

THE LITTLE SHAVER SITE: EXPLORING SITE STRUCTURE AND EXCAVATION METHODOLOGY ON AN UNPLOUGHED SITE IN THE REGION OF HAMILTON-WENTWORTH, ONTARIO

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The Little Shaver site is a small, unploughed prehistoric camp located in a woodlot near Ancaster, Ontario. Excavations conducted in 1991 yielded substantive data on a small multi-component (Middle Archaic/Early Woodland) site and insights into excavation methodology. The tool assemblage is characterized by a dominance of bifaces and biface production debris, and absence of formal scrapers, suggesting a short-term hunting camp function.

Highly controlled excavations were conducted to compare piece plotting with shovel excavation. It was determined that piece plotting, while considerably more expensive than shovel excavation, yields higher quality spatial information.

Current models of hunter-gatherer site formation were applied to the Little Shaver spatial data. In the northern area of the site, a five by six metre structure is inferred based on artifact distributions. These data can also be interpreted, albeit less convincingly, as the remains of an exterior hearth. In the southern area of the site one or two exterior hearths are inferred. The analysis highlights the need to maximize the information potential of small undisturbed sites and refine models of hunter-gatherer site formation.

INTRODUCTION

The Little Shaver site (AhHa-146) is a small prehistoric camp located near Ancaster, Ontario (Figure 1). It was excavated in 1991 in advance of the construction of Highway 403 between Brantford and Ancaster. The site was located in a mature woodlot that had never been ploughed. Hence it had a high potential for yielding data on the nature of hunter-gatherer site structure and provided excellent

opportunities to study the efficacy of highly controlled excavation including piece plotting of artifacts and debris. This paper describes the Little Shaver excavations and summarizes their results with respect to site function, site structure, and excavation methodology.

Middle Archaic, Late Archaic and Early Woodland components are present on the site, although the Middle Archaic component is the most substantial. This component falls late in the period, as the diagnostics most closely resemble material from the Brewerton phase of the Laurentian tradition (Ritchie 1969:89-103). In Ontario Brewerton-like manifestations likely date circa 5,000 - 4,500 B.P. (Ellis et al. 1990:72, 83-93). The Late Archaic and Early Woodland components are represented by a single Crawford Knoll projectile point and three probable Meadowood artifacts respectively. The Crawford Knoll component probably dates between 3,300 and 2,900 B.P. (Ellis et al. 1990:107), while the Meadowood occupation should date between 2,900 and 2,400 B.P. (Spence et al. 1990:128).

PROBLEM ORIENTATION

The discovery of the Little Shaver site in a relatively undisturbed state within a woodlot offered an opportunity to examine prehistoric hunter-gatherer site structure, and evaluate excavation techniques. Small undisturbed sites are quite rare in southern Ontario owing to the fact that most prime land has been cleared for agricultural purposes. Such small sites are often the result of short-term occupations and they may yield assemblages and artifact spatial distributions that are more easily interpreted than assemblages from larger sites that were occupied over longer

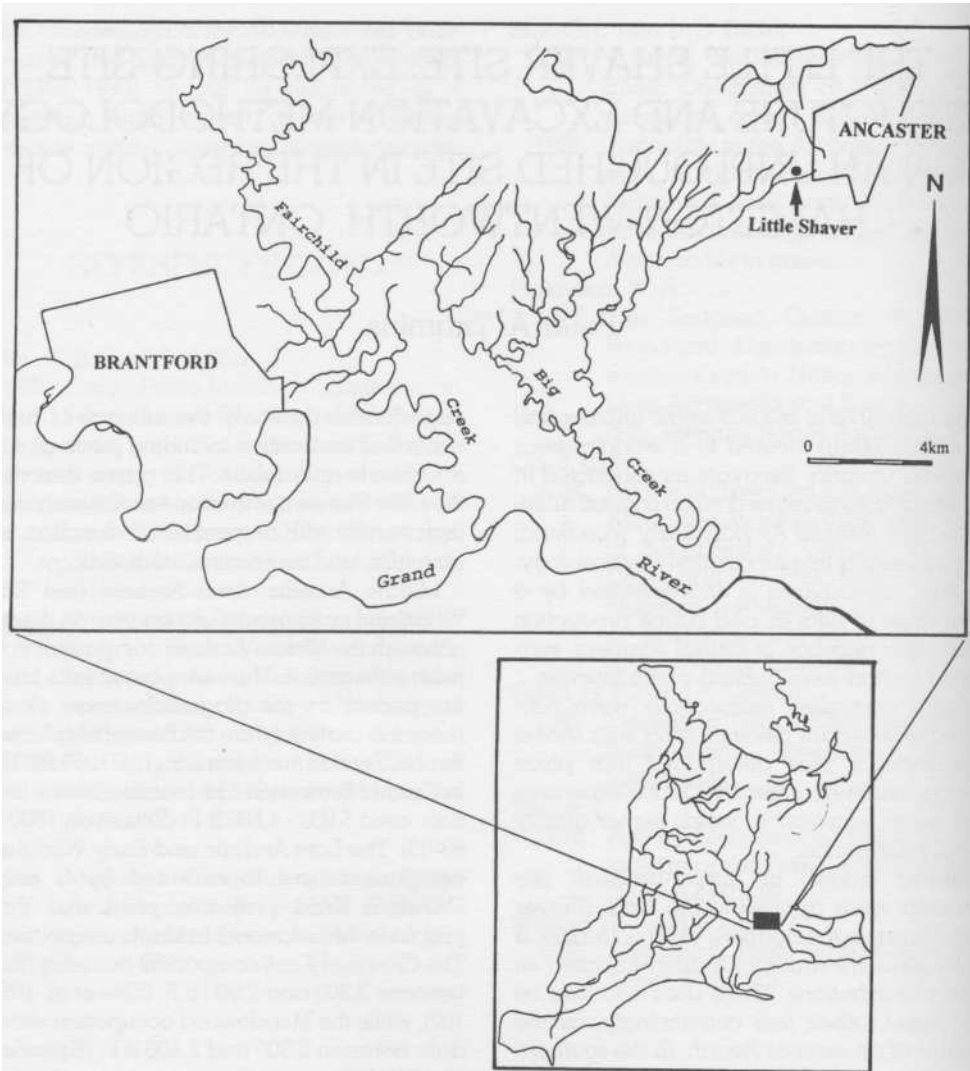


Figure 1. Location of the Little Shaver Site

periods. Our understanding of the organization of Archaic hunter-gatherer camps in southern Ontario, and the lower Great Lakes region in general, is limited by the fact that few unploughed components have been excavated and reported in detail. Researchers have necessarily used artifact distributions from ploughzone contexts to infer aspects of site structure (Lennox 1986), or have relied on sub-ploughzone data from ploughed components (Woodley 1990). Notwithstanding the myriad of natural processes that affect all archaeological deposits (Schiffer 1987), it is likely that significant spatial patterning will be

found more on unploughed sites than on ploughed sites. The Little Shaver site offers the opportunity to analyze artifact distributions from an unploughed component and compare them to the patterns observed on plough-disturbed sites. An examination of in situ artifact spatial distributions may clarify Archaic site structure and organization. This, in turn, might aid in the interpretation of the more common plough disturbed components.

Developing an appropriate degree of excavation control is also an issue in both Cultural Resource Management (CRM) and research contexts, where archaeologists are sometimes

pressured to sacrifice precise excavation control in favour of less time-consuming techniques. The Little Shaver data allowed us to assess the costs and benefits of trowel excavation and piece plotting, and compare these with shovel excavation of one-metre-square units.

LOCATION AND PHYSICAL SETTING

The Little Shaver site is located on Lot 37, Concession 3, Ancaster Township, in the Region of Hamilton-Wentworth. It is situated near the bottom of a small valley, on a low terrace, 55 m north of a creek that is only seasonally wet today (Figure 2). This watercourse rises in the Christie Bog, a small bog located just east of the site. The creek flows in a southwesterly direction, eventually entering Big Creek which in turn empties into the Grand River near Middleport. The area is part of a northerly extension of the Norfolk Sand Plain (Chapman and Putnam 1984:113,153) and the soils are quite sandy.

The site is close to the height of land between the Lake Erie and Lake Ontario watersheds. Sulphur Creek rises just 1.3 km to the north, flows easterly down the Dundas Valley, and eventually empties into Cootes Paradise at the western tip of Lake Ontario. Thus the Little Shaver site occupies an interior location in relation to Lakes Ontario and Erie and major rivers such as the Grand.

The site is one of three prehistoric sites discovered on the Highway 403 right-of-way just east of Shaver Road (Figure 2). The Christie site (AhHa-61), located just 65 m east of Little Shaver, on the edge of the Christie Bog, has produced evidence of Paleo-Indian, Early Archaic, Middle Archaic, Late Archaic, Early Woodland, Middle Woodland and Late Woodland occupations (Warrick 1995). The Shaver Knoll site, located on a prominent knoll 75 m to the west, has yielded evidence of numerous Middle to Late Archaic occupations (Lennox and Morrison 1993).

These sites lie above the Niagara escarpment at the edge of the Dundas Valley, which is a major gap in the escarpment cut by ice erosion during the Wisconsinan glaciation (McCann 1987:19; cf. Chapman and Putnam 1984:6). The escarpment would have constituted a formidable barrier to the movement of

both animals and people in prehistoric times, and the valley provides one of few openings permitting easy passage. This may be one of the reasons for the high density of archaeological sites in the area.

The prehistoric environment of the immediate site locale has been reconstructed using palynological and stratigraphic data from two sediment cores taken from the Christie Bog, located just east of the site (Parkins and McCarthy 1994). The stratigraphy of the two cores was similar, with "well-sorted inorganic sands overlain by 5-6 cm of poorly sorted gravel, then by more organic sediments in the upper meter..." (Parkins and McCarthy 1994:2). A large piece of wood resting on the gravel layer at a depth of 116-120 cm, was radiocarbon dated to 2,900 +/-120 years B.P. (BGS 1697) (Parkins and McCarthy 1994:2). This date provides a minimum age for the gravel deposit which is interpreted as the result of a debris flow (landslide) or a flood. The well-sorted sands underlying the gravel layer were deposited by a fast flowing creek. Parkins and McCarthy summarize the stratigraphic and palynological evidence as follows:

During Middle Archaic times a relatively high energy creek probably occupied the valley, although the energy of the creek was decreasing through time. A permanent change in the depositional environment occurred around 2,900 yBP, when a debris flow covered the creek bed with a layer of poorly sorted gravel, ponding the drainage and forming a swamp. A sugar maple-basswood forest occupied the moist valley bottom, while pine and oak dominated the uplands. These would have been the environmental conditions ... from the Late Archaic to at least the end of the Late Woodland Period [Parkins and McCarthy 1994:6].

Thus, during the Early Woodland occupation (circa 2,900 to 2,400 B.P.) the immediate site environment was probably a maple-basswood forest adjacent to a swamp on the valley floor.

The Christie Bog pollen diagram does not extend beyond 2,900 B.P. since refusal of the

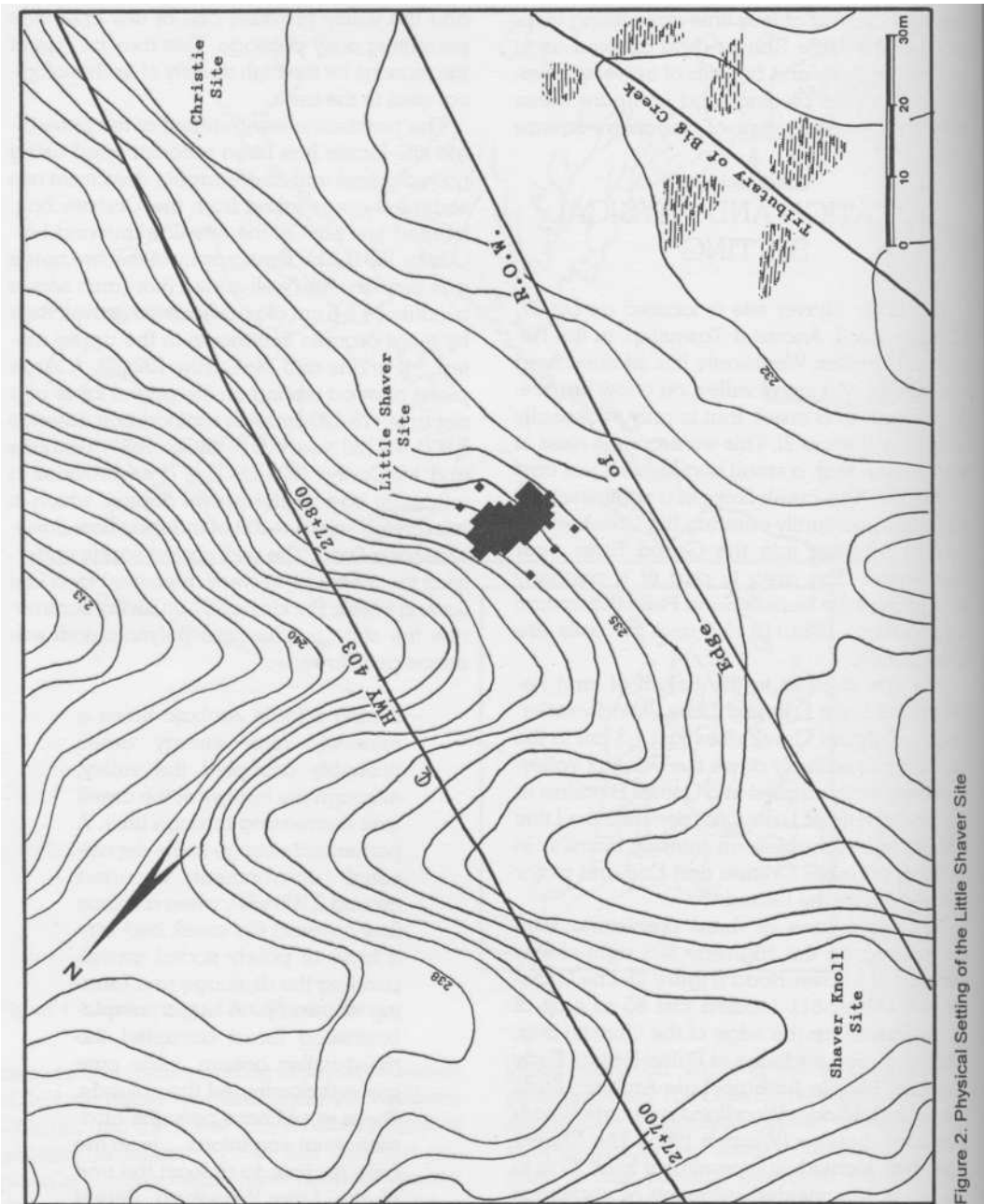


Figure 2. Physical Setting of the Little Shaver Site

coring device occurred in the waterlain sands underlying the gravel layer (Parkins and McCarthy 1994:6). To obtain palynological data for the Middle Archaic occupation we must look further afield to lake bottom sediment cores that provide longer sequences. A core from

Ham's Lake (Bennett 1987), located about 30 km west of the Little Shaver site, is typical of the region. It indicates a mixed beech-oak-elm hardwood forest environment during Middle Archaic times (circa 5,000 B.P.). However, this represents the dominant upland forest of the

period. Species like maple and basswood were also present (at 7 percent and 3 percent respectively) and would have occupied moist areas like valley floors. Moreover, both maple and basswood are low pollen producers and were probably more common in the vegetation than the pollen diagrams suggest (Bennett 1987:1798). Thus, it is possible that the sugar maple-basswood forest of the Early Woodland existed around Little Shaver from at least Middle Archaic times. The main environmental change between the two periods would have been the transformation of a high energy creek in the Middle Archaic period to a swamp in the valley floor during the Early Woodland period.

