Woodland-early Late Woodland temporal placement. Low priority.

1 kaolin pipe bowl fragment
1 primary chert flake with distal unilateral use-wear
2 tertiary flakes, one of Upper Mercer chert

20 BA 116 (TBS-81-16)

The Tinkler site is a quartzite debitage scatter occupying 400 m^2 of flat land lying 600 m east of the Thornapple River in the NW 1/4, NE 1/4, SW 1/4 of Section 22, Hastings Township, T3N R8W, Barry County, Michigan. Associated with the 19 rather concentrated flakes were numerous pieces of FCR. No other cultural material was observed, and the cultural affiliation of this site cannot be determined. Moderate to high priority.

5 quartzite primary flakes
2 quartzite secondary flakes
4 quartzite tertiary flakes
8 quartzite flake fragments

20 BA 117 (TBS-81-17)

Barry County Farm #1 is a probable component occupying a low sand ridge in a field adjacent to the Thornapple River in the NE 1/4, NW 1/4, SE 1/4 of Section 27, Hastings Township, T3N R8W, Barry County, Michigan. This site, encompassing perhaps 2,000 m^2 and located no more than 70 m north of the river channel, produced a concentrated pattern of FCR, chippage, and a number of stone tools. Albeit a specific analog(s) is lacking, the notched points and flakes of Upper Mercer chert in the assemblage strongly suggest a Middle-Late Woodland temporal placement for the site. Moderate to high

priority.

3 projectile points, all of which are notched forms generally analogous with Woodland types; one of these is made from Bayport chert
2 bifacial preforms
1 bipolar piece
2 primary flakes
6 tertiary flakes, two of which are Upper Mercer chert
1 block flake

20 BA 118 (TBS-81-18) Barry County Farm #2 is a light lithic scatter associated with FCR in the NE 1/4, NW 1/4, SE 1/4 of Section 27, Hastings Township, T3N R8W, Barry County, Michigan. It is located about 100 m to the northeast of 20 BA 117 and occupies an estimated 80 m^2. Cultural affiliation is undetermined. Low priority.

1 cobble mano
1 bipolar piece
2 secondary flakes of Bayport chert

20 BA 119 (TBS-81-19) The Herp #1 site records the isolated occurrence of a bifacial knife about 10 m west of Mathison Road and 300 m south of the intersection of Mathison and River Roads in the SE 1/4, NW 1/4, NE 1/4 of Section 27, Hastings Township, T3N R8W, Barry County, Michigan. The findspot is also about 150 m north of an unnamed tributary of the Thornapple River. Cultural affiliation of this site is not known. Low priority.

1 bifacial knife

20 BA 120 (TBS-81-20) Herp #2 represents the recovery of a primary flake of quartzite in association with FCR on a sandy ridge about 200 m west-southwest of 20 BA 119 and 150 m north of the same unnamed creek in the SW 1/4, NW 1/4, NE 1/4 of Section 27, Hastings Township, T3N R8W, Barry County, Michigan. Cultural affiliation cannot be determined. Low priority.

1 quartzite primary flake

20 BA 121 (TBS-81-21) The Lepkey site occupies the bluff edge on the east side of the Thornapple River in the SW 1/4, NE 1/4, NW 1/4 of Section 27, Hastings Township, T3N R8W, Barry County, Michigan. Due to frequently dense ground cover, site size could not be estimated. However, it does appear to extend along the river for a distance of several hundred meters. The extensive FCR and lithic debris

afford no clues as to the age or cultural affiliation of this site. Low priority.

1 primary flake
1 bipolar item
1 quartzite core bearing 12 platforms
3 possibly utilized cobbles

20 BA 122 (TBS-81-22)

The Postula site is defined on the basis of one good flake found amidst an FCR scatter covering an estimated 40 m^2 of bluff top west and immediately across the river from 20 BA 121 in the SW 1/4, NW 1/4, NW 1/4 of Section 27, Hastings Township, T3N R8W, Barry County, Michigan. Below and between this site and the river there occurs an extensive area of floodplain. The single cultural item is not diagnostic, and the cultural affiliation of the site is not known. Low priority.

1 primary flake

20 BA 123 (TBS-81-23)

Andrea Allen has yielded a single potsherd without any FCR or lithic debris in association. This sherd (and the site) was found in the extensive area of floodplain below 20 BA 122 at a distance of about 130 m from the river. It is in the SE 1/4, SW 1/4, SW 1/4 of Section 22, Hastings Township, T3N R8W, Barry County, Michigan. The workmanship and appearance of this sherd suggest a Late Woodland temporal placement. Low priority.

1 cord-marked body sherd exhibiting fine temper and no decoration

20 BA 124 (TBS-81-24)

The Lowell #1 site occupies a position near the valley margin on the south side of the river in the SW 1/4, SW 1/4, NW 1/4 of Section 27, Hastings Township, T3N R8W, Barry County, Michigan. The landowner has a "soup to nuts" collection of artifacts from the site, and when surveyors walked the field they observed a very heavy concentration of FCR together with several flakes over an area of perhaps 600 m^2. Archaic through Woodland components appear to be represented here. A low to moderate priority is suggested on the basis of the contents of Mr. Lowell's collection and the location of the site proximal to the river and its floodplain.

1 decortication flake
1 flake fragment

20 BA 125 (TBS-81-25)

Lowell #2 is located about 150 m southwest of 20 BA 124 on a very pronounced knoll in the NW 1/4, NW 1/4, SW 1/4 of Section 27, Hastings

Township, T3N R8W, Barry County, Michigan. A dense scatter of FCR was observed to occupy about 200 m^2 of this landform and, in addition, the survey team recovered a quartzite core and one potsherd from this location. A nonspecific Woodland temporal placement is proposed on the basis of the ceramic piece. Low priority.

1 quartzite core with three distinct platforms
1 cord-marked body sherd exhibiting quite large particles of grit temper

20 BA 126 (TBS-81-26)

The Fox site is situated on the west bank of Cedar Creek in the SE 1/4, NW 1/4, NE 1/4 of Section 34, Hastings Township, T3N R8W, Barry County, Michigan. The landowner reported finding a number of "arrowheads" along the creek behind his house, and when the survey team investigated the area a chert flake and some FCR were observed. Site size has not been determined, nor has it been possible to assign 20 BA 126 to a specific culture or time period. Low priority.

1 primary flake of chert

20 BA 127 (TBS-81-27)

Moore #1 represents the findspot of a core fragment in a broad expanse of flat land about 600 m northeast of the head of Mud Creek in the NE 1/4, SE 1/4, NE 1/4 of Section 1, Castleton Township, T3N R7W, Barry County, Michigan. The cultural affiliation of this site cannot be determined from the evidence. Low priority.

1 utilized blade core fragment of Bayport chert

20 BA 128 (TBS-81-28)

Moore #2 is a Paleo-Indian site reflecting the isolated occurrence of a fluted point in an eroded area of corn field about 100 m east of the head of Mud Creek in the SE 1/4, SW 1/4, NE 1/4 of Section 1, Castleton Township, T3N R7W, Barry County, Michigan. The findspot lies along the 270 m contour, and our examination of that area between the site and the creek suggests that water may have formerly been ponded in the low lying field, presumably supporting wetland vegetation. Wetland resources may have provided the reason for a Paleo-Indian presence here. Low priority.

1 projectile point exhibiting unifacial fluting

20 BA 129 (TBS-81-29)

The Klein #1 site is located on a bluff overlooking Mud Creek and an extensive area of

wetland flanking this stream in the SW 1/4, SW 1/4, NW 1/4 of Section 2, Castleton Township, T3N R7W, Barry County, Michigan. A scatter of FCR covers an area of 1,000 m^2 in a corn field, and associated material consists of several nondiagnostic flakes and a probable ground stone implement. The cultural affiliation of this site cannot be determined. Low priority.

1 heat-crazed block flake of possible human manufacture
1 tertiary flake of Bayport chert
1 probable utilized cobble

20 BA 130 (TBS-81-30)

Klein #2 is identified on the basis of one flake which is associated with a scatter of FCR covering about 400 m^2 in the NW 1/4, SE 1/4, NW 1/4 of Section 2, Castleton Township, T3N R7W, Barry County, Michigan. It is located about 360 m upstream and to the east of 20 BA 129 near that point where the creek bifurcates and enters yet another area of wetland. The cultural affiliation of this site is unknown. Low priority.

1 tertiary flake

20 BA 131 (TBS-81-31)

Located in the NW 1/4, NW 1/4, NW 1/4 of Section 11, Castleton Township, T3N R7W, Barry County, Michigan, the Klein #3 site represents a dense scatter of lithic debris and FCR on a prominent knoll overlooking a pond. This landform occurs at an elevation of 258 m, and the scatter occupies approximately 150 m^2 of the crown of the knoll. None of the artifacts is diagnostic, and the cultural affiliation is not known. Low to moderate priority.

1 biface
1 distal portion of a uniface
1 quartzite core having six platforms
1 quartzite primary flake

20 BA 132 (TBS-81-32)

The Flanigan #1 site is located in the NW 1/4, SE 1/4, SE 1/4 of Section 3, Castleton Township, T3N R7W, Barry County, Michigan. Situated about 150 m south of Mud Creek on a sandy knoll, it encompasses an area of about 600 m^2 and is characterized by abundant FCR and a handful of cultural items. Cultural affiliation and temporal placement have not been determined. Low to moderate priority.

1 large slate biface with distal polish
1 grooved axe
1 bipolar piece
1 block flake
2 decortication flakes

20 BA 133
(TBS-81-33)

Flanigan #2 is situated in an area of muck soils bordering Mud Creek on the north in the SE 1/4, SW 1/4, NE 1/4 of Section 3, Castleton Township, T3N R7W, Barry County, Michigan. It has not been possible to determine site area inasmuch as the field contains numerous dense stands of marsh grass among the corn rows. However, FCR was noted to be very dense near the locus of the flake which provides the basis for defining this site. Cultural affiliation is unknown. Low priority.

1 quartzite secondary flake

20 BA 134
(TBS-81-34)

Flanigan #3 is located in the same extensive area of wetland bordering the creek as 20 BA 133 and is situated about 300 m north of that site in the SW 1/4, NE 1/4, NE 1/4 of Section 3, Castleton Township, T3N R7W, Barry County, Michigan. The distribution of FCR, albeit sparce, is coterminous with the sand ridge which rises about 3 m above the muck soils surrounding it. Near the top of the ridge the survey team encountered a single tool of unknown age and affiliation. Low priority.

1 large unifacially flaked "chopper"

20 BA 135
(TBS-81-35)

The Barry #2 site is located about 900 m southeast of Pumpkin Seed Lake in the SE 1/4, SE 1/4, SE 1/4 of Section 17, Castleton Township, T3N R7W, Barry County, Michigan. This site represents the isolated occurrence of a utilized flake manufactured from quartzite. The age and affiliation of the findspot are unknown. Low priority.

1 large quartzite FCR slough with two concavities showing evidence of probable utilization

20 BA 136
(TBS-81-36)

Located 150 m upslope and to the west of 20 BA 135, the Barry #3 site is a lithic scatter with very abundant FCR. This location in the NW 1/4, SE 1/4, SE 1/4 of Section 17, Castleton Township, T3N R7W, Barry County, Michigan, corresponds with the place where Mr. Barry has recovered several of the Archaic projectile points in his collection. Based upon these artifacts, it is suggested that this site is probably of Archaic age and affiliation. Low to moderate priority.

1 amorphous biface fragment
1 utilized pebble of till chert
1 decortication flake bearing a unifacial wear concavity
2 secondary flakes, one being of quartzite

1 tertiary flake
1 flake fragment

20 BA 137 (TBS-81-37) Steele #1 is an isolated point find located in muck soils flanking the south bank of Mud Creek in the NW 1/4, SE 1/4, NE 1/4 of Section 2, Castleton Township, T3N R7W, Barry County, Michigan. Late Woodland affiliation is indicated for this site. Low priority.

1 projectile point (Madison)

20 BA 138 (TBS-81-38) Steele #2 represents the isolated occurrence of a uniface on the side of a slight ridge about 300 m southeast of 20 BA 137 in the SE 1/4, SE 1/4, NE 1/4 of Section 2, Castleton Township, T3N R7W, Barry County, Michigan. The site's age and cultural affiliation are not known. Low priority.

1 uniface on till chert

20 BA 139 (TBS-81-39) Steele #3 is a large site, perhaps encompassing 2-3,000 m^2 and conforming to the outside bank of a pronounced southward bend in Mud Creek about 100 m downstream from 20 BA 137 in the Center, SW 1/4, NE 1/4 of Section 2, Castleton Township, T3N R7W, Barry County, Michigan. All along the creek surveyors observed concentrations of FCR, some of them associated with very distinct patterns of discoloration in the soil which are so indicative of subsurface features (firepits). FCR and lithic debris extended from stream's edge upslope to the top of a ridge which in part parallels the course of the creek. Unfortunately, the collection from the surface of this site contains no diagnostic items, and the age and affiliation of Steele #3 are not presently known. Moderate to high priority.

1 preform of Bayport chert
3 decortication flakes
3 primary flakes
1 secondary flake
2 tertiary flakes, one with 90% marginal unifacial retouch
2 flake fragments
1 quartzite primary flake
2 quartzite tertiary flakes

20 BA 140 (TBS-81-40) The Scobey site is located along the east bank of Cedar Creek opposite 20 BA 126 on the west side of the stream. The scatter of lithic debris and FCR occupies about 1,000 m^2 in the NW 1/4, SE 1/4, NE 1/4 of Section 34, Hastings Township, T3N R8W, Barry County, Michigan. The age

and cultural affiliation of this site are not known. Low to moderate priority.

2 argillitic secondary flakes
1 chert secondary flake exhibiting distal bilateral use-wear
3 tertiary flakes, two of Bayport chert
1 quartzite primary flake
1 quartzite tertiary flake

20 BA 141 (TBS-81-41)

Sandbrook is a small lithic scatter with associated FCR on the east slope of a ridge about 900 m east of Mud Creek in the SE 1/4, NE 1/4, SW 1/4 of Section 10, Castleton Township, T3N R7W, Barry County, Michigan. This site appears to occupy about 400 m^2 of the field and is also the general location of a projectile point find made by the landowner several years ago. The cultural affiliation of the Sandbrook site has not been determined. Low priority.

1 decortication flake
2 secondary flakes, one of purple chert and the second of what appears to be Flint Ridge chert

20 BA 142 (TBS-81-42)

The Eldred #1 site is also a light scatter of lithic debris and FCR, covering an area of 80 m^2 along the 267 m contour and about 300 m south of the Thornapple River in the SE 1/4, SW 1/4, NE 1/4 of Section 28, Castleton Township, T3N R7W, Barry County, Michigan. The river was noted to be in plain sight from the "flat" on which this site occurs. The cultural affiliation of this site has not been determined. Low priority.

1 flake fragment
1 quartzite secondary flake

20 BA 143 (TBS-81-43)

Eldred #2 is yet another light lithic and FCR scatter, in this instance confined to an area of about 40 m^2 along the same contour as 20 BA 142 and about 120 m downstream and northwest of it. The site is located in the NW 1/4, SW 1/4, NE 1/4 of Section 28, Castleton Township, T3N R7W, Barry County, Michigan. The age and cultural affiliation of this site are also unknown. Low priority.

1 secondary flake
1 flake fragment

20 BA 144 (TBS-81-44)

Eldred #3 is situated near a small marsh and/or spring at an elevation of 249 m in the SW 1/4, SE 1/4, NW 1/4 of Section 28, Castleton Township, T3N R7W, Barry County, Michigan. It encompasses

approximately 200 m^2, and it is characterized by a diffuse scatter of cultural debris and FCR. Based upon the one potsherd in the collection, assignment to the Woodland period is appropriate. Low priority.

2 primary flakes
1 secondary flake
1 hammerstone
1 body sherd exhibiting sand tempering and a fabric(?)-marked exterior

20 BA 145 (TBS-81-45)

The Cardenas #1 site is located in the SE 1/4, NW 1/4, SW 1/4 of Section 26, Castleton Township, T3N R7W, Barry County, Michigan. It represents the isolated occurrence of a biface about 20 m southeast of a knoll in a bean field on which there occurs a very heavy concentration of FCR with no cultural association. This artifact is not diagnostic, and the cultural affiliation of the site is unclear. Low priority.

1 biface fragment of Flint Ridge(?) chert

20 BA 146 (TBS-81-46)

Cardenas #2 is located 60 m northwest of 20 BA 145 on a slight rise of sandy soil in the NE 1/4, NW 1/4, SW 1/4 of Section 26, Castleton Township, T3N R7W, Barry County, Michigan. Here surveyors recovered a huge quartzite core without any other material in association. The age and affiliation of this site cannot be determined. Low priority.

1 quartzite core having 13 platforms

20 BA 147 (TBS-81-47)

The Smith site occupies a position on a terrace of the Thornapple River in the E 1/2, NE 1/4, SW 1/4 of Section 27, Castleton Township, T3N R7W, Barry County, Michigan. Occurring at an elevation of about 3 m above stream level, this site extends along the river for about 300 m and is estimated to encompass 10,000 m^2 of area. It produced a sherd, numerous flakes of chert and quartzite, and abundant FCR. In the absence of temporal indicators in the lithic assemblage, and with only the single sherd to guide us, it is suggested that the Smith site probably dates to the Late Woodland period. High priority.

2 block flakes
1 primary flake
7 secondary flakes
20 tertiary flakes, with two being of Norwood and two of Bayport chert
2 flake fragments
1 quartzite primary flake with unifacial-unilateral retouch

3 quartzite secondary flakes
8 quartzite tertiary flakes
2 quartzite flake fragments
1 body sherd with a cord-marked exterior, sand temper, and fine paste

20 BA 148 (TBS-81-48)

Kilmer #1 is a projectile point findspot on a slope facing toward the Thornapple River about 600 m to the west in the SE 1/4, SW 1/4, NW 1/4 of Section 22, Hastings Township, T3N R8W, Barry County, Michigan. Site 20 BA 116 is located some 120 m south and east of this site. Based on the point's morphology, a temporal placement in the Woodland period is suggested. Low priority.

1 projectile point with an expanding stem

20 BA 149 (TBS-81-49)

Kilmer # 2 is located just outside the transect on the east bank of the Thornapple River about 600 m west of 20 BA 148 in the E 1/2, SE 1/4, NE 1/4 of Section 21, Hastings Township, T3N R8W, Barry County, Michigan. The site extends along the river for an undetermined distance and yielded a light scatter of lithic debris without FCR in association. The cultural affiliation of this site has not been determined. Moderate priority.

1 quartzite secondary flake
1 quartzite tertiary flake
1 quartzite core fragment
1 argillitic biface
1 quartzite cobble with bipitted wear and evidence of unifacial grinding or mano wear

20 BA 150 (TBS-81-50)

Kilmer #3 represents the isolated find of a granitic cobble exhibiting a pecked and pitted surface in the NW 1/4, NE 1/4 NW 1/4 of Section 22, Hastings Township, T3N R8W, Barry County, Michigan. The cultural affiliation cannot be determined. Low priority.

1 granitic cobble, pecked and pitted

20 BA 151 (TBS-81-51)

The Watson site occupies the high north bank of Gravel Brook in the SE 1/4, NW 1/4, SE 1/4 of Section 4, Castleton Township, T3N R7W, Barry County, Michigan. Amidst a very dense concentration of FCR, averaging 10-15 pieces per m^2, covering an area of perhaps 40 m^2, a single flake of chert was observed. The age and cultural affiliation of the Watson site cannot be ascertained. Low priority.

1 tertiary flake of chert

20 BA 152
(TBS-81-52)

The Kilmer #4 site is located about 240 m north and west of 20 BA 148 on a slope that has until recently never been plowed. As the survey team walked the freshly turned furrows, about one dozen exposed features, characterized by concentrations of fire-cracked cobbles in a soil matrix black with charcoal and generally exhibiting a pattern that was circular in form, were observed. Although no cultural items were recovered, perhaps because the field had been collected prior to our arrival (as suggested by recent footprints occurring across the entire field), we are quite confident that this location in the NE 1/4, SW 1/4, NW 1/4 of Section 22, Hastings Township, T3N R8W, Barry County, Michigan, does require recording as a site. Cultural affiliation cannot be determined without a revisit to the site. High priority.

-no surface collection made by the WMU survey team, but field observations do suggest the presence of a dozen or more subsurface features in this small field

6. Interpretations and Conclusions

The survey team investigating the TBS Phase II research universe in Hastings and Castleton Townships, Barry County, Michigan recorded a total of 52 new archaeological sites in this portion of the Thornapple River Basin. Analysis of the surface collections from these sites has been hampered by the fact that few have yielded significant quantities of cultural material and less than 30% of the sites have provided artifacts of a diagnostic nature. Be that as it may, the data available to us clearly indicate the presence of human populations in this area since Paleo-Indian times.

Of 51 sites occurring within transect boundaries, 27 are isolated or "spot" finds, usually of a stone tool with or without FCR in association; 20 are lithic scatters, almost always associated with FCR and an occasional stone tool and/or ceramic piece; and four may be tentatively regarded as being components (i.e. habitation areas), based upon their size, the kinds and quantities of cultural debris observed on the surface and, in two instances, the presence of subsurface features (firepits) partially exposed by the plow. The single site (20 BA 149) that lies outside of the transect is interpreted to represent yet another lithic debris scatter.

To record these new sites, the TBS survey team evaluated 12.2 km^2 of the 114 km^2 transect. In other words, surveyors recorded one site for every 24 ha that were investigated. This rate of recovery compares quite favorably with that of the Kalamazoo Basin Survey program (one site per 41 ha surveyed), especially in the lower and upper valley segments-1977 (site/ha

ratio = 23) and 1980C (site/ha ratio = 27) transects (Cremin 1980: 116; Cremin and Dinsmore 1981: 68). This observation may be interpreted to indicate the comparability of both the archaeological resource base and the methods of data collection used in these two drainages.

A. Observations on Site Distribution and Implications for Prehistoric Settlement

The measures of site size, site density, and occupational intensity are here employed to gain some insights regarding locational decision-making in prehistory. We have noted that on the average for the 47 sites for which it has been possible to estimate site area that the mean for sites in the transect is slightly more than 500 m^2. By sampling stratum, the six sites located in Stratum 1-2-A yield the highest mean, averaging almost 1800 m^2. These are followed by nine sites occurring in areas of beech-maple forest flanking streams tributary to the Thornapple River, with a mean site area of 834 m^2. The only other situation yielding sites which on the average exceed the mean calculated for the entire transect is Stratum 1-2-B. The five sites which surveyors found in this area of oak and oak-hickory forest along the Thornapple are observed to average 576 m^2 in size.

Of course, the aforementioned observations may be construed to indicate a preference for locating major communities along prominent streams. Clearly, the distribution of those sites identified as components as well as several of the larger lithic scatters greatly influence the means calculated for these strata. The largest component in the research area, 20 BA 147, occurs in

Stratum 1-2-A, and this site is followed by 20 BA 117 in Stratum 1-2-B and 20 BA 139 in Stratum 2-3-A. Those lithic scatters which approach or exceed in size the smaller components include: 20 BA 101 -Stratum 3-3-A; 20 BA 129 -Stratum 2-3-A; and 20 BA 140 -Stratum 1-3-B.

In addition to the influence of individual sites of relatively large size on these observations, it is also noteworthy that the distribution of findspots, interpreted more often than not as reflecting limited activity loci such as an isolated episode of hunting during which a point or knife was lost or discarded, varies inversely with the distribution of larger and presumably more permanent habitation areas. Those strata yielding a mean site size greater than the average for the entire transect have only eight (30%) findspots recorded for them. The remaining 19 are found in upland areas which are more often than not associated with oak and oak-hickory forest and frequently lack permanent water of any sort. This pattern of dispersion for limited activity sites is consistent with seasonal movements of small work parties from their main habitation areas along major waterways into upland areas to procure certain animals like the white-tailed deer and harvest autumn nut crops. And such activity might reasonably be anticipated to result in sites which barely attain the threshold of archaeological visibility.

Table 2 summarizes site density and occupational intensity data for the 1981 transect by sampling stratum. The figures at the bottom of the table reflect the SD and OI values calculated for the entire surveyed portion of the transect. On the average for the entire transect, the SD is 51 sites/12.2 km^2 surveyed = 4.18. Examination of the table reveals that the SD for each

Table 2: Site Density and Occupational Intensity Calculated for the Transect by Stratum

Stratum	Sites/Km^2	Occupational Intensity
1-0-A	3.15	4.25
1-0-B		
1-2-A	4.20	5.17
1-2-B	6.74	5.17
1-3-A	2.23	2.33
1-3-B	5.46	2.00
2-0-A	4.78	2.33
2-3-A	8.35	3.60
2-4-A	1.35	1.00
3-0-A	3.77	3.66
3-0-B	10.29	1.00
3-3-A	4.35	2.00
3-3-B	1.90	1.00
13 Strata		
$\bar{X}$ for Transect	51/12.2 = 4.18	167/51 = 3.27

of the strata containing sites which on the average are larger than the mean calculated for the transect also exceed the mean SD for the transect. This is especially apparent for Stratum 1-2-B (SD = 6.74) and Stratum 2-3-A (SD = 8.35), areas of the basin which were intensively occupied and supported main habitation sites. However, perhaps more impressive are the relatively large number of sites which occur in several areas of oak and oak-hickory forest, whether drained by permanent streams (Stratum 1-3-B; SD = 5.46) or in uplands lacking permanent sources of water (Stratum 3-0-B; SD = 10.29). Clearly, site density data illustrate that areas of oak and oak-hickory forest were frequently visited, if not intensively occupied, and that the nature of the occupation more often than not resulted in the formation of sites that evidence only limited activity or special purpose ventures into the uplands located at some distance from the main river trench.

As a means of evaluating the observations derived from site density data, an index of occupational intensity (C. Pebbles, personal communication) has also been calculated. In this instance:

01: findspot = 1 point

02: debris scatter = 5 points

03: component = 10 points

As is indicated in Table 2, a mean intensity score of 167/51 = 3.27 has been derived for the transect. This value is exceeded by only five of 13 sampling strata and, importantly, only one stratum of the five includes areas formerly supporting oak and

oak-hickory forest. That those strata yielding the highest occupational intensity scores (Stratum 1-2-A and Stratum 1-2-B) flank the Thornapple, the portion of the transect which also has the largest sites, is consistent with the interpretation that the main river trench witnessed the most intensive occupation in prehistory; albeit site frequencies recorded for a number of upland strata are higher. For example, Stratum 3-O-B has an SD of 10.29 sites per km^2 surveyed, but the OI value of 1.00 for this area of the basin is very telling with respect to the sorts of activity undertaken here. This area experienced specialized and short-term reoccupation with much shifting of activity loci over a long period of time.

A final comment regarding these SD and OI values has to do with their potential usefulness in comparative studies. When the Kalamazoo Basin Survey program was completed, the data available to us provided for an overall SD of 2.43 and an OI of 4.39 for 135 km^2 of surveyed land in the basin. Comparing these values with the scores calculated following survey of 12.2 km^2 of the Thornapple Basin reveals that site frequency is 60% greater in the latter area, but that the Kalamazoo witnessed more intensive occupation in prehistory. Little more can be said with respect to comparisons between the research universes in the two drainages, inasmuch as the size of the surveyed portions is so disparate.

B. Comments on Specialized Activity Loci and Lithic Technology

The ubiquitous presence of FCR with sparce or, more often, without other associated material in localities which were anticipated to produce sites was an almost daily conundrum

of the 1981 field season. The sorts of data recovered from once-over pedestrian survey, no matter how intensive, cannot be used to answer many of the questions posed by the archaeological record. Be that as it may, it is often possible to evaluate certain aspects of site distribution and, in a general sense, site function through examination of the lithic assemblage.

The configuration of four sites provides an initial model of a specialized activity locus which may shed some light on the pattern of widespread FCR. The closely spaced Davis #1-4 (20 BA 101-104) sites produced three diagnostic artifacts of Middle Woodland (Hopewell) affiliation. Assuming contemporaneity, these sites constitute two possible habitation areas on well drained high ground (20 BA 102 and 20 BA 103). The evidence for occupation is limited to extensive and diffuse FCR with only a trace of tool maintenance activity. The Snyders preform from 20 BA 103 suggests that the occupants were prepared to notch and haft a new projectile if necessary. That this was necessary is suggested by 20 BA 101 and BO BA 104, both of which are isolated finds of undamaged Middle Woodland projectiles in areas of heavy muck soils. These latter sites represent failure to recover the spear or foreshaft to which the stone tips had been affixed. And, moreover, that these well made, broad-bladed points of exotic raw material had a utilitarian function and were not restricted to special status or ritual contexts.

Lovis et al (1980: 102) noted a similar association of complete points and muck soils in the Looking Glass River drainage. These were assigned a Late Archaic temporal placement based on typology. It was suggested that this situation

represents specialized hunting activity or brief episodes of the occupation of a frozen surface. Since the situation presented by the Davis site complex includes two possible habitation areas, it would seem most appropriate to accept the interpretation involving hunting activity. If the temporal assessments derived from the Looking Glass and Thornapple sites are correct, some longevity with respect to certain hunting strategies may be indicated.

A limited tool inventory is consistent with the FCR distribution, strongly suggesting a restricted range of activities characterizing the occupation of sites in the Thornapple study area. Apparently, the need for durable flakes and bifaces was met by locally abundant cobbles of quartzite and, to a lesser extent, argillite, when cherts were not so readily available.

Quartzite artifacts were recovered from 13 of 51 sites in the transect. All stages of reduction are represented, including several good cores with up to 13 platforms. Considering the quartzite materials as a whole, two reduction trajectories are suggested:

1. Coarse-grained quartzite was selected for the removal of Teshoa flakes (Eyman 1968).
2. Fine-grained quartzites were reduced in a manner similar to chert (such as direct or indirect freehand percussion) to produce bifaces.

Although none was recovered from survey or observed in collections, fairly large but finely flaked bifaces are strongly suggested by the flakes with bifacial platforms. These showed preparation by

abrasion in several cases. A variety of quartzites can be found in the glacial till of the study area, while chert is noticeably absent.

The distribution of sites with quartzite artifacts seems to indicate a bottomland association. The two upland localities (20 BA 105 and 20 BA 108) are findspots without any temporal indicators. The remaining 11 sites have immediate access to permanent streams. Temporal placement of quartzite in the Woodland Period is indicated by ceramics at two sites (20 BA 125 and 20 BA 147).

Chert debitage emphasizes final stages of reduction and biface maintenance. There is no evidence suggesting the presence of a local chert source other than the glacial gravels. Non-local raw materials present in the survey collection include Bayport, Mercer, Norwood, and possibly Flint Ridge, Ohio.

In sum, flintknapping appears to have been a minor aspect of the prehistoric occupation of the Thornapple research area, in favor of activities involving nondurable or perishable tools and/or facilities in which heated rocks (FCR) were important.

Special attention should be given to the Tinkler site (20 BA 116) inasmuch as it represents a highly concentrated quartzite knapping locus. The field where this site is located has abundant diffuse FCR throughout, but is otherwise devoid of cultural materials. Only two or three varieties of quartzite are represented in the debitage. All stages of reduction are represented, although no cores or completed tools were recovered. Based on the correlation of raw material and debitage class, it can be suggested that the Tinkler site knapping area reflects three discrete events, probably within a short period of time,

considering the closely circumscribed nature of the deposit of debris. Systematic recollection or test excavation of this small activity area could potentially provide a larger sample of debris and, therefore, a clearer picture of the technological aspects of quartzite reduction.

Some brief remarks concerning the fluted biface findspot (20 BA 128) are in order since it is an atypical specimen with respect to the majority of Paleo-Indian fluted points found in the Upper Great Lakes. The specimen from Moore #2 exhibits a single flute, the removal of which apparently destroyed the platform to the extent that, in order to prepare a second fluting platform, a considerable portion of the proximal length would have had to be sacrificed, or an unusually deep concavity produced. The biface is very thin and would probably have been suitable for hafting without the second flute. However, it lacks the bilateral and basal grinding of the hafting element which almost always occurs on points attributable to Paleo-Indian. Rather, this specimen has a very fine unifacial-bilateral serration, with very sharp edges. While it seems appropriate to assign this artifact to a fluted point complex, it cannot be satisfactorily compared to extant typologies of the Paleo-Indian Period.

Finally, sites like Kilmer #4 (20 BA 152) and Tinkler should be subjected to close scrutiny inasmuch as their small size and contextual integrity make them virtual snapshots of past activities. These site are usually well below the level of archaeological visibility, and it is highly fortuitous that they were observed at all. A veritable "Garden of Eden" for small site archaeology, it may prove stimulating to analyze and date cultural features

without the usual aid of diagnostic material objects. Widely scattered FCR, both dense and diffuse, without associations, and isolated finds of projectile points, with few occupation areas of FCR and light lithic debris, punctate the Thornapple study area. Certainly, here lies the potential to reveal specialized extractive sites which exist by inference, but for reason of their small size have either not been found or have not been recognized.

C. Cultural Affiliation and Temporal Placement of Sites

Before concluding this section of the report, a few comments are warranted with respect to the probable cultural affiliation and age of sites occurring in the 1981 research universe. First, with respect to temporal placement, 15 of 52 sites found this past year have provided diagnostic materials leading to the tentative identification of 18 cultural components, ranging from Paleo-Indian to Late Woodland in time. The Paleo-Indian Period is represented by the isolated find of a fluted projectile point on 20 BA 128. An Archaic presence in the research universe is suggested by points either in private collections or in the material recovered through survey on sites 20 BA 124 and 20 BA 136. Nonspecific Woodland analogs are inferred for points and/or ceramics from four sites, including 20 BA 124, 20 BA 125, 20 BA 144, and 20 BA 148. Four isolated artifacts from 20 BA 101, 20 BA 103, 20 BA 104, and 20 BA 111 are thought to be indicative of a Middle Woodland occupation, probably of Hopewell affiliation. And three sites can be assigned to the Late Woodland Period on the basis of diagnostic sherds and/or lithic pieces in surface collections. Finally, the presence of Upper Mercer chert on two

sites (20 BA 115 and 20 BA 117), the second of which also yielded several notched projectile points, argues for an occupation that in all probability dates to the late Middle Woodland-early Late Woodland transition.

7. Comments on the Management of Cultural Resources

The sites recorded during the TBS Phase II project in 1981 were found exclusively on or immediately adjacent to land currently in crops, reflecting the emphasis on surface reconnaissance procedures in our research. Therefore, that portion of the landscape which has been the focus of our work, together with the archaeological context, is constantly undergoing modification as a result of the use of farm machinery, and valuable information is being irretrievably lost.

The parcels of land evaluated range from small family holdings to large-scale commercial enterprises. And virtually everywhere we observed deep plowing to be the common practice, with the result being that the disturbed zone in many fields where we located sites is being extended from one year to the next. In more cases than not, only plow zone sites remain for the archaeologist to study, and even the most ambitious excavator cannot anticipate recovering much in the way of contextual information from the majority of the sites in the research universe.

In the final analysis, and with the aforementioned problem of deep plowing in mind, the TBS survey team did not observe a single instance in which a site was in eminent danger of complete destruction! However, farming in those areas where we identified potentially significant sites will continue to erode our cultural resource base. It is very important that the archaeological community, in cooperation with landowners on whose property such sites are located, address this problem by developing appropriate programs of test excavation and data analysis in order to ensure that small but potentially valuable sites are not ignored and the information which they possess

is not simply allowed to diminish as a result of the gradual destruction brought on by the plow.

REFERENCES CITED

Bernard, P.G.
1967 Years gone by. Bernard Historical Society, Delton.

Brewer, R., compiler
1979 Vegetation of southwestern Michigan at the time of settlement. Department of Biology, Western Michigan University. Kalamazoo.

Cremin, W.M. and R.E. Dinsmore
1981 An archaeological survey of Calhoun and Jackson counties, Michigan: 1980 multiple transect survey in the upper Kalamazoo river valley. Department of Anthropology, Western Michigan University, Archaeological Report 10. Kalamazoo.

Cremin, W.M. and P.W. McAllister
1980 An archaeological survey of the Thornapple river basin, Barry county, Michigan: phase I completion report. Department of Anthropology, Western Michigan University, Archaeological Report 7. Kalamazoo.

Eyman, F.
1968 The Teshoa, a Shoshonean women's knife. The Pennsylvania Archaeologist, 38 (3-4): 9-51.

Hinsdale, W.B.
1931 Archaeological atlas of Michigan. University of Michigan, Michigan Handbook Series 4. Ann Arbor.

Johnson, C.
1880 History of Allegan and Barry counties, Michigan. D.W. Ensign and Company, Philadelphia.

Lovis, W., R. Kingsley, P. Forsberg and D. Hodges
1980 The Looking Glass river archaeological project: 1979 season. Michigan State University, Museum of Anthropology, Archaeological Survey Report 41. East Lansing.

Potter, W.W.
1912 History of Barry county. Reed-Tandler Company, Grand Rapids.

Weissert, C.A.
1932 The Indians of Barry county and the work of Leonard Slater, the missionary. Michigan History Magazine, 16: 321-333.