The Kassel and Blue Dart Sites: Two Components of the Early Archaic, Bifurcate Base Projectile Point Tradition, Waterloo County, Ontario.

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Archaeological mitigation, undertaken by the Ministry of Transportation in advance of highway construction, resulted in the excavation of two Early Archaic sites. Both are components of the Bifurcate Base Tradition which is recognized over much of eastern North America because of the highly distinctive point style after which it is named. This article describes our investigations and our findings at the Kassel site, a base camp, and the nearby Blue Dart site, a short term, special purpose activity area, likely a kill site or butchering station. These single component sites furnish the first excavated assemblages of this Archaic manifestation from Ontario and, along with an acceptable radiocarbon date of 8320 ± 60 B. P., help to establish both the presence and form of the Bifurcate Base Tradition north of the Great Lakes. These sites may also he considered good examples of site types that have much broader implications. Kill sites and base camps represent universal settlement-subsistence adaptations among hunter-gatherers. Both sites, being small and yielding low artifact densities, furnish a new perspective on the elusiveness of such Archaic, and more specifically Early Archaic, components in the Great Lakes region. These examples raise questions about some basic assumptions concerning our evaluation of sites for further investigation based on their artifact densities alone.

Introduction

The Bifurcate Base Tradition is recognized as a late manifestation of the Early Archaic and is distributed over much of eastern North America, dating between 8000 and 9000 B.P. The tradition has long been recognized in the Great Lakes region due to the highly distinctive point style after which it is named. However, other than the occasional point or small mixed assemblage, components have remained elusive in the Northeast. In fact, the Kassel (AiHd-71) and Blue Dart (AiHd-89) sites represent the first substantial assemblages excavated in Ontario.

This report documents the excavations and materials recovered from the Kassel and Blue Dart sites and considers these findings with respect to their contributions to the study of the Early Archaic and to our evaluation or perceptions of similar site types as candidates for further investigation. Most descriptive detail is presented in the initial sections of this report where comparisons with similar materials are made when clarification is required of the analysis or terminology for specific artifact forms. Broader considerations are discussed in the concluding sections.

Environs

The Kassel and Blue Dart sites are found in similar topographic situations, being located on low, but well drained, sandy ridges, which rise a few metres above the broad wetlands associated with Alder Creek, a branch of the Nith River which in turn joins the Grand River at Paris, Ontario (Figure 1). Alder Creek occupies what was once a meltwater channel which drained portions of the Waterloo Moraine and is now a misfit stream bordered by relatively broad lowlands. Long before the sites were occupied the sandy moraine was formed by glacial meltwater deposits trapped between the retreating ice lobes of the Lake Ontario and Lake Huron basins (Karrow *et al* 1990:3). This periglacial setting created a landscape dotted by ice margin features such as kettle ponds, kames and eskers which provide considerable topographic relief.

The area's present vegetation is that of the Carolinian-Canadian Transition Zone (Cleland 1966) and biotic communities vary considerably depending on local topographic features and drainage. Local pollen cores indicate that the area's vegetation was in a state of transition at the time the sites were occupied, at approximately 8000 B.P. Jack/red and white pine were in decline and elm, maple and beech were becoming more common. The area was changing into a more open and deciduous, essentially modern, environment (Karrow and Warner 1988, Karrow *et al* 1990) as is argued for a much broader geographical area by Roberts (1984:250) and Wright (1978:69).