Why did early aboriginal groups return to the Little Shaver site and other sites in the vicinity over several thousand years? While the answer to this question is not yet clear, it is possible that people were attracted to the area to exploit the resources of the creek or swamp, or to tap maple trees for sap in the spring. The function of the site is further explored later in this paper.

FIELDWORK

The site was discovered in 1991 when initial test pitting at five-metre intervals revealed a single chert flake. More intensive test pitting at two to three-metre intervals yielded two more pieces of chert and a single calcined bone fragment within an area measuring approximately five metres (east to west) by ten metres (north to south).

Excavation of a series of one-metre-square units located at five-metre intervals confirmed the small site size and revealed that the deposit was up to 25 cm deep and was unstratified. The typical soil profile consisted of a leaf mat overlying a thin layer of dark brown, humic topsoil, which in turn overlay yellow sand subsoil. No diagnostic artifacts were found during either the initial survey or the test excavation stage.

The initial units excavated indicated that most of the cultural material was recovered from the topsoil-subsoil interface and from the subsoil. To maintain vertical control on a site where no stratigraphy was apparent, a combination of natural and arbitrary excavation units was employed. Level One, consisting of the topsoil layer averaged six cm in depth with little variation. After the removal of Level One,

arbitrary five-centimetre levels following surface contours were used. Level Two consisted of the topsoil-subsoil interface, and Levels Three through Five extended 15 cm into sub-soil.

The site was excavated one level at a time by digging several contiguous squares to permit an assessment of soil changes and artifact distributions over several square metres at once. All excavation was conducted by trowel. Artifact locations were piece plotted to record their horizontal distribution with the aid of a portable grid divided into ten centimetre units. Soil was screened through six-millimetre mesh to recover artifacts not found *in situ*. A site plan showing artifact locations, features, and disturbances was prepared for each level. Due to time constraints, not all flakes within dense debitage concentrations were piece plotted, although enough flakes were plotted to adequately document each debitage cluster. In the end, approximately half of the cultural material was piece plotted.

Although the site had not been ploughed, several minor disturbances were noted in the field (Figure 3). These included the root systems of two standing trees in the central portion of the site, a large root complex in the southeast quarter, a groundhog burrow in the northwest quarter, and two linear stains of indeterminate origin in the northeast quarter of the site. While these disturbances obviously caused some disruption of artifact distribution patterns, the degree of disturbance must be considered less than on a ploughed site.

SITE CONFIGURATION AND FEATURE ANALYSIS

The excavations revealed artifacts and features distributed over an area measuring 17 by 6 metres, oriented northwest to southeast. The distribution of formal tools, fire-broken rock, and features is shown in Figure 3. One-metre-square excavation units are designated by their northwest corner in relation to the ONOE point.

All diagnostic Middle Archaic artifacts were found north of the 1 North line, designated as the North area in Figure 3. Two of the three Early Woodland (Meadowood) artifacts were found in the South area and the third was located just a short distance to the north (Figure 3). This distribution of diagnostic artifacts

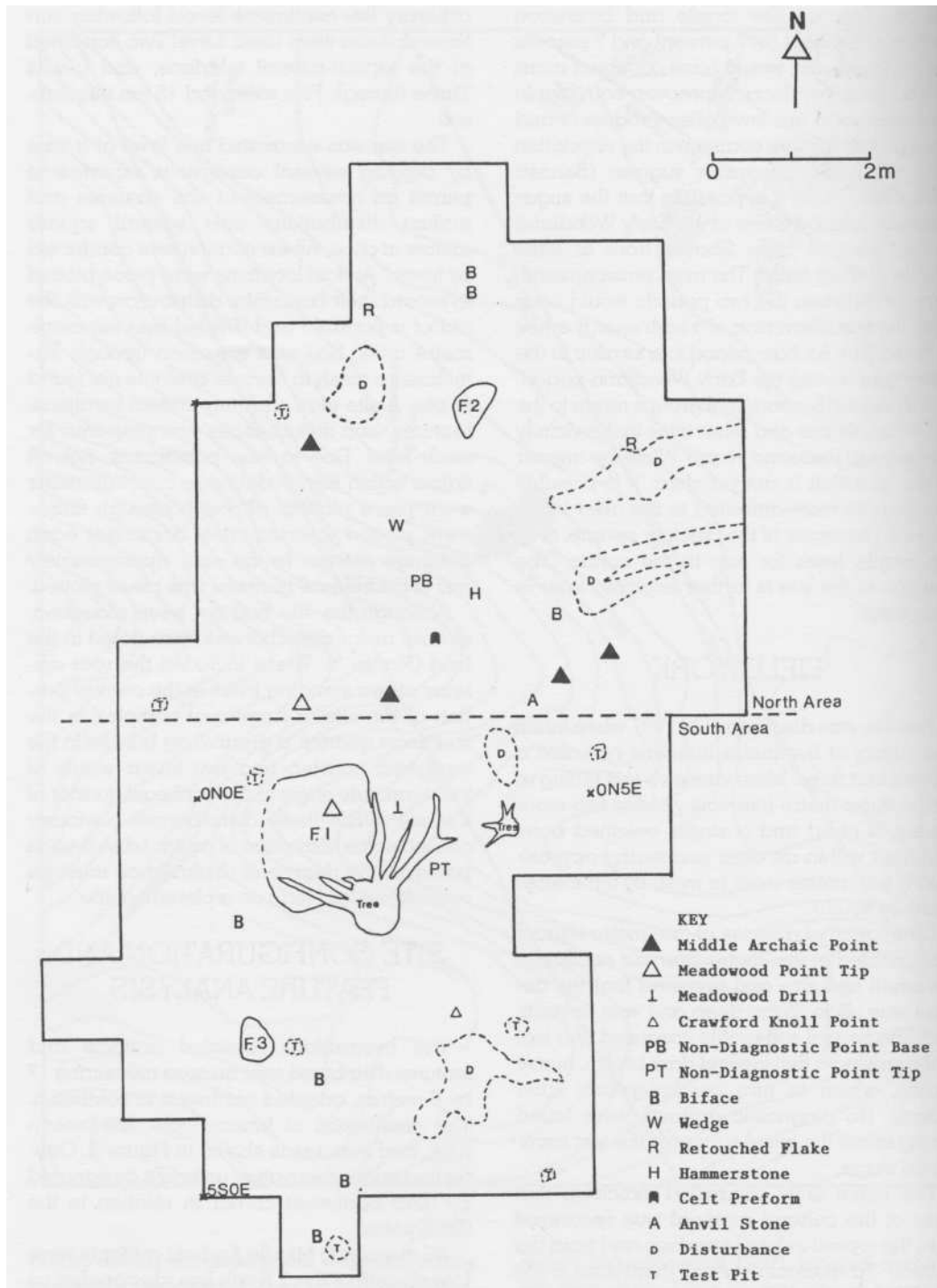


Figure 3. Distribution of Diagnostic Artifacts and Features

Table 1. Little Shaver Site Artifact Inventory

Artifact Type	f	%
Projectile Points	9	.5
Drill	1	.1
Biface Knives	3	.2
Biface Fragments	5	.3
Retouched Flakes	2	.1
Wedge	1	.1
Utilized Flakes	31	1.8
Debitage	1644	96.5
Core	3	.2
Abrader	1	.1
Hammerstone	1	.1
Ground Stone Fragment	1	.1
Celt Preform	1	.1
Total	1703	100.2

approximately 175 cm by 150 cm at the subsoil surface and extended 15 cm into subsoil. Most of the calcined bone, 118 of the flakes, and half of the charcoal was recovered from a flotation sample. The presence of the calcined bone and 15 heated flakes suggests that there may have been a hearth in the immediate vicinity. While there were no diagnostics re-covered in the subsoil deposit, a well made Meadowood point tip was found in Level 2. This feature was not marked by soil discolouration and may simply be a refuse-filled depression rather than an intentionally formed pit. Feature 2, at the northern end of the site, measured 75 cm by 47 cm and extended 17 cm into subsoil. Flotation samples contained 68 pieces of calcined bone, 8 small flakes and 1.1 g of wood charcoal. Two of the flakes were heated. The feature outline was based on artifact distribution and soil texture as no soil discolouration was noted. The soil within the feature was harder than the surrounding soil and may have been "baked". In addition to the

suggests some spatial separation of the Middle Archaic and Early Woodland components, but does not preclude the possibility that these two occupations overlapped.

Three features were discovered (Figure 3). Their profiles were uninformative as there was little soil discolouration in Features 1 and 2, and Feature 3 extended only six centimetres into subsoil. Flotation samples taken from each feature yielded calcined bone fragments, several very small pieces of debitage, and small amounts of carbonized plant remains. The flakes were analyzed microscopically for evidence of heat alteration with only pot-lid fractures accepted as definitive evidence of heating.

Feature 1 was centred on square 0N1E but extended beyond that unit to the north, south and east. It was a large, dense concentration of debitage (185 flakes) associated with 34 pieces of calcined bone and 1.34 g of wood charcoal. The flake distribution measured

material recovered in the flotation samples, Level 3 in these units yielded 72 pieces of calcined bone, 22 pieces of debitage (1 heated), and 2 fire-broken rocks. Most of this material also relates to this feature.

The contents of Feature 2 had obviously been heat altered. As noted below, this feature may be related to a circular cluster of fire cracked rock found in adjacent square 4N3E, as part of a hearth complex (Figures 8, 9 and 10).

Feature 3 was an ovate feature located in the South area. It measured 65 cm by 40 cm and extended 6 cm into subsoil. The fill was grey brown with ash and wood charcoal visible. The profile was a shallow basin shape. The west half of this feature was screened resulting in the recovery of 2 pieces of debitage, one of which was burnt. Soil from the east half of the feature was processed by flotation and yielded 6.1 g of charcoal, 27

pieces of chipping detritus (1 heated), and 2 pieces of calcined bone. Feature 3 is interpreted as a hearth.

ARTIFACT ANALYSIS

The excavations resulted in the recovery of 1,703 pieces of stone tools and flaking debris. The total artifact inventory is listed in Table 1.

The tool collection is small, but it is sufficient to demonstrate the presence of at least two occupations at the site. These include a Middle Archaic occupation, evidenced by the presence of thick, broad bladed notched projectile points, and an Early Woodland occupation, indicated by a Meadowood drill and two point tips. The Middle Archaic occupation is the dominant component, while the Early Woodland occupation is minor, and the single Late Archaic small point is regarded as an isolated find. Metrics and other attribute data for the diagnostic artifacts are found in Table 2.

Analytical Methodology

The debitage was analyzed according to material type and morphological flake type. Flake types were chosen for the information that they may contribute to our understanding of the stone tool reduction sequence.

Primary flakes are defined as flakes from cores which normally have platform to ventral surface angles near 90 degrees and may have cortex adhering to their platforms or dorsal surfaces.

Secondary flakes are from biface reduction, thinning, and retouch. They normally have obtuse platform to ventral surface angles and may vary from large flakes (initial stages of biface reduction) to very small flakes (biface finishing or retouch). No attempt was made to separate the secondary flake category into biface thinning and biface retouch flakes. These flake types represent the by-products of a reduction sequence continuum, which makes the distinction between biface thinning and biface retouch flakes rather arbitrary and unlikely to be consistently observed.

Uniface retouch flakes (Deller and Ellis 1992:86-87) were tabulated separately to quantify scraper use and resharpening. These distinctive flakes have small, flat platforms, combined with evidence of step fractures on the dorsal flake surface. The dorsal surface is

usually markedly curved, following the surface characteristics of the "parent" tool.

Finally, flakes lacking proximal ends were classified as fragments, while blocky flakes with no clear morphological pattern were classed as shatter.

Raw materials were identified macroscopically with the aid of samples from the Ministry of Transportation and the Ministry of Citizenship, Culture and Recreation (MCZCR) reference collections. Microscopic comparisons with samples of known geological provenience were made as necessary.

Tools were grouped into bifaces, unifaces, and utilized flakes. The biface category includes such functional types as projectile points, knives, preforms, drills, and wedges. The uniface group includes only retouched flakes, scrapers being totally absent. Following Woodley (1990:19), utilized flakes were classified into several categories according to wear location and hypothesized manner of use.

Bifaces

The biface collection includes nine projectile points, one drill, three backed knives, one preform, one wedge, and five biface fragments. These tools are described in detail below.

Projectile Points. Four of the projectile points may be classed as Brewerton Side-notched or Corner-notched forms, although they all appear to have been substantially modified by resharpening. These four points illustrate a continuum in the reworking and resharpening of Brewerton points, likely for use as notched knives. Such resharpening may result in a variety of forms being produced from a single original form — the broad bladed Brewerton Corner-notched point. Most points in the assemblage were likely discarded because they were at or near the end of their use-lives. Metric data are provided in Table 2 and the points are shown in Figure 4.

The first point (from 2N2E, L.2) is broad bladed, relatively thick and well made. It is corner-notched with an expanding stem. The blade edges are convex and finely retouched and the base is slightly convex and lightly ground. It is bi-convex in cross-section and is made from mottled light grey Onondaga chert (Figure 4:a).

The second specimen (from 2N5E, L.3) is

Table 2. Little Shaver Site Biface Data

Provenience	Tool Type	Form	L	BW	IW	SW	T	Comment
2N2E L.2	Point	Triangular Stemmed	43	17	-	30	9	Middle Archaic reworked base
2N5E L.3	Point/Knife	Triangular Side Notched	37	18	13	24	8	Middle Archaic round tip - knife?
5N1E L.3	Point	Triangular Notched/ Stemmed	35	19	-	29	10	Middle Archaic reworked base
2N4E L.2	Point	Triangular	37	18	15	19	7	Middle Archaic reworked as a knife
253E L.1	Point	Triangular Side Notched	27	(10)	9	18	6	Terminal Archaic Crawford Knoll
3N2E L.3	Point	Base Frag Notched	-	16	9	-	(5)	Terminal Archaic?
0N3E L.2	Point	Tip Frag	-	-	-	-	9	Unknown Affiliation
0N1E L.2	Point	Tip Frag	-	-	-	(23)	4	Early Woodland Meadowood?
2N1E L.2	Point	Tip Frag	-	-	-	(17)	3	Early Woodland Meadowood?
0N2E L.1	Drill	Triangular Side Notched	36	22	16	18	5	Early Woodland Meadowood
4S1E L.2	Backed Knife	Irregular	37	27	n/a	n/a	11	Similar to 5S1 E
5S1E L.3	Knife?	Tip Frag	-	-	n/a	n/a	4	Similar to 4S1E
7N3E L.2	Knife	Semi-Lunar	35	22	n/a	n/a	8	Preform abandoned in manufacture
7N3E L.2	Biface	Edge Frag	-	-	-	-	5	
3S1E L.2	Biface	Base Frag?	-	-	-	-	5	
1S0E L.3	Biface	Edge Frag	-	-	-	-	4	
3N4E L.2	Biface	Edge Frag	-	-	-	-	5	
4N2E L.3	Wedge	Red	15	16	-	-	5	Piece Esquillee
2N5E L.2	Biface	Unknown	-	-	-	-	8	

Key: L = Length, BW = Base Width, IW = Inter-Notch Width, SW = Shoulder Width, T = Thickness, Rect = Rectanguloid, Frag = Fragment.

Note: All artifacts are made from Onondaga chert except the point from 2N5E which is made from Ancaster chert.

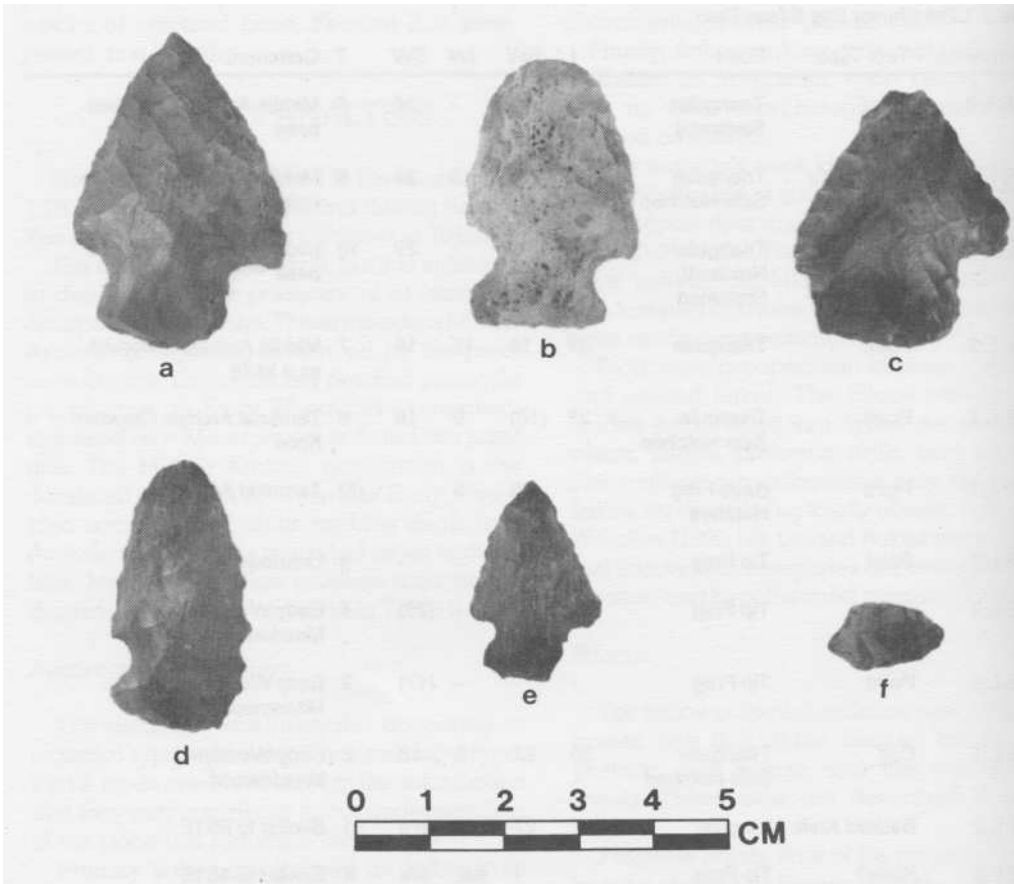


Figure 4. Projectile Points, Little Shaver Site

- (a) Middle Archaic point, Onondaga chert (2N2E, L.2)
- (b) Middle Archaic point/knife, Ancaster chert (2N5E, L.3)
- (c) Middle Archaic point, Onondaga chert (5N1E, L.3)
- (d) Middle Archaic point/knife, Onondaga chert (2N4E, L.2)
- (e) Late Archaic Crawford Knoll point, Onondaga chert (2S3E, L.1)
- (f) Unidentified point base, Onondaga chert (3N2E, L.3)

made from whitish-brown Ancaster chert. It is side-notched on one side and corner-notched on the other. The base is straight and unground (Figure 4: b). The lateral edges are convex and converge at a rounded blunt tip. The tip has been bifacially retouched and shows edge rounding suggesting use as a knife. It is bi-convex in cross-section.

The third point (from 5N1E, L.3) appears to have been significantly altered. It is fairly thick with straight lateral edges that suggest extensive resharpening (Figure 4: c). Resharpening on one lateral edge has removed all of the

barb so that only a slight shoulder is left. The opposite lateral edge is corner-notched and the basal corners have been broken, reworked and ground, giving the appearance of a basal stem derived from what was previously a notched hafting element. The raw material is a mottled, light grey Onondaga chert.

The fourth specimen (from 2N4E, L.2) is narrower but as thick as the first three. One lateral edge has extensive retouch that has removed the barb, although a remnant of the notch remains (Figure 4: d). The retouched lateral edge is convex, sinuous and sharp. This

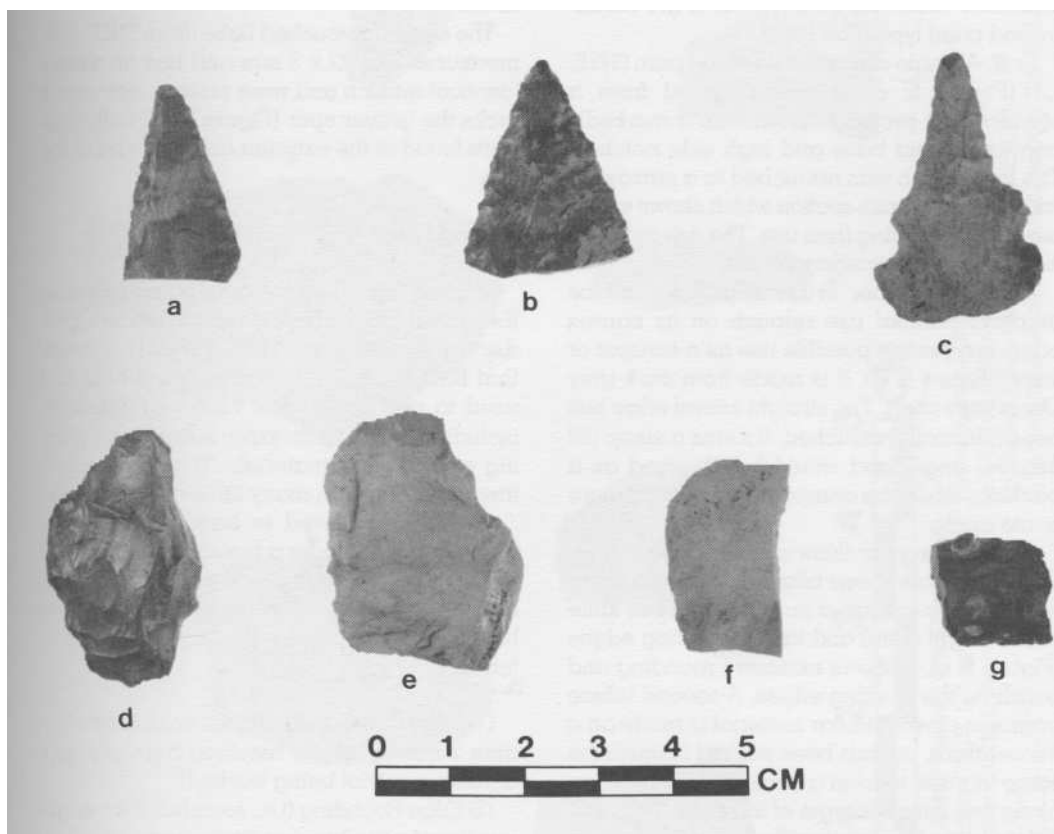


Figure 5. Miscellaneous Tools, Little Shaver Site

- (a)(b) Meadowood point tips, Onondaga chert (2N1 E, L.2 and 0N1 E, L.2)
 (c) Meadowood drill, Onondaga chert (0N2E, L.1)
 (d) Semi-lunar biface, Onondaga chert (7N3E, L.2)
 (e)(f) Biface knives, Onondaga chert (4S1E, L.2 and 5S1E, L.3) (g)
 Wedge, Onondaga chert? (4N2E, L.3)

tool may have been modified for use as a knife and also has some edge rounding on the tip. The opposite lateral edge is side-notched and the base is convex and unground. The material is light, grey-brown Onondaga chert.

The final complete point in the collection (Figure 4: e) is a small corner-notched form (from 2S3E, L.1) that is very similar to the Craw-ford Knoll type (Kenyon 1980). It has slightly convex lateral edges and an unground convex base. It is plano-convex and quite thick in cross-section. The raw material is mottled,

grey-brown Onondaga chert.

One small base fragment (from 3N2E, L.3) made from Onondaga chert has a heavily ground convex basal edge, but is too fragmentary to be typed (Figure 4: f).

There are three projectile point tips in the collection (Table 2). One of these (from 0N3E, L.2) is a very thick piece made from grey-brown Onondaga chert. Its cultural affiliation is unknown. The other two are very similar to each other, being thin, finely flaked point tips made from a mottled, dark grey Onondaga

chert (Figure 5: a - 2N1E, L.2, ,b - 0N1E, L.2). Both exhibit straight lateral edges and flat lenticular cross-sections typical of the Meadowood point type (Fox 1980).

Drill. A single drill was recovered from 0N2E, L.1 (Figure 5: c). It was recycled from a Meadowood projectile point with a markedly convex ground base and high side notches. The foresection was retouched to a narrow tip with an ovate cross-section which shows extensive edge rounding from use. The raw material is grey-brown Onondaga chert.

Knives. A rather crude semi-lunar biface displays bifacial use retouch on its convex edge, suggesting possible use as a scraper or knife (Figure 5: d). It is made from dark grey Onondaga chert. The straight lateral edge has been *minimally* retouched; it forms a steep (62 degree) angle and would have served as a backing, while the convex edge forms a more acute angle.

A thick, irregular flake of grey-brown Onondaga chert has been bifacially worked along two margins to form a naturally-backed knife with straight distal and lateral working edges (Figure 5: e). It shows extensive rounding and polish on the working edges. A second biface fragment of very similar material is made on a thinner flake, but has been worked in much the same manner to form a straight working edge along one lateral margin of the flake (Figure 5: f). It is quite fragmentary making it difficult to ascertain its original and final forms.

Wedge. A single rectanguloid wedge shows evidence of battering along three edges, while the fourth edge displays a heat induced fracture (Figure 5: g). The dark grey chert is probably Onondaga, although the heat alteration makes material identification difficult.

Retouched Flakes

There are only two retouched flakes in the collection. Both are lustrous dark Onondaga chert and are made on ovate flakes with convex lateral edges and plano-convex cross-sections, although they differ significantly in size. The larger specimen (from 7N2E, L.3), measures 57 by 31 by 5 mm and has been alternately retouched on the two lateral edges (Figure 6: a). It also displays use retouch on the opposite face of each intentionally-retouched edge. This wear pattern, on the dorsal and ventral surfaces of both lateral edges, sug-

gests knife use. There may also be one small graver spur near the proximal end on one lateral edge.

The second retouched flake (from 5N5E, L.2), measures 29 x 22 x 3 mm and has an almost identical retouch and wear pattern, although it lacks the graver spur (Figure 6: b). Both tools were found at the extreme northern end of the site.

Utilized Flakes

Utilized flakes are the most common tool in the assemblage. Experimental studies conducted by Callahan (1981:197-201) indicate that flakes may be hafted or hand held and used to perform a wide variety of functions, including cutting, scraping, sawing and planing various plant materials. This may explain their dominance in many lithic assemblages.

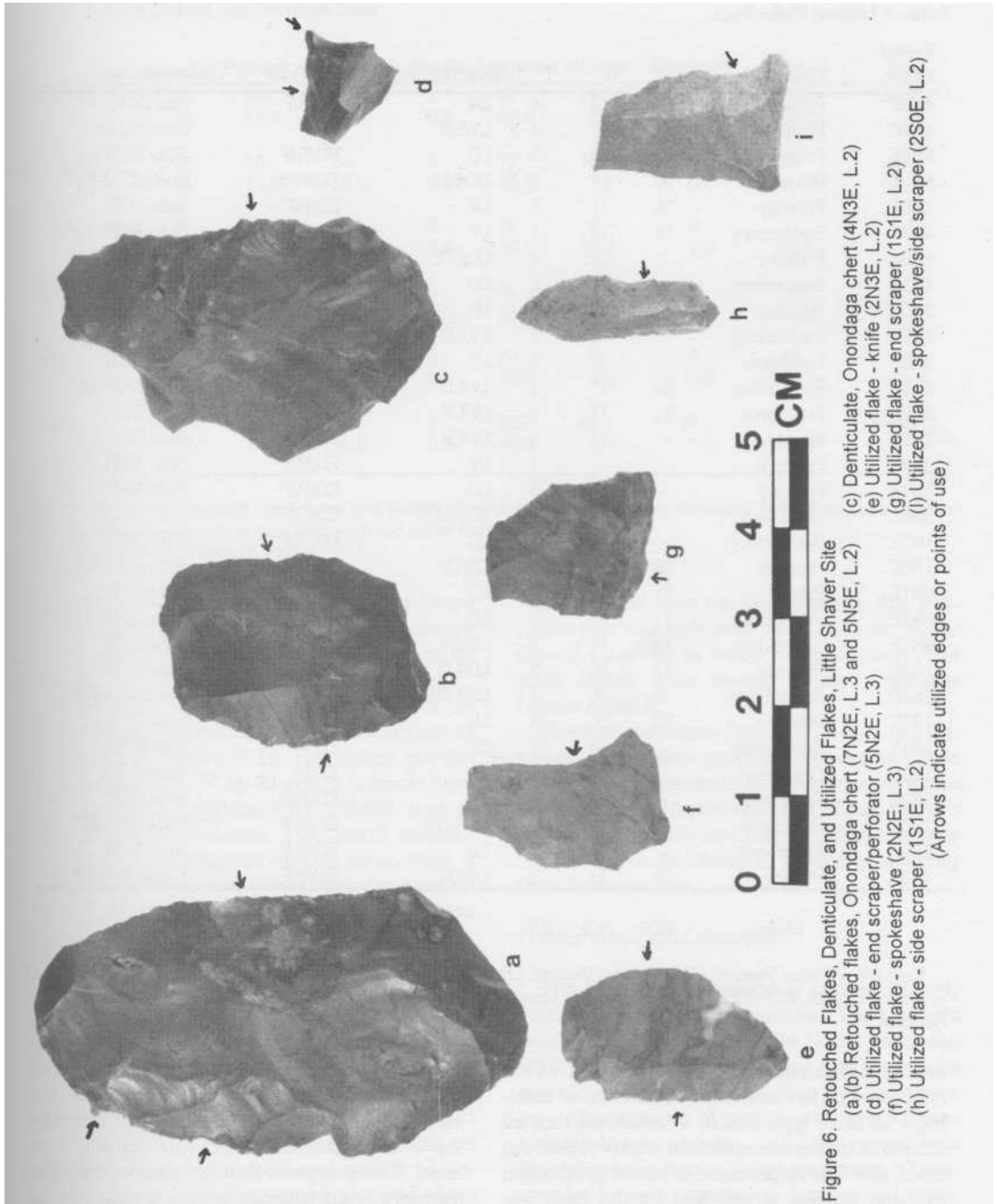
All flakes believed to have been utilized were examined under a binocular microscope (16 - 80 X magnification) to confirm that they had been used. Flakes accepted as utilized had at least two of the following edge characteristics:

- (1)Edge Damage (i.e., small flake scars, less than 2 mm in height, resulting from pressure against material being worked);
- (2)Edge Rounding (i.e., rounded flake edges resulting from abrasion during use); or
- (3)Polish (i.e., a bright or dull polish resulting from use).

The utilized flake data are provided in Table 3, and several utilized flakes are shown in Figure 6: c-i. As Table 3 shows, there is considerable variation in the location and type of wear observed. Although this tends to support the notion that utilized flakes were used for a variety of tasks, the majority of these tools have only unifacial edge wear which suggests that they were used in a scraping fashion. The large number of utilized flakes believed to have been used for scraping is of interest since there are few "formal" scrapers in the assemblage.

Debitage

As Table 4 shows Onondaga chert comprises 85 percent of the total debitage. There are Onondaga chert outcrops approximately



30 km south of the site in several areas on and near the north shore of Lake Erie between Villa Nova and Fort Erie. It also occurs in glacial till in the vicinity of the site.

Ancaster chert is the second most common debitage material in the collection (9 percent). This chert occurs in the Goat Island member of the Middle Silurian Lockport formation (Eley and von Bitter 1989:20). It outcrops in a distinct stratigraphic unit along the top of the Niagara

Table 3. Utilized Flake Data

Proven- ience	Flake Type	L	W	T	Wear Location	Wear Type	Inferred Use
4N3E	Primary	20	19	4	DV	ED/R/P	End SCR
4N3E	Primary	44	27	4	LV/LD	ED/P	Denticulate
6N1E	Primary	37	20	5	LD	ED/R/P	Side SCR
5N2E	Primary	20	13	4	DD/LD	ED/P/R	End SCR/PERF
4N5E	Primary	15	15	2	LV	ED/R/P	Side SCR
4N3E	Secondary	15	12	1	LV	ED/R/P	Side SCR
4N2E	Primary	-	25	4	LD/LD	ED/R/P	Side SCR
4N1E	Secondary	-	13	2	LD	ED/R/P	Side SCR
3N5E	Primary	25	19	4	LD	ED/R/P	Side SCR
3N2E	Secondary	-	11	2	LV/LD	ED/R/P	Side SCR
3N2E	Fragment	-	9	2	LV	ED/R/P	Side SCR
2N3E	Secondary	26	17	3	LV/LD	ED/R/P	Side SCR/KNI
2N2E	Fragment	24	17	2	LV/LV	ED/R	Side SCR
2N2E	Primary	-	12	2	LV/LD	ED/R/P	Side SCR/KNI
2N2E	Primary	-	-	1	LV	ED/R/P	Side SCR
2N1E	Primary	-	23	3	LD	ED/R/P	Side SCR
2N0E	Fragment	-	17	1	LDV/LDV	ED/RIP	Knife/SCR
1N3E	Secondary	-	11	2	LD	ED/R/P	Side SCR
1N0E	Primary	29	11	3	LD/LV	ED/R/P	Side SCR/KNI
0N1E	Primary	21	16	2	LD	ED/R	Side SCR
0N1E	Secondary	19	6	2	LD	ED/R/P	Side SCR
0N1E	Secondary	19	13	2	LD/LV	ED/R/P	Side SCR
1S3E	Primary	21	10	2	LD/LD	ED/R/P	Side SCR
1S1E	Secondary	10	8	1	LD/LD/DD	ED/R/P	Random SCR
1S1E	Primary	23	7	2	LD	ED/P	Side SCR
1S1E	Secondary	-	18	2	DD	ED/P	End SCR
1S1E	Fragment	-	10	1	LD	ED/P	Side SCR
2S3E	Fragment	-	14	4	LD	ED/P/R	Side SCR
2S0E	Fragment	-	16	3	LD/LDV	ED/R/P	Side SCR/KNI
2S0E	Fragment	-	-	2	LD	ED/R/P	Side SCR
3S3E	Primary	15	11	2	LV/LV	ED/R/P	Random SCR
Mean		22.5	14.5	2.5			

Key: DV = Distal Ventral, LV = Lateral Ventral, LD = Lateral Dorsal, LDV = Lateral Dorsal and Ventral, DD = Distal Dorsal, ED = Edge Damage, R = Rounding, P = Polish, SCR = Scraper, KNI = Knife, PERF = Perforator.

escarpment near Clappison's Corners, 14 km northeast of the site. The breakdown of debitage by flake type (Table 4) indicates that all stages of biface manufacture were carried out at the site. The importance of biface production at Little Shaver is attested by the high frequency of secondary flakes and flake fragments, which are often pieces of thin secondary flakes. Scraper retouch flakes are extremely rare, comprising only .5 percent of the assemblage (n=7). This corresponds to the low occurrence of formal scrapers in the collection.

Primary flakes comprise only 12 percent of the collection and are relatively consistent

across chert types. Most primary flakes do not exhibit cortex (99.2 percent). Among those that do, nodular (n=7 or .4 percent) and tabular (n=7 or .4 percent) cortex are equally common. This suggests that both secondary and primary chert sources were exploited by the site occupants.

Rough Stone Artifacts

There are three rough stone tools in the assemblage: an anvil stone, a cell preform, and a hammerstone. They are referred to as rough rather than ground stone tools because

Table 4. Little Shaver Site Debitage Data

		Primary	Secondary	Scr Ret	Fragment	Shatter	Unknown	Total	%
Onondaga	f	149	489	7	571	29	24	1269	85.2
	%	11.7	38.5	0.6	45.0	2.3	1.9	100.0	
Ancaster	f	15	34	0	77	10	0	136	9.1
	%	11.0	25.0	0.0	56.6	7.4	0.0	100.0	
Unidentified	f	5	11	0	9	6	0	31	2.1
	%	16.1	35.5	0.0	29.0	19.4	0.0	100.0	
Other Cherts	f	1	0	0	5	0	0	6	0.4
	%	16.7	0.0	0.0	83.3	0.0	0.0	100.0	
Slate	f	9	15	0	24	0	0	48	3.2
	%	18.8	31.3	0.0	50.0	0.0	0.0	100.0	
Total	f	179	549	7	686	45	24	1490	100.0
	%	12.0	36.9	0.5	46.0	3.0	1.6	100.0	

Note: Other Cherts include Haldimand and Selkirk. The Unidentified category excludes 149 flakes from flotation that are less than 6 mm in size and were too small to permit identification. Scr Ret = Scraper Retouch Flake

they are either crudely chipped or pitted from use, but they are not ground. The provenience of these artifacts suggests that they can be assigned to the Middle Archaic occupation.

The anvil stone (from 2N4E, L.3), is of an elongate rectanguloid form and is broken in mid-section (Figure 7: b). The extant portion measures 137 by 57 by 32 mm. It is made from a fine-grained sedimentary cobble and is smooth on all surfaces. Two small isolated areas of pitting appear on one face, while a single, less-intensively pitted area appears on the opposite face. Some of the pitting marks are longitudinal, extending up to 16 mm in length. These are not striations or grooves from abrasion, but appear to be marks created by blows from a bit-ended implement such as a celt. None of the pitted areas are extensive and this tool seems to have seen minimal anvil use.

The celt preform (3N3E, L.2) is made of slate and is quite large, measuring 191 by 74 by 25 mm (Figure 7: a). It is rectanguloid with an oblique break at the poll end and a piano-piano cross-section. It is roughly chipped along both lateral edges but has not been pecked or ground. It shows no obvious traces of wear under microscopic examination, and it seems to have been abandoned during the process of manufacture. There were 48 slate flakes recovered in the excavation, 32 of which were found in two adjacent units located one metre east of the celt location. Assuming that the slate flakes

were derived from the celt preform, this suggests that the celt was deposited or abandoned close to its locus of production. The slate flakes were evenly divided between Levels 2 and 3.

The hammerstone (from 3N3E, L.3), is fragmentary and was probably fire-broken. It is smoothed on the remaining exterior surfaces and measures 45 mm wide and 37 mm thick. It is angular in form and displays three heavily worn areas on its "corners", probably resulting from hammer use.

Faunal and Floral Analysis

The faunal assemblage is almost entirely calcined and highly fragmented. The analysis was conducted by Christine Dodd using the MCZCR comparative collection and the results are summarized in Table 5. Due to its fragmentary nature, none of the faunal material was identifiable to species, but 59 percent was identifiable to class. Of this total, over 57 percent belonged to medium to large-sized mammals. On the basis of knowledge of southwestern Ontario game populations (Banfield 1977:391-394) and aboriginal hunting practises we can speculate that most of this bone is probably deer.

One bird bone was recovered. It is the only non-calcined bone in the collection and came from a large to medium sized bird. Its non-

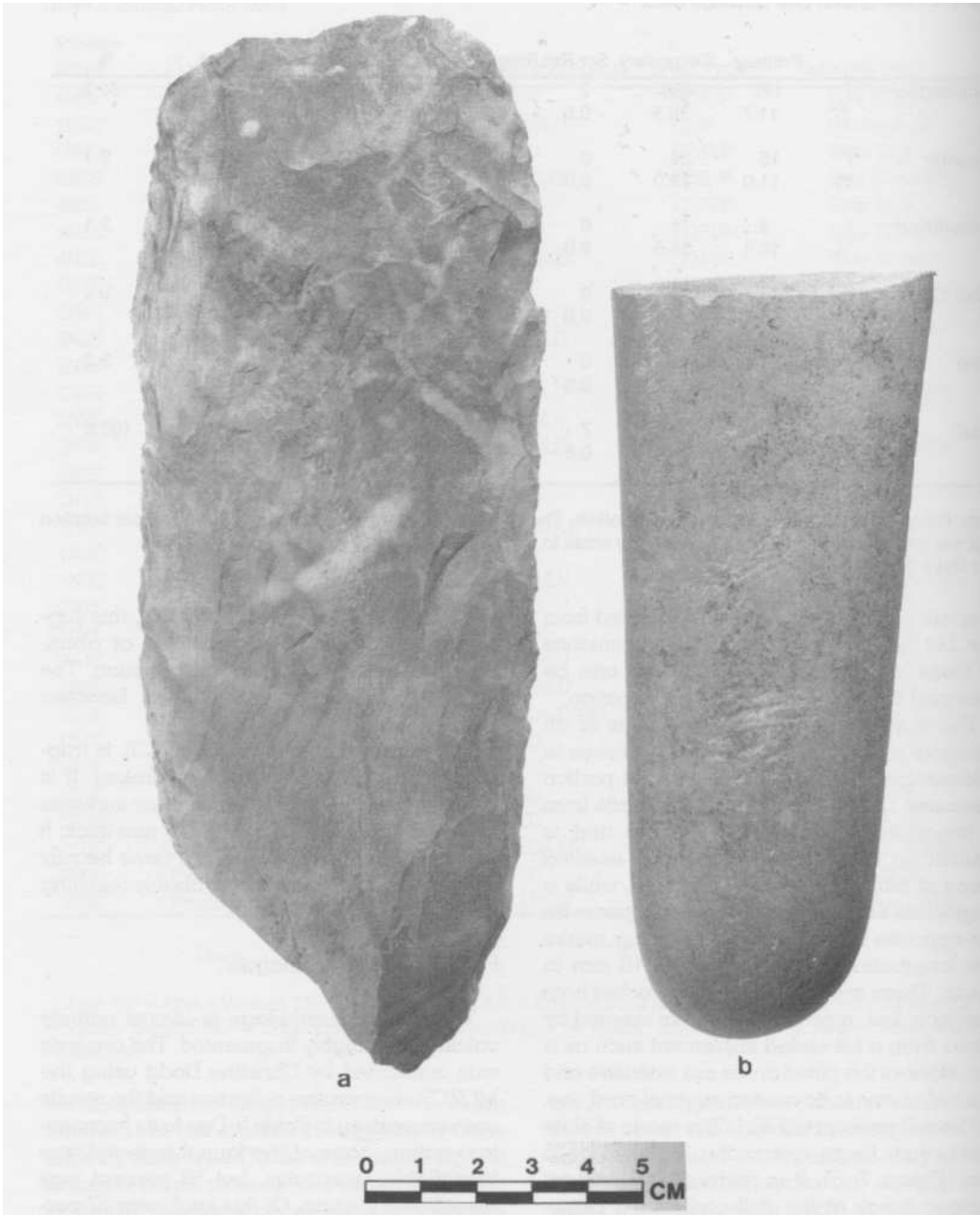


Figure 7. Rough Stone Tools, Little Shaver Site
 (a) Celt preform, slate (3N3E, L.2)
 (b) Anvil stone (2N4E, L.3)

calcined state is unusual on this site and may indicate that it is intrusive. This is supported by the fact that it was found in Level 1, while

almost all the remaining bone was recovered from Levels 2 and 3.

A very small amount of carbonized wood

Table 5. Faunal Analysis

Class		f	%
Mammal			
Unidentified	- large	13	7.1
	- medium	2	1.1
	- med to large	92	50.3
Subtotal		107	58.5
Bird			
Unidentified	- med to large	1	.5
Class Uncertain			
Fragments	- calcined	75	41.0
Total		183	100.0

was recovered from flotation samples taken from features. No seeds were identified and the wood charcoal is too fragmentary to permit species identification. AMS radiocarbon dating was not undertaken due to cost constraints.

CULTURAL AFFILIATION

There is little doubt that the single drill and two thin, well-made point tips represent a Meadowood occupation. The recycling of Meadowood points into drills, along with other tools, is well documented (Ellis et al. 1988; Granger 1978), and the high side notches and markedly convex basal form of the Little Shaver specimen is typical of what Granger (1978:40) has called the "Ontario variant" of the Meadowood point. Likewise, the two tips can be assigned to Meadowood on the basis of their thinness, form and raw material (Fox 1980; Justice 1987:170). It is estimated that Meadowood sites date to the period 900 to 400 B.C. in southern Ontario (Spence et al. 1990: 128).

The small, complete corner-notched point falls nicely within the size range of the Craw-

ford Knoll point type (Kenyon 1980) and exhibits typical Crawford Knoll characteristics, including convex lateral edges and base, and a lack of basal grinding. Crawford Knoll points are dated between 3,300 and 2,900 B.P. (Ellis et al. 1990:107). As noted previously, this point is an isolated find.

While the Meadowood and Crawford Knoll points in the assemblage are easily classified, the same cannot be said for the thicker, broad-bladed specimens that appear to represent the major component at the site (Figure 4: a-d). These points all share certain characteristics in size and overall shape. They are all relatively thick and crudely flaked and were probably all corner-notched at one time. They have been reworked to varying degrees and may reflect different stages in the use-life of what is essentially the same point form.

Collectively these points show greatest similarities to the Brewerton Side-notched and

Brewerton Corner-notched types, which are both rather variable forms (Justice 1987: 115-118; Kenyon 1981; Ritchie 1961:16,19). A resharpening continuum between the thick, broad-bladed Brewerton Corner-notched and Brewerton Side-notched forms is recognized by Justice (1987:115) and Ellis et al. (1990), accounting for some of this variability.

According to Justice (1987:115), the distinctive characteristics of Brewerton points include triangular blades with bi-convex cross-sections, very wide shoulders extending beyond the basal ears, excurvate lateral edges, and straight or slightly convex bases that are often ground. With resharpening of the blade the hafting element may change from side-notched to corner-notched to expanding stemmed (Ellis and Deller 1986:50). This process may be observed on the Little Shaver specimens shown in Figure 4. One point (Figure 4: a) was asymmetrically resharpened, and a similar modification completely removed one notch on two other specimens (Figure 4: c,d), apparently in preparation for use as a knife. Finally, the specimen in Figure 4: b has a reworked (rounded) tip, presumably for

scraper or knife use.

Basal corners are broken or reduced on three specimens (Figure 4: a,c,d), resulting in a stemmed appearance. On two of these (Figure 4: c,d) a basal corner was removed as part of the reshaping process, perhaps for use as a knife.

Ellis and Deller (1986) have reported on Brewerton-like points from sites in the south-east Huron basin that have been water-rolled by the high waters of post-glacial Lake Nipissing. These points must be at least as old as the Nipissing high water stage, which dates to circa 5,000 B.P. (Karrow and Warner 1990:21). Based on comparisons with dated sites yielding similar points from eastern Ontario, New York State, and Michigan, Ellis et al. (1990:72) have suggested a 5,000 to 4,500 B.P. date range for Brewerton-like points in southwestern Ontario. For the Brewerton phase proper, Ritchie has suggested a range between 2,980 and 1,723 B.C. based on a small number of (uncalibrated) radiocarbon dates (Justice 1987:115; Ritchie 1969:91).

In New York State and adjacent southeastern Ontario Brewerton side and corner-notched points are diagnostic of the Brewerton phase of the Laurentian Archaic tradition (Ellis et al. 1990:85-93; Funk 1988:28; Ritchie 1969:89-103; Wright 1972:74). As defined by Ritchie, the Laurentian Archaic is characterized by a range of ground and polished stone tools including semi-lunar knives, plummets, slate projectile points, gouges, adzes and ungrooved axes. Wright (1972:76) prefers a broader definition and argues that the frequencies of the 'index fossils' [i.e., ground stone tools] are too low to be solely relied upon for designating a site Laurentian Archaic". In southern Ontario the entire range of ground stone tools is only found in the southeastern part of the province, confined to the Canadian biotic province. While sites in the southwest of the province may yield Brewerton-like points they generally lack the same range of ground stone tools and are not considered to be Laurentian Archaic by some researchers (Ellis et al. 1990). According to Funk, the Brewerton phase distribution extends from western New York State to the north shore of Lake Ontario (Funk 1988:7). The Little Shaver site lies on the extreme western fringe of this Brewerton distribution.

The Little Shaver site shows evidence of a rough stone industry including the cell preform, anvil stone, and hammerstone described above, but none of the typical Laurentian Archaic ground stone tools are present. It is suggested that the Middle Archaic materials from the site may be assigned to a Brewerton-like rather than a classic Laurentian Tradition Brewerton phase component. I have followed Ellis et al. (1990) in referring to Laurentian and Laurentian-like material as Middle Archaic rather than Late Archaic as some researchers have done in the past (cf. Funk 1988).

Finally, the broad-bladed Little Shaver points share similarities with the recently defined Berrien Corner-notched type found in southwestern Michigan. Clark recognizes affinities among Berrien points and Brewerton, Feeheley, and Crawford Knoll points (Clark 1990:68). On the basis of radiocarbon dates associated with Berrien points in feature contexts, he argues that this point type spans the Late Archaic and Early Woodland periods, possibly extending into the Middle Woodland (Clark 1990:59-60). If this is correct, it suggests that there is much greater typological variety in Late Archaic-Early Woodland points than has previously been recognized. It also raises the possibility that the Little Shaver site could be a single component. It should be noted, however, that the Berrien point type shows great morphological variability (Clark 1990: Plates 23-31), which limits its usefulness as a diagnostic point form.

It is useful to remember that terms like the Laurentian tradition and the Brewerton phase are purely taxonomic devices that refer to groups of shared cultural traits, mostly artifact types. Given that Archaic hunter-gatherers lived in small, highly mobile groups, our archaeological taxons for this period probably have little relationship to prehistoric ethnicity although they may indicate the sharing of similar technology (artifact types) over broad areas.

In summary, the main component at Little Shaver appears to be late Middle Archaic and the artifacts are best described as "Brewerton-like". The Crawford Knoll point is Late Archaic and the Meadowood diagnostics indicate a brief Early Woodland occupation.

ARTIFACT SPATIAL DISTRIBUTIONS AND SITE STRUCTURE

The intra-site spatial organization of hunter-gatherer sites has been a topic of much discussion in the literature over the last two decades (Binford 1978, 1983; Carr 1991; Kent 1984, 1991; Stevenson 1991; Yellen 1977). These studies have tried to develop models to account for the distribution of material on hunter-gatherer sites, and have usually focussed on physical and ecological factors as prime determinants of hunter-gatherer camp spatial organization. Factors such as site population, threat of predators, seasonality, subsistence, and group mobility have all been recognized as important variables for influencing the spatial organization of such camps (Kent 1991:33). At a more basic level, site structure is conditioned by fundamental physical and biological properties including the size of the human body, the number of people who can comfortably sit around a hearth, the need for light, and necessity for protection from heat and cold (Binford 1983:172-186). Since these properties are common to hunter-gatherers in general, it is not surprising that there is a high degree of similarity in the size and layout of hunter-gatherer camps in various cultures (Binford 1983).

Following Binford (1983) and Kent (1991), the term site structure is used here to refer to site size, arrangement of activity areas, structures, features, and the patterning of artifacts within the site. Analyzing site structure involves combining general spatial models relating to particular activities (such as working around a hearth or sleeping), to account for the overall distribution of features and artifacts (Binford 1983:172). On small hunter-gatherer sites, where evidence of structures and features is often ephemeral, the distribution of artifacts is of primary importance in interpreting site structure.

The Exterior Hearth Model

Much of the ethnoarchaeological and archaeological research on site spatial organiza-

tion has focussed on artifact distributions that are hearth centred (Binford 1978; Carr 1991; Stevenson 1986, 1991). Binford (1978) developed a model for refuse disposal and cultural site formation for men's exterior hearths based on his ethnoarchaeological work among the Nunamiut. This exterior hearth model predicts the formation of two concentric rings of refuse around the hearth: an inner "drop zone" where small items are usually deposited, and an outer "toss zone" where larger debris is tossed. Stevenson (1991) has refined this model with the addition of a "displacement zone", between the drop and toss zones, into which material is usually swept, brushed, or kicked. The drop zone around an exterior hearth is usually semi-circular since people tend to sit on the upwind side of the hearth to avoid smoke. The downwind side is often used as a toss area for larger objects. Both intentional and unintentional size sorting affects the distribution of debris around hearths. In general, larger objects tend to be displaced or tossed greater distances from hearths than are small objects (Stevenson 1991). The effects of these processes should be observable in archaeological contexts.

The Interior Hearth Model

A model for artifact distributions inside structures has also been developed. Binford (1983) developed such a model from his Nunamiut data and Stevenson (1991) has done research on the spatial distribution of debris inside Yukon gold rush prospector tents. Some of the formation processes that occur around interior hearths are similar to those associated with exterior hearths. For example, drop zones dominated by small debris are to be expected around interior hearths (Stevenson 1991). Displacement zones also occur with the build up of secondary refuse along the inside walls of structures from cleaning and sweeping the central activity area (Carr 1991; Stevenson 1985, 1991). Toss zones are not expected within structures as people rarely throw waste against the inner walls of their homes, preferring to collect it and dump it outside (Binford 1983:157). Seating plans inside structures are not affected by smoke as wind direction is not a factor.

Interpretations: Applying the Models

Figure 8 shows the distribution of piece plotted artifacts on the site, with all levels combined. As noted previously, approximately half the material was piece plotted. For the purposes of the following discussion the spatial distribution of the piece plotted sample is assumed to be representative of the total collection. Units ON0E and 5N4E were the initial test units excavated and were not piece plotted. The comparison of the piece plotted sample to the total artifact sample is discussed in a subsequent section of this report.

The overall distribution of piece plotted flaking debris is of interest in view of the differing distribution patterns associated with exterior and interior hearths. As noted previously, all of the diagnostic Middle Archaic artifacts were recovered in the North area of the site, while most of the Meadowood artifacts were found in the South area. It is inferred that much of the debris in the North area is also attributable to the Middle Archaic occupation, while much of the debris in the South area may be related to the Meadowood occupation.

Interpretation 1: Two Exterior Hearths. One possibility is that both the North and South artifact distributions are related to separate exterior hearths (Figure 9). If this is true, one would expect to find an inner drop zone, a displacement zone, and a toss zone in each area, as outlined above.

In the North area the flake distribution occurs in four distinct clusters (in squares 2N1E, 2N4E, 5N5E, and 7N3E). In the centre of the area circumscribed by the four debitage clusters there is a hearth complex indicated by a circular concentration of fire-broken rock as well as Feature 2, which contained much calcined faunal material. The four clusters of flaking debris are sufficiently discrete to suggest that they may have resulted from specific tool manufacture or maintenance tasks conducted around the hearth. It is not known if they reflect immediate in situ deposition (a drop zone) or if they resulted from sweeping of refuse out of a central activity area (a displacement zone). These flake clusters are, on average, 1.5 m away from the hearth. When compared to the spatial organization of other archaeologically and ethnographically documented exterior hearths (Binford 1983; Stevenson 1991) they appear to be too dispersed to

represent a drop zone around the hearth. It is possible that they represent a displacement zone, with the drop zone lying within a one metre radius of the hearth. In other words, flint knapping may have occurred in four distinct areas around the hearth, with most debris subsequently being swept back to create the four extant debitage clusters. Beyond the displacement zone there may be a poorly defined toss zone in the North area. It is notable that many of the larger artifacts, including fire-broken rocks, projectile points, and the anvil stone, occur in or near the toss zone (Figure 9). One of the problems in applying this model is that very little bone waste is preserved at Little Shaver, and large bones are the materials that are most often tossed to the periphery of activity areas.

Turning to the South area, Feature 3, located three metres south of the inferred structure is interpreted as an exterior hearth (Figures 8, 9, 10). The debris associated with this hearth displays the expected pattern of a high density drop zone on the north and northwest sides, and a more diffuse toss zone behind the drop zone and across the hearth on the south side.

Interpretation 2: An Interior Hearth and an Exterior Hearth. An alternate interpretation is that the North area distribution represents an artifact pattern that has been affected by the presence of a structure (Figure 10), while the South area pattern represents an exterior hearth. In the North area, a drop zone is recognized within a one-metre-radius of the hearth and the four debitage clusters form a displacement zone with each cluster possibly relating to a seating position within the drop zone. It is noteworthy that the outer edges of these debitage clusters are sharply defined, suggesting that some sort of structure may have been present to confine the flaking debris to an interior area measuring approximately six by five metres. Much of the larger debris (fire-broken rocks, projectile points, and anvil stone) occurs just inside the inferred wall. Using an interior hearth model, a toss zone is not expected.

The area between the four debitage concentrations in the North area is relatively clean (Figure 8). These areas contain minimal debris and may represent sleeping areas or activities that did not leave preserved archaeological traces. If a structure was present, one of these areas may represent a door. It is most likely

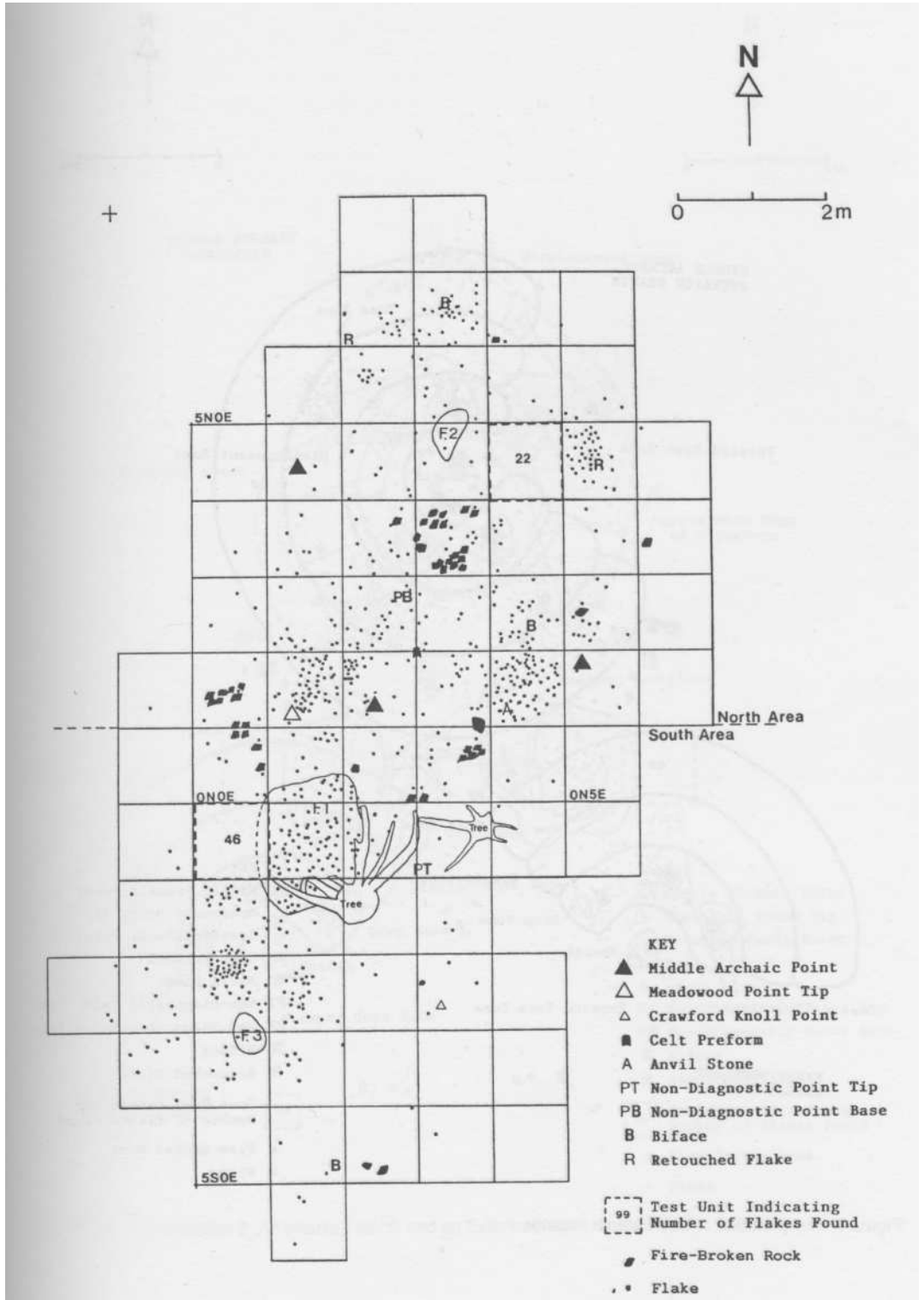


Figure 8. Piece Plotted Artifact Distribution

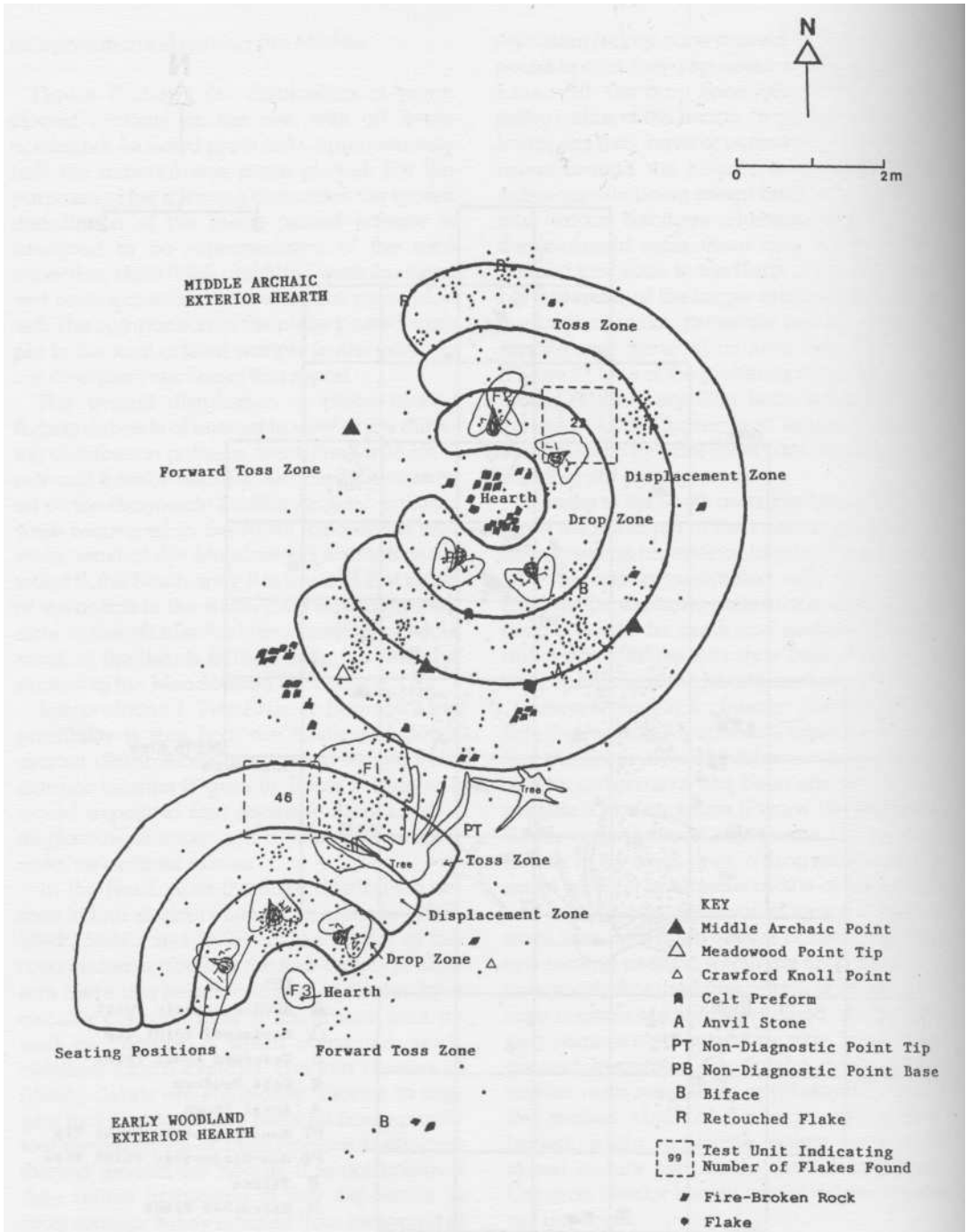


Figure 9. Interpretation 1. Two Exterior Hearths

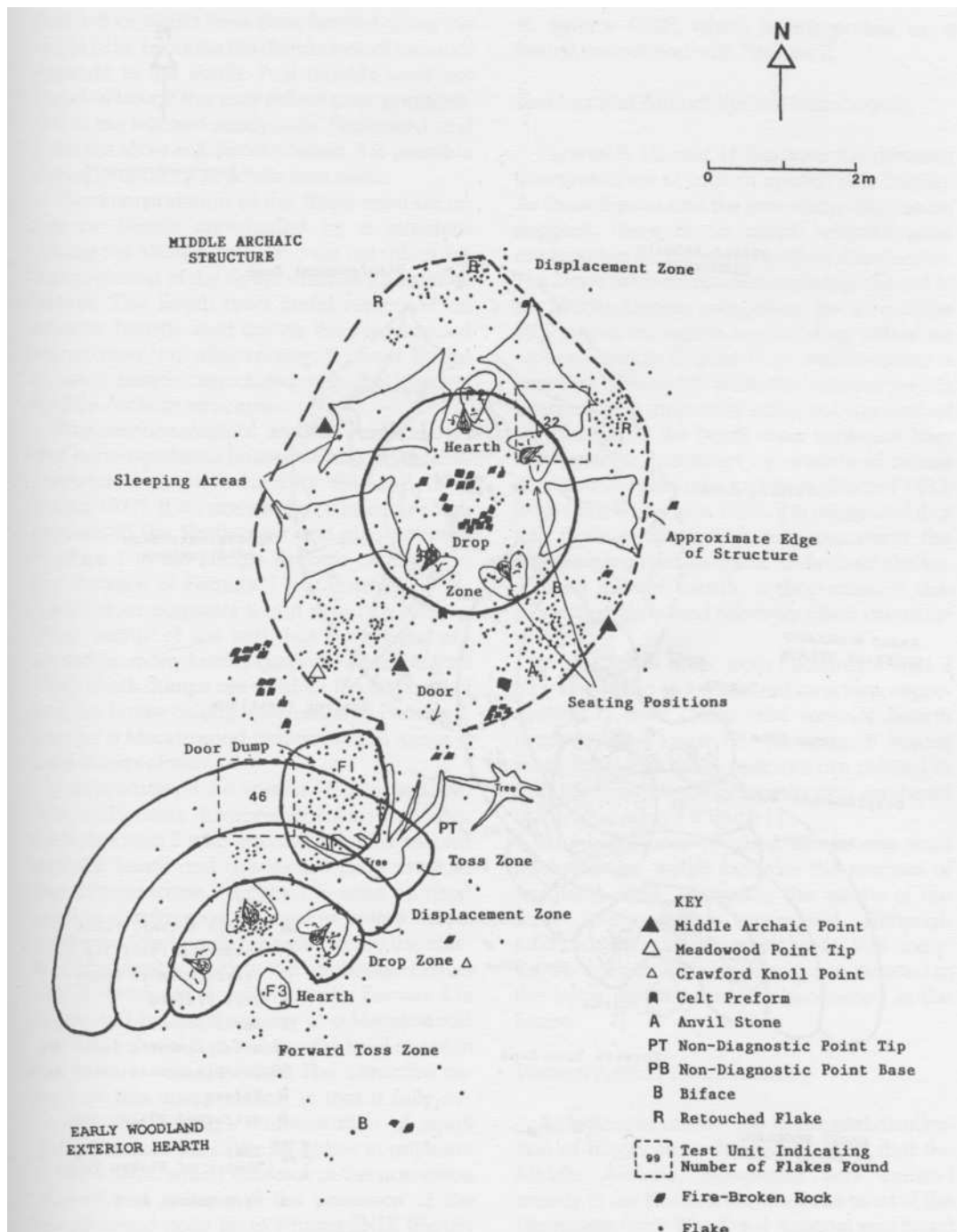


Figure 10. Interpretation 2. An Interior Hearth and an Exterior Hearth

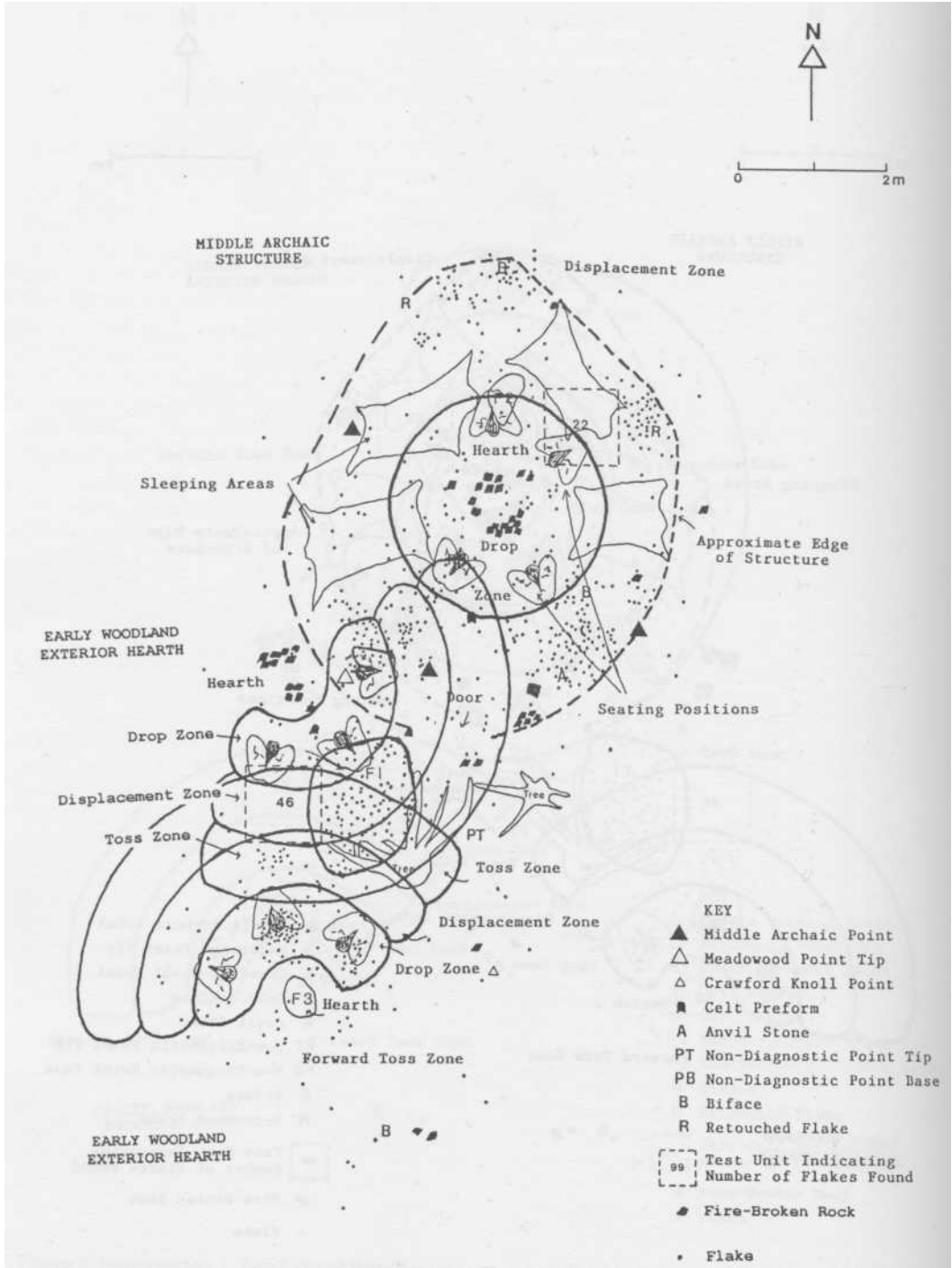


Figure 11. Interpretation 3. An Interior Hearth and Two Exterior Hearths

that a door would have been located along the south side, because the distribution of material extends to the south. Post moulds were not found although this may reflect poor preservation in the leached sandy soils. Features 1 and 2 did not show soil discolouration. It is possible that a temporary structure was used.

The interpretation of the North area as an interior hearth surrounded by a structure during the Middle Archaic does not affect the interpretation of the South area as an exterior hearth. The South area could represent an exterior hearth used during the Meadowood occupation, or, alternatively, it could be an exterior hearth associated with the inferred Middle Archaic structure.

Ethnoarchaeological studies have shown that hunter-gatherer houses or huts often have associated exterior hearths (Binford 1983; Yellen 1977). If we accept that a structure was present in the North area and also attribute Feature 1 to the Middle Archaic occupation, the location of Feature 1 just outside the inferred door suggests that it may represent a "door dump" of the sort that have been observed on many hunter-gatherer sites (Binford 1983). Such dumps are used for the disposal of interior house debris. Alternatively, Feature 1 may be a Meadowood feature, which raises a third interpretation.

Interpretation 3: An Interior *Hearth* and Two *Exterior Hearths*. Interpretation 3 is identical to Interpretation 2 with the addition of a second exterior hearth and associated drop zone. In this interpretation Feature 1 is seen as drop zone or displacement zone associated with a third possible hearth represented by the cluster of fire-broken rock to the northwest (Figure 11). A Meadowood association for Feature 1 is supported by the discovery of a Meadowood point tip in Level 2, just above the level at which the feature was identified. The attractive aspect of this interpretation is that it fully accounts for the high concentration of small debris in Feature 1, the 46 flakes in adjacent square 0N0E which was one of the non-piece plotted test units, and the presence of the Meadowood point tip in square 2N1E (Figure 11). It also explains the concentration of fire-broken rock northwest of Feature 1, but there is no other evidence to support an interpretation of that rock cluster as a hearth. However, hearths are rarely artifact-rich. There were few artifacts found near the fire-broken rock cluster

in square 4N3E, which is interpreted as a hearth associated with Feature 2.

Summary of Artifact Spatial Distributions

Figures 9, 10, and 11 illustrate the different interpretations of artifact spatial distribution. As these figures and the preceding discussion suggest, there is no single unambiguous explanation for the entire artifact distribution. The North area distribution is clearly related to the Middle Archaic occupation, but it could be interpreted as debris surrounding either an exterior hearth (Figure 9) or debris within a structure (Figure 10). While the exterior hearth interpretation cannot be ruled out, the artifact distribution in the North area conforms best with patterns predicted by models of refuse distribution within huts and tents (Binford 1983; Carr 1991; Stevenson 1991). It is suggested that this artifact distribution may represent the interior living floor debris of an Archaic shelter, with an interior hearth, a drop zone, a displacement zone, and relatively clean areas for sleeping.

In the South area, both Features 1 and 3 may be related to the inferred structure, representing a door dump and exterior hearth respectively (Figure 10). However, it seems more likely that these features are related to the later Early Woodland occupation, as shown in Interpretation 3 (Figure 11).

Three AMS radiocarbon dates, one from each feature, would facilitate the process of weighing and assessing the merits of the three interpretations presented. Although funds are not currently available for this analysis, the carbon samples have been curated in the hope that they can be processed in the future.

Vertical Artifact Distribution

As indicated earlier, the horizontal distribution of diagnostic artifacts suggests that the Middle Archaic occupation was centred mainly in the North area, whereas most of the diagnostic Early Woodland material was found in the South area. A corroborating line of evidence for this interpretation involves artifact depth. Although cultural stratigraphy is not evident in the excavation profiles, one would expect the Middle Archaic material to be deeper, on average, than the Early Woodland

material. It is possible to test this by observing the depth of material in the North and South areas.

The vertical distribution of diagnostic artifacts shows some meaningful patterning. In the South area the Meadowood drill and the Crawford Knoll point were found in Level 1, and one of the Meadowood point tips was found in Level 2. In the North area the other Meadowood point tip and two of the Brewerton-like points were recovered from Level 2 and the final two Brewerton-like points were found in Level 3. This distribution indicates that material from the Early Woodland occupation is found in Levels 1 and 2, while the Middle Archaic diagnostics are found in Levels 2 and 3. There is a mixture of material from all occupations in Level 2.

The vertical distribution of debitage was also examined. The three subsoil levels (3 to 5) were lumped as Level 3 for this analysis to allow comparison of topsoil, interface and subsoil debitage frequencies. The debitage percentages from each level were then plotted in histogram form to compare the relative amounts of material recovered. The debitage depth in the North area was compared to the South area in this manner.

The results are shown in graphic form in Figure 12. These data clearly show that the majority of the debitage in the North area was recovered from Levels 2 (42.1 percent) and 3 (51.0 percent), with very little found in Level 1 (6.9 percent). In contrast, 20 percent of the debitage from the South area was found in Level 1; the majority (49.5 percent) was found in Level 2, and significantly less (30.6 percent) was found in Level 3. These data indicate that average debitage depth differs between the two areas.

Since the site is not stratified and there is some component admixture, especially in Level 2, it is not possible to separate the non-diagnostic materials into different assemblages on the basis of depth alone. Yet the vertical distribution of material does help to corroborate the horizontal spatial data which suggests that the older Middle Archaic occupation was centred on the North area while the Early Woodland occupation was centred in the South area. This, in turn, supports the suggestion that material in the South area relates to an Early Woodland occupation centred around one or two exterior hearths (Figures 9 and 11),

rather than an exterior hearth associated with a Middle Archaic structure.

A Comparison of Techniques

Over the past decade I have been involved in several excavations of unploughed, usually forested sites, that were conducted primarily by shovel in one-metre-square units. These excavations, all completed in a CRM context, include the West Bog, East Bog, and North Bog sites (Timmins 1989), the Shaver Knoll site (Lennox and Morrison 1993) the Severn Bridge site (Timmins 1993), and the Baxter site (Dodd 1996). These sites are only those that I am familiar with; there are undoubtedly other unploughed sites in Ontario that have been excavated in a similar manner. Although the excavation techniques employed on these sites have usually been justified through an informal cost/benefit analysis, there has been little consideration of the type of information that is lost by excavating in one metre squares. While some archaeologists have always excavated with a high degree of provenience control when working in forested contexts, some of us (myself included), appear to be applying excavation techniques developed on ploughed sites to these unploughed components. It was with these methodological issues in mind that I planned the excavation of the Little Shaver site.

Although not all of the artifacts at Little Shaver were piece plotted, all soil was screened through 6 mm mesh to recover artifacts not found in situ. Hence the Little Shaver data includes both the total artifact sample grouped in one-metre-square units and the piece plotted sub-sample. In this case it can be argued that the one-metre-square patterns represent the total artifact collection, whereas the piece plotted data represents only half of the collection. On the other hand, the piece plotted data preserves more precise spatial information and permits an easier assessment of the relationship between the spatial distribution of different artifact classes (e.g., debitage versus fire-broken rock). When dealing with grid data it is usually not possible to show more than one artifact class on a single density plan. Since the site has yielded both types of data, it affords the opportunity to compare the results and the costs involved. Figure 13 presents the total debitage distribution by one-metre

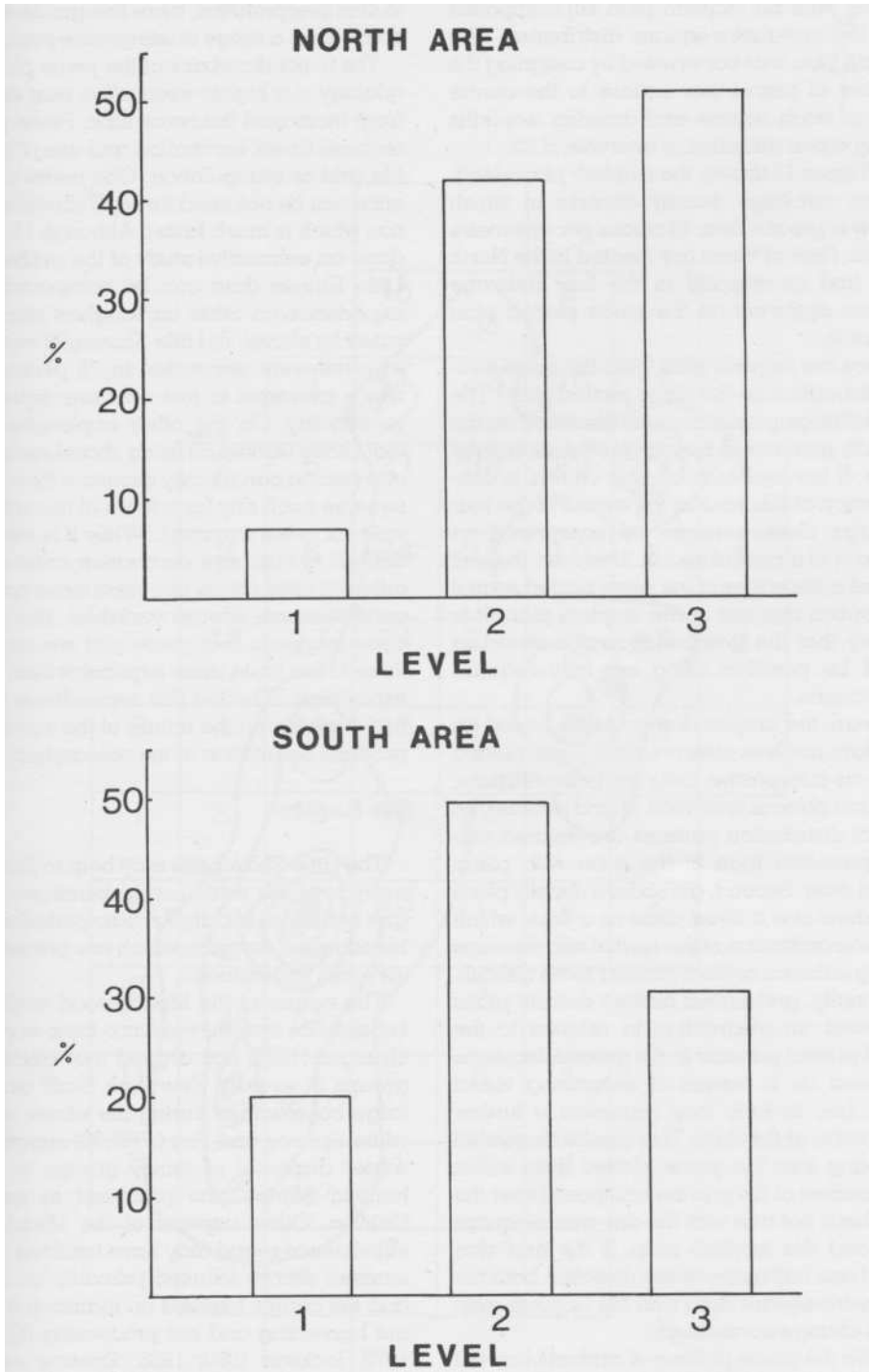


Figure 12. Histogram Comparing Debitage Depth in the North and South Areas

square, with an isopleth plan superimposed over the one-metre-square distribution. The isopleth plan was constructed by assigning the number of pieces per square to the centre point of each square and drawing isopleths linking equal densities at intervals of 20.

As Figure 13 shows, the isopleth plan identifies six debitage density clusters in which density is greater than 40 pieces per one-metre square. Four of these are located in the North area and correspond to the four debitage clusters apparent on the piece plotted plan (Figure 8).

Does the isopleth plan yield the same spatial information as the piece plotted plan? The four debitage concentrations identified on the isopleth plan could be interpreted as activity areas. If fire-broken rock was shown, a concentration of this rock in the centre of the four debitage clusters might be interpreted as evidence of a central hearth. However, the well defined outer edges of the piece plotted spatial distribution are lost in the isopleth plan. It is unlikely that the interpretation of a structure would be possible using one-metre-square provenience.

In sum, the artifact density plans based on grid data are less effective than piece plotted plans as interpretive tools for three reasons. The most obvious limitation of grid data is that artifact distribution patterns are defined with less precision than is the case with piece plotted data. Second, grid-based density plans only show one artifact class at a time, which makes examination of the spatial relationships among different artifact classes more difficult. And finally, grid-based artifact density plans represent an abstraction in relation to the actual artifact patterns in the ground. Isopleths are used as a means of enhancing visual effect, but, in fact, they represent a further abstraction of the data. This can be illustrated by noting that the piece plotted data exists independent of the grid superimposed over the site. This is not true with the one-metre-square data and the isopleth map. If the grid was shifted one half metre in any direction both the one-metre-square data and the isopleth map would change accordingly.

While the piece plotting of artifacts has not led to clear, unambiguous interpretations of the artifact spatial patterns, it has permitted detailed consideration of three different interpretations. Thus, while the grid data appears

to limit interpretation, more fine grained spatial data opens a range of interpretive possibilities.

The major drawback of the piece plot methodology is a higher excavation cost resulting from increased fieldwork time. Piece plotting requires trowel excavation and use of a portable grid or triangulation. One-metre provenience can be obtained through shovel excavation which is much faster. Although I have not done an exhaustive study of the problem, the Little Shaver data can be compared to my experience on other unploughed sites excavated by shovel. At Little Shaver 78 one-metre squares were excavated in 75 person-days, which averages to just over one square per person-day. On the other unploughed sites that I have worked on using shovel excavation, one person can usually excavate three to five squares each day (or a team of two will excavate six to ten squares). While it is extremely difficult to compare excavation costs among different sites (since circumstances and field conditions are always variable), this experience suggests that piece plot excavation is three to five times more expensive than shovel excavation. Whether this expenditure is justified depends on the nature of the site and the problem orientation of the researcher.

Site Function

The Little Shaver site may help to illuminate aspects of the settlement-subsistence strategies of the late Middle Archaic period and the Meadowood complex which are presently not very well understood.

The nature of the Meadowood settlement-subsistence system remains a topic of debate. Granger (1978) has argued that macroband groups in western New York State occupied large base camps during the winter months, while Spence and Fox (1986:30) suggest that winter dispersal of family groups to inland hunting camps was practised in southern Ontario. Other aspects of the Meadowood subsistence round may have involved spring-summer camps focused primarily on fishing, and fall camps focused on mammal hunting, nut harvesting and nut processing (Granger 1978; Jackson 1980; 1986; Spence and Fox 1986). The Billiard site, located on a tributary of Big Creek 6 km west of Little Shaver, has been interpreted as a fall occupied hunting stand with an associated processing area (Timmins

1992).

The assemblage of diagnostic material from the Early Woodland component at Little Shaver is too small to permit any definitive conclusions regarding site function, but some tentative inferences can be made. Hunting and butchering activities may be inferred by the recovery of two projectile point tips. Point tips are often recovered from animal carcasses during butchering. As noted earlier, the artifact distribution pattern in the South area is probably related to activities conducted around one or two exterior hearths. Therefore, the Early Woodland component is tentatively interpreted as a small hunting camp and butchering station. The paleoenvironmental data indicate that the site was located beside a small swamp which raises the possibility that hunting was focused on species attracted to the wetland.

The presence of a sugar maple stand during the Early Woodland occupation raises the possibility that maple sugaring was another procurement activity. However, definitive evidence for prehistoric maple sugaring has not been found and most interpretations of this activity remain speculative (Mason 1987). It is possible that the inferred Early Woodland hearths and fire-broken rock associated with Feature 1 are related to boiling down sap. In this regard, the lack of Early Woodland ceramics seems unusual, but stone boiling may have been performed using some other type of water-tight container such as a wooden trough. If maple sap was collected and processed at the Little Shaver site, it would obviously have been occupied in the spring.

Turning to the Middle Archaic occupation, the settlement patterns of Brewerton-like groups in southwestern Ontario are poorly understood as few sites have been excavated. Brewerton phase Laurentian groups in southeastern Ontario and New York State aggregated at large sites located along major waterways during the spring and summer and dispersed into smaller extended family groups living at more sheltered inland locations during the cold season (Ellis et al. 1990:92; Ritchie and Funk 1973:339). These large, warm weather sites are usually located near major rapids indicating that fishing was an important subsistence pursuit. While it is possible that some of these large sites are simply aggregations of numerous smaller components, they occasionally have several human interments indicative

of large population gatherings, social activities, and ritual associated with burial of the dead (Ellis et al. 1990:92).

The smaller interior camps postulated for the Middle Archaic have rarely been investigated in southern Ontario. In contrast to the larger sites, these are usually located inland from major lakes and rivers and appear to be briefly used campsites, although few have been described in detail (Ellis et al. 1990:90). Recent models of hunter-gatherer mobility emphasize residential flexibility and the use of several site types as part of a logistical strategy (Binford 1980; Robertson 1987; Bettinger 1991:64-67). Assuming that such models have relevance to Middle Archaic hunter-gatherer settlement systems, there could be several settlement types involved in the overall settlement pattern. Some of these will be difficult to recognize as they will have very low archaeological visibility. The inferred hut structure and associated interior and possible exterior activity areas at Little Shaver suggest that the Middle Archaic occupation represents a residential base camp or a temporary field camp. A residential base camp would be expected to yield a wide range of tool forms related to varied activities, whereas a task specific camp would have a more restricted tool kit such as the one recovered at Little Shaver. Here the assemblage is dominated by projectile points and debris from point manufacture and maintenance. The lack of formal scraping tools often associated with hide scraping is further evidence of the task specific nature of the camp. The dominance of points, bifaces, and knives in the Little Shaver assemblage suggests that the site was used primarily for hunting and was occupied by a task group for that purpose.

As a headwater hunting or procurement camp located in a small valley within an upland hardwood forest environment, the Little Shaver site represents only one aspect of late Middle Archaic settlement systems. The Shaver Knoll site, located immediately west of Little Shaver (Figure 2) also includes Middle Archaic material (Lennox and Morrison 1993). Unfortunately, the Shaver Knoll assemblage is a mixture of several Archaic components making it difficult to draw any reliable inferences about site function. The Bell and Weber I sites are examples of other small, interior Middle Archaic components in the lower Great

Lakes region, although they do not seem to share the task specific nature of the Little Shaver site.

The Bell site, located on a small tributary of Twelve Mile Creek in the Niagara Peninsula, is interpreted as a Brewerton phase camp (Williamson et al. 1994:84). The structure of the Bell site is difficult to interpret since it is plough disturbed and was only partially excavated. It is considerably larger than Little Shaver, covering at least 800 square metres. Excavation of 132 square metres yielded a large and diverse assemblage dominated by bifaces ($n=73$) and scrapers ($n=59$) (Williamson et al. 1994:69,70). The presence of sub-surface features and small artifact clusters in the subsoil indicated activity areas rather than clear evidence of house structures (Williamson et al. 1994:77). The researchers suggest that Bell was a hunting and processing camp intensively occupied by one or two families during the fall and perhaps the winter (Williamson et al. 1994:84). The size of the Bell site and its large assemblage suggest that it served a different function than Little Shaver — perhaps as a cold season, residential base camp.

The Weber I site is located in an upstream location in the Saginaw Valley of Michigan. A total of 91 square metres was excavated in the Middle Archaic stratum (Zone II), although this occupation zone probably extends beyond the limits of the excavation (Lovis and Robertson 1989:221). The artifact assemblage is quite diverse and includes Raddatz Side-notched points ($n=5$), untyped points ($n=5$), scrapers ($n=7$), percoids, denticulates, notches, flake knives, retouched flakes, and utilized flakes. Lovis and Robertson interpret Weber I as a temporary hunting/collecting camp during its earliest (Middle Archaic) occupation and note that it displays little formal internal structuring (1989:221). Spatial analysis of "activity sets" based on one-metre-square provenience indicated that tool resharpening, butchering, processing and discard were carried out in the same area in the northeast section of the excavation. This interpretation is at odds with ethnoarchaeological studies which indicate that hunter-gatherer camps are usually quite well organized, especially if they are briefly occupied (Binford 1983:175). It could be argued that this area represents a midden, or that the site was re-occupied several times during the Middle Archaic resulting in overlapping activity

areas. In a separate study, Robertson (1987:94) suggests, on the basis of evidence for hide and bone processing from stone tool use wear analysis, that the Middle Archaic zone at Weber I was a small residential camp, rather than a satellite hunting camp occupied by a hunting party composed of males. Given the diversity of the tool assemblage, this residential camp interpretation seems more likely.

In summary, the few small sites that have been excavated and reported are larger than Little Shaver and have more diverse tool assemblages. The Bell and Weber I sites both appear to be residential inland camps, while the Middle Archaic component at Little Shaver is interpreted as a task specific hunting camp with a more limited tool assemblage.

Middle and Late Archaic House Structures

There is little evidence of house structures on Middle Archaic sites in the lower Great Lakes region. Ritchie and Funk (1973:339) suggest that "sand or gravel spreads 6 to 10 feet [1.8 - 3.1 m] across, associated with animal bones and other refuse, may have been lodge sites" on the large Brewerton phase Robinson and Oberlander No. 1 sites in New York State. A possible house floor on the Vergennes phase KI site in Vermont was described as "approximately fifteen feet [4.6 m] in diameter, ... traceable by a rough circle of three-inch [7.6 cm] post moulds" (Ritchie 1969:86). An oblong house with a side entrance was defined by post moulds at the Bliss site in Connecticut, a component of the newly defined Duck Bay phase of the Laurentian tradition (Funk 1988:28-29).

Stothers and Abel have recently described at least 11 Late Archaic to Early Woodland structures from Ohio. They report structure sizes ranging from 3 by 2 m to 9 by 6 m, with an average size of 6 by 4.4 m. Many of these structures are clearly outlined by post moulds, while others are more difficult to discern due to confusing arrays of posts and features (Stothers and Abel 1993:56,57,59,62).

House or hut structures have been tentatively defined on some Late Archaic sites in southern Ontario. As mentioned previously, Lennox (1986) inferred the presence of two house structures at the plough disturbed Innes site on the basis of debitage density transects (1986). These density transects generally show

a peak in the centre, with secondary peaks at the edges. It was suggested that the secondary peaks were created from debitage accumulation along the inside edges of structure walls. These debitage clusters define two ovate structures measuring about 12 by 7 m and 13 by 10 m respectively (Lennox 1986:257). Another inferred house structure, defined in the same manner at the Canada Century site, measures approximately 16 by 9 or 13 by 7 metres depending on how the data is interpreted (Lennox 1990:45). These inferred structures are much larger than the 6 by 5 m structure inferred for Little Shaver and much larger than structures documented ethnographically for most hunter-gatherer groups (Yellen 1977; Binford 1983).

Both Innes and Canada Century are interpreted as cold season residential camps. To explain the large size of these inferred structures Lennox suggests that larger structures may have been required for cold weather occupations because they provide more indoor space for daily activities (Lennox 1990:45). On the other hand, such large structures would be more difficult to heat in the winter. A 5 by 7 m post and frame structure was found at the Hockessin Valley site in Delaware which is interpreted as a cold weather occupation dating to 3000 B.C. (Custer and Hodney 1989: 31). Contrary to Lennox (1990:46), this structure is much smaller than the structures inferred for Imes and Canada Century, but it is comparable to other ethnographically documented hunter-gatherer structures. It also coincides with the roughly 5 by 8 m winter cabins occupied historically by Central Algonquian groups (Murphy and Ferris 1990:253).

At the Late Archaic Thistle Hill site, a small inland base camp, Woodley (1990) has interpreted two large, sub-surface pit features as the remains of semi-subterranean houses. These features have a few associated post moulds and measure 4.0 by 3.15 m and 4.3 by 3.22 m respectively. Most of the posts lie 20 to 30 cm outside the features, suggesting that the structures themselves may have been slightly larger than the extant features (Woodley 1990:35-36), although even these would have been somewhat smaller than the inferred Little Shaver structure.

The size discrepancies between the inferred structures at Little Shaver and Thistle Hill are minor and may reflect cultural, temporal or

seasonal variability. The Thistle Hill features lie beneath the ploughzone and have probably been plough-truncated, which may partially account for their small size. Yet, the extremely large structures defined for Innes and Canada Century do not seem credible given the lack of ethnographic or prehistoric analogs to hunter-gatherer structures of this size. Moreover, the use of "secondary peaks" from debitage density transects to identify house walls has not been validated in any case in which a structure has been identified through independent evidence.

On the other hand, the Little Shaver site is not plough-disturbed and the piece-plotted artifact pattern is more precise than the one-metre-square pattern. As described above, detailed analysis of the site structure suggests that a temporary house or hut may have been present.

CONCLUSIONS

The Little Shaver site was first occupied late in the Middle Archaic period, circa 5,000 to 4,500 B.P., as indicated by the presence of Brewerton-like projectile points. Subsequent to the Middle Archaic occupation the site was briefly re-occupied during the Early Woodland period, circa 2,900 to 2,400 B.P., as suggested by the recovery of a Meadowood drill and two finely made projectile point tips.

The Middle Archaic component of the site demonstrates the unique advantages offered by small, limited activity sites. The tool assemblage is indicative of a restricted range of re-tooling, biface manufacture, and processing activities associated with a special purpose hunting camp. The recognition of this site type refines our understanding of Middle Archaic settlement systems in the lower Great Lakes region.

The Little Shaver analysis has shown the difficulties involved in applying site formation models derived from ethnoarchaeological studies to archaeological situations. Specifically, models for artifact distributions around interior and exterior hearths, although distinct in theory, leave much ambiguity when applied to the Little Shaver spatial data. This is partly due to preservation factors and the multi-component nature of the site, but it also points to the need for model refinements.

While alternative interpretations have been

considered, the interpretation of a Middle Archaic structure in the North area is preferred, mainly because the spatial distribution of artifacts and debris in the northern area of the site appears "bounded", possibly demarcating a living floor. The inferred structure measures approximately 6 by 5 m and contains a central hearth complex consisting of a concentration of fire-broken rock and a small, adjacent pit feature containing debitage and calcined bone. Within the inferred structure concentrations of lithic debitage are located in three of the corners, while a fourth concentration lies inside the southwest wall. The debitage concentrations are interpreted as a displacement zone created by sweeping debris away from stone tool manufacture and maintenance areas around the hearth. It is also possible that flint knapping may have been conducted near the structure walls to take advantage of light from openings and to help keep the central living space clean. The areas between the debitage concentrations and the hearth are virtually clear of debris and may have been sleeping areas.

In addition to the inferred structure, there are two features and associated debris located in the South area of the site. Based on hunter-gatherer site formation models and the analysis of the horizontal and vertical artifact distributions, it is suggested that there may have been two exterior hearths associated with the later Early Woodland occupation.

There are no strong floral or faunal indicators of seasonality present for either occupation. The site location, inferred hunting/processing camp function, and the inferred structure all point to a fall or winter occupation for the Middle Archaic component, but these lines of evidence cannot be considered conclusive. The Meadowood occupation has been interpreted as a relatively brief visit related to hunting/butchering activities and possibly maple sugaring. If maple sugaring was conducted during the Early Woodland occupation, a spring occupation is implicated.

This paper also addresses methodological issues that should be of interest to all archaeologists and cultural resource managers faced with decisions regarding field procedures, their relative costs, and expected returns. In the Little Shaver case, controlled excavation involving piece plotting both tools and debitage allowed the recovery of precise spatial

information that led to the definition of an inferred structure. In particular, the debitage distribution pattern had significant information potential.

A comparison of piece plotted data with one-metre-square provenience revealed that the latter method allows definition of individual artifact concentrations. However, it makes it more difficult to identify the precise shape and configuration of artifact distributions or compare the spatial relationship of artifacts and artifact clusters. It is argued that one-metre-square provenience data are more difficult to interpret using site formation models.

Piece plot excavation maximizes the spatial quality of the archaeological data, but there are obvious costs involved in applying the method. Consideration of the cost factors demonstrates that trowelling and piece plotting is approximately three to five times more expensive than shovel excavation in one-metre squares.

Excavation techniques must always be appropriate to the type of archaeological site under study and the problem orientation of the researchers. Piece plotting highly disturbed sites would probably be unproductive. Piece plotting sites with superimposed, nonstratified components, even in undisturbed contexts, is likely to yield data that are difficult to interpret. However, the Little Shaver data indicate that piece plot methodology is appropriate for smaller undisturbed sites or parts of sites with brief occupations or limited use. As with all excavations, decisions about appropriate methodology must involve consideration of time, costs, the nature of the site, and the type of information relevant to the research problems at hand.

Differential preservation and post-depositional disturbance are inherent characteristics of the archaeological record. As a result of cultural resource management work, more and more plough disturbed "lithic scatter" sites are being excavated than ever before. Unploughed sites like Little Shaver can provide comparative material that constitutes a "reality check" for our interpretations of these ploughed sites. One of the basic maxims of archaeology is that we must use the better preserved parts of the archaeological record to make the more disturbed aspects of it more accessible. A corollary to this is that we must maximize the

information potential of undisturbed sites. It follows that small undisturbed components must be excavated with appropriate control.

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