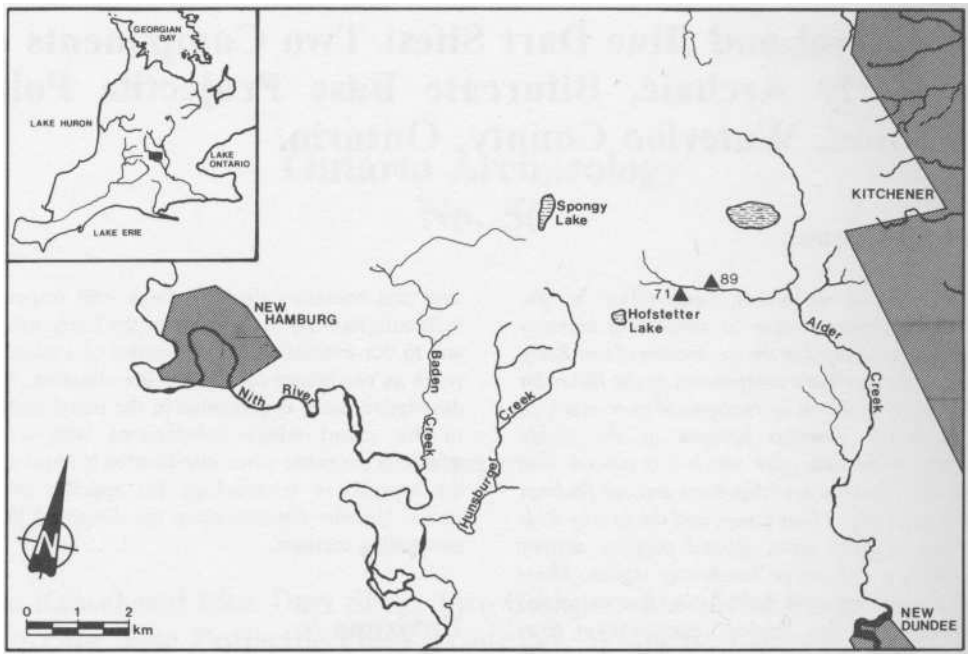

Figure 1. Location of the Kassel (AiHd-71) and Blue Dart (AiHd-89) Sites

Excavation Techniques

It was unclear whether the sites had seen previous disturbance by the plough. At Kassel the topsoil showed considerable variation in depth from 10 cm to 25 cm, with the thinner topsoil tending to occur toward the upper portions of the low ridge. The open, grassy knoll with a lone apple tree was edged by secondary growth poplar. This, together with the rare fragment of historic iron, glass or white earthenware suggested that it had been cleared and perhaps ploughed sometime in the distant past but the land area available for cultivation was small by modern standards.

At Blue Dart the topsoil was on the deeper end of the range listed for Kassel and its depth showed less variation, perhaps due to the gentle slope there. The trees had been cut at the time the site was discovered but cedar wetlands were noted downslope to the south while cultivated fields lay upslope and to the north of the existing highway. Prior to the construction of the highway, about twenty years ago, the site probably existed on the edge of a cultivated field.

With regard to the vertical distribution of artifacts, there was not a clear presence/absence distinction between the topsoil and the subsoil as there often is on ploughed sites between the ploughzone, which has usually incorporated the occupation layer or "living floor", and the sterile subsoil. Perhaps, due to the sandy nature of the soils, the site locations on low ridges, and their age, topsoil development at the time of occupation was limited and movement of cultural remains took place between the topsoil and the upper subsoil during the many years since occupation (cf. Julig 1988).

Given these considerations and the limited contributions that piece plotting would likely have provided, the sites were excavated as if they were ploughed. The sandy-loam topsoil and approximately 5 cm of the topsoil-subsoil transition zone was shovelled through 6 mm mesh screens by one-metre squares. The topsoil-subsoil interface was examined for cultural features and samples of subsoil were screened to test for the presence of cultural remains at this level. Elsewhere on Archaic sites we have found that cultural remains may be present in what appears to be sterile subsoil, within "features" that are more often than not visually imperceptible (Lennox 1986a:15). Although it was common to recover traces of cultural material in the upper portions of the subsoil at Blue Dart and Kessel, aside from a single subsoil feature at the former site, no cultural features were identified.

On occasion the 6 mm (1/4") screens were replaced by 3 mm (1/8") screens, sometimes considerably

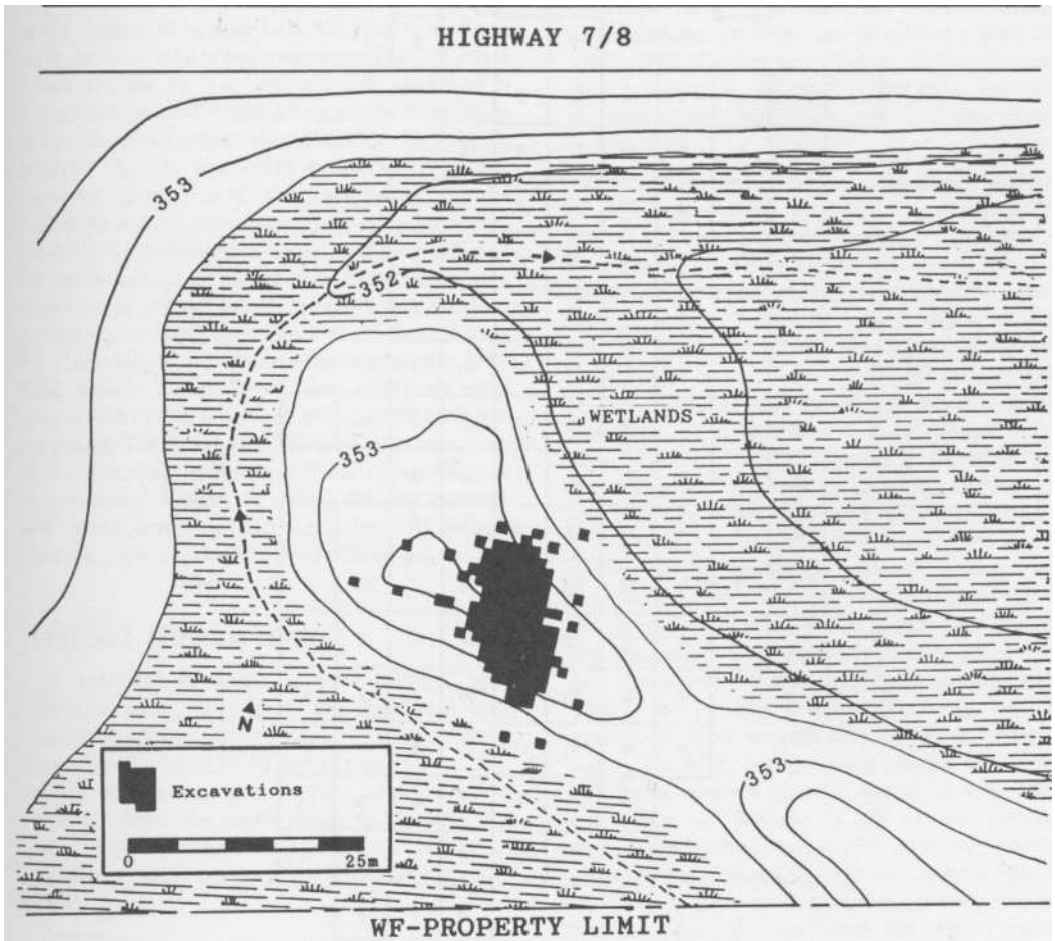

Figure 2. The Kassel Site Topography and Limits of Excavation

increasing the recovery of microdebitage in both the topsoil and upper subsoil levels. This material was however excluded from the analysis since it was not gathered systematically and, because of its small size, it could not easily contribute to the study of material type or morphology.

In the following text, tables and figures, artifact provenance to the one-metre unit of recovery is provided using the northwest grid coordinate of the excavation unit. For example, provenance for an artifact recovered from a one-metre square bounded by coordinates 2N3E, 2N4E, 1N4E and 1N3E is referred to as having been recovered from 2N3E. A hyphen between provenance designations (ie. 6N3E-5N4E) indicates that the specimen was refitted from two fragments recovered from the two units signified.

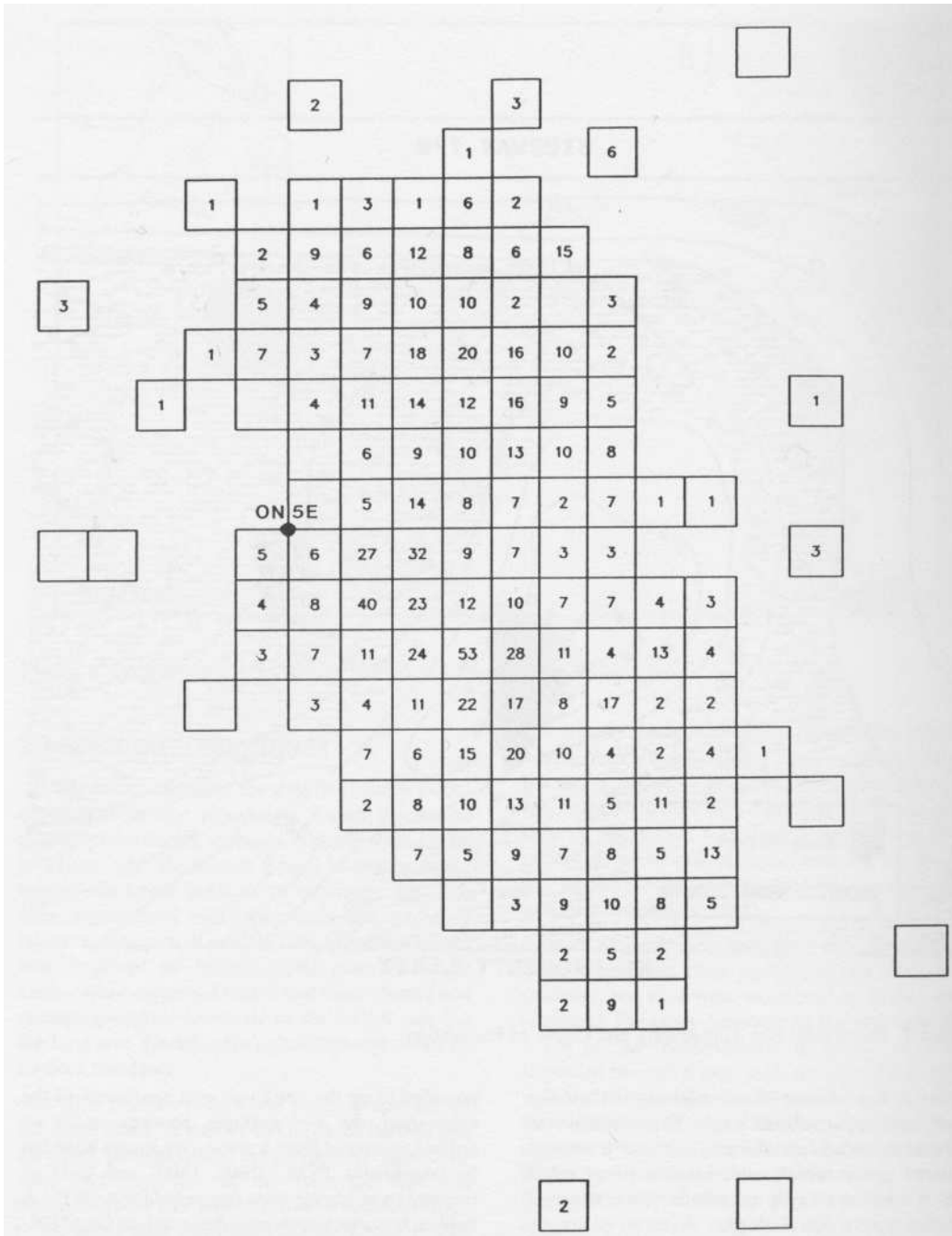

Figure 3. Kassel Site Debitage Density per Metre Square

The Kassel Site

The Kassel site is located on Lot 6, SSR, in Wilmot Township, Waterloo County, Ontario. The site is situated on the western end of a long, low, sandy ridge (350 m/1160 ft. A.S.L.) and is bordered on three sides by a broad tributary-wetland of Alder Creek (Figure 2). The site was first identified in September of 1988 when a few pieces of debitage were recovered while shovel testing an existing highway right-of-way within an area where further highway development was proposed. In the following season more intensive testing led to the recovery of a diagnostic Early Archaic point and further definition of the site area. Excavations were expanded to an arbitrary limit of one-metre squares producing less than five pieces of debitage (Figure 3). Excavations were completed during the 1989 field season except for a few additional units excavated in 1990. A total of 146 square metres was excavated. These included 127 units within the large excavation block and another 19 units placed around its periphery, initially to define the concentration and subsequently to test for additional artifact clusters, none of which were identified.

Artifact Descriptions

As indicated in Table I, 1163 artifacts were recovered from the Kassel site, distributed as a continuous cluster with a length of 17 metres north to south and a width of 10 metres east to west. The artifact distribution was oriented across the low ridge and down the gentle slopes to the north and south, rather than following the east-west crest of the ridge as might have been expected (Figures 2 and 3).

Lithic Debitage

As is generally the case on Archaic sites in southern Ontario, lithic debitage contributes the largest portion to the Kassel assemblage. Waste flakes from the manufacture and maintenance of stone tools made up 93.2% of the assemblage (Table 1). In an attempt to understand the procurement and reduction of lithic materials the chipping debitage was analyzed according to material type and flake morphology.

Most of the debitage (95.0%) was of Onondaga chert with small frequencies of Kettle Point and Selkirk cherts also represented (Table 2). Pebble cherts are available from the local till and while it is likely that these secondary sources provided pebble cherts from a number of primary sources (as the direction of ice movement in this area of the province was from the northwest, south and southeast), a brief examination of roadcuts and gravel sources in the immediate site vicinity produced nodules of both Onondaga and Selkirk cherts, but none of Kettle Point chert. Extensive excavations on a nearby Late Woodland village, the Sluyter Site (Lennox and Hagerty 1992), produced little evidence for the use of the latter material, suggesting that Kettle Point chert is, in fact, scarce in the vicinity.

Debitage morphology was examined using a simple classification of flake types (Lennox 1986b). The assemblage was divided into primary flakes (flakes from cores), secondary flakes (flakes from bifaces), unidentifiable flake fragments (primarily those without striking platforms), and shatter (small angular pieces of chert showing none of the attributes of a true flake (Table 2). Almost half (49.3%) of the debitage consisted of flake fragments that could not be identified, a fact attributed to the high frequency of thin secondary flakes in the assemblage and not simply to ploughing as has been suggested for other sites with highly fragmented debitage (Lennox 19866:227, 1990:37). The largest portion of the identifiable flakes (primary and secondary flakes) were secondary flakes (88%) indicating that thinning and resharpening of bifaces was the major lithic reduction activity at the site. The few primary flakes recovered constitute only 12% of the identifiable flakes. This fact, and the scarcity of cores, suggests that little core reduction took place here, a supposition reinforced by the scarcity of cortex. Cortex is present on only fifty-one pieces of debitage (4.7% of the debitage assemblage by frequency). Most examples (thirty-nine) are represented by rounded nodular cortex, indicating preference for secondary source materials probably derived from local till. Only twelve specimens exhibited tabular cortex and these occur only on Onondaga chert. While the presence of tabular cortex has elsewhere been taken as an indication of primary source utilization, other excavations in this area have indicated that a lightly patinated tabular cortex may also be present on secondary source materials. This suggests that some secondary source materials were not extensively rolled or rounded prior to being deposited and were perhaps protected in glacial ice during transport. Tabular cortex does not, therefore, indicate the use of primary source cherts at Kassel. The distribution of thermally altered debitage, pieces of chert exhibiting potlidding as well as those which appeared to have thermally induced colour changes, was examined in the hope of identifying the location of a hearth area. This material was however widely distributed and offered no insights as to the site's configuration.

Table 1. Artifact Type Frequencies from the Kassel and Blue Dart Sites

Artifact Type	Kassel		Blue Dart	
	f	%	f	%
Debitage	1084	93.2	199	95.7
Utilized Flakes	27	2.3	4	2.0
Retouched Flakes	3	0.3	0	0
Retouched Bladelets	**4**	0.3	0	0
Burins	2	0.2	0	0
Scrapers	18	1.5	0	0
Bifaces	14	1.2	2	1.0
Biface/Knife	1	0.1	1	0.5
Point Preforms	1	0.1	1	0.5
Points and Fragments	7	0.6	1	0.5
Drills	2	0.2	0	0
TOTAL	**1,163**	**100.00**	**208**	**100.20**

Table 2. Kassel Site Lithic Debitage

Chert Type	Flake Type				Total	
	Primary	Secondary	Shatter	Fragment	f	%
Onondaga	52	421	29	528	1030	95.0
Selkirk	4	9	0	5	18	1.7
Kettle Point	1	12	0	0	13	1.2
?		16	0	2	23	2.1
TOTAL f	**62**	**458**	**29**	**535**	**1,084**	**100.00**
TOTAL %	**5.7**	**42.2**	**2.7**	**49.3**	**99.9**	

Cores

Random, rotated or bipolar, cores are absent from the Kassel site assemblage. Larger pieces of chert, primary flakes from random cores, 30-40 mm in their maximum dimension, do exist, but the lack of cores on the site suggests that their production took place elsewhere and that the large primary flakes were brought to the site as blanks.

Utilized Flakes

A total of twenty-seven flakes exhibiting thirty-two utilized edges were recovered from the Kassel site and these appear widely distributed throughout the excavations. Common to all specimens is use retouch resulting in the removal of a series of small flakes (less than 2 mm long) from one or more edges. Rarely is use retouch extensive enough to create a marked change in the shape of the flake edge showing use. Use retouch does tend to dull, or increase, the utilized edge angle. Descriptions of these specimens are found in Table 3 while their attributes are summarized below.

All of the twenty-seven utilized flakes are of Onondaga chert but only fourteen are identifiable as to flake type. The remainder are represented by flake fragments many of which appear to have been broken during their use and then discarded. Other assemblages (ie. Lennox I986b:228, 1990:41)exhibit a preference for the utilization of larger, thicker flakes, usually represented by primary flakes. However, in this assemblage, where primary flakes make up only a small portion (12%) of the identifiable debitage the utilization of secondary flakes appears to have sufficed, slightly outnumbering the utilization of primary flakes by a ratio of eight-to-six. Complete utilized flakes range between 17 mm and 50 mm in length (mean = 32.1 mm), 11 mm-32 mm in width (mean = 19.6 mm) and 2 mm-9 mm in thickness (mean = 3.6 mm). The lateral edges of utilized flakes are usually the longest employable edges and these are preferred on twenty-one of the twenty-seven utilized edges that could be

Table 3. Utilized Flakes

Provenance	Flake Type	Flake Metrics			Utilized Edge		
		Length	Width	Thick.	Loc.	Shape	Length
8N11E	S	45	27	4	LV	CC	24
					LV	S	23
6N7E	P	20	15	3	LV	CC	12
6N8E	F	9+	11	2	LD	S	8+
5N7E	P	29	27	5	DD	S	27
ON7E					LD	S	15
4N8E	S	17	20	**4**	DD	CV	20
3N6E	F	16+	12+	2	?D	S	9+
3N6E	P	42	32	9	LB	IR	17
3N7E	P	30	11	3	LD	CV	19
2N6E	P	28+	19	5	LD	?	7+
2N8E	F	20+	9+	2	?D	S	8+
2N9E	F	20+	14+	4	LV	IR	15+
2N11E	F	13+	14	3	LB	S	11+
ON9E	F	29+	26	4	LD	S	9+
					LV	CC	14
ON11E	S	17	16	3	DD	CV	9
1S8E	F	17+	11+	3	?D	S	14+
1S9E	F	17+	20	3	DD	?	11+
2S7E	F	15+	10+	2	?D	S	16+
2S7E	P	31	22	9	DD	IR	16
2S7E	S	40	17	4	LV	CC	15
2S8E	P	50	17	**4**	LD	S	16
					LV	S	37
3S10E	F	16+	22+	3	LV	S	11+
5S7E	F	10+	11+	2	LV	?	8+
5S9E	S	28	11+	**4**	DD	?	5+
7S11E	F	41+	21	**4**	LB	S	17+
					LB	IR	30+
8S10E	S	20+	19+	3	LD	S	12+
8S12E	F	17+	11+	2	?D	S	10+
9S12E	S	30	19	2	LV	S	12

Abbreviations:
Flake Type: P Primary
S Secondary F Fragment

Location L:
P Proximal
D Distal
L Lateral

Utilized Edge:
Location R:
D Dorsal
V Ventral
B Bifacial

Shape:
S Straight
CC Concave
CV Convex
IR Irregular

Measurements are in mm. Material, in all instances, is Onondaga chert. + Indicates incomplete measurement due to breakage.

oriented. Six utilized edges are distal flake edges and the remaining five are unidentifiable with respect to flake orientation. Utilized edge length ranges from 9 mm to 37 mm (mean = 17.3 mm) on the twenty-nine measurable edges. Unifacial use retouch, suggesting unidirectional scraping, appears predominantly on dorsal surfaces (eighteen edges) while ten edges show unifacial use retouch on their ventral surfaces. Only four edges exhibit bifacial use retouch, and this contributed to an irregular edge

form in three of the four examples. Such retouch may be attributed to bidirectional scraping, cutting or whittling. Due to the small size of some utilized flake fragments, five utilized edges were impossible to orient to their original flake. Utilized edge shape is dominated by seventeen examples of straight edges, four others being concave, three convex and four irregular.

Retouched Flakes

Retouched flakes, in contrast to utilized flakes, appear to have been intentionally retouched to change their shape or edge angle. Specialized examples are described below as retouched bladelets and scrapers. Of the three retouched flakes, one from 4N8E is made on a secondary flake measuring 16 mm long, 17 mm wide and 2 mm in thickness. It may be classified as a denticulate with three small teeth distributed over the 9 mm long lateral edge. Another specimen from 0N8E appears on a primary flake measuring 20 mm in length and width and 4 mm in maximum thickness. It possesses two steeply retouched concavities measuring 7 mm and 8 mm in length along its distal and lateral edges and is best referred to as a notch or spokeshave. The remaining specimen from 4N 10E is made on a primary flake and measures 23 mm long, 19 mm wide and 5 mm in maximum thickness. It exhibits acute unifacial dorsal retouch and edge rounding of the slightly convex distal edge.

Retouched Bladelets

Four specimens have been classified as retouched bladelets since they resemble those reported from the Icehouse Bottom Site in Tennessee. There they were only recovered from Early Archaic strata (Chapman 1977:86). Similar specimens are also reported from the Early Archaic Nettling Site in southwestern Ontario (Ellis *et al* 1991:16). These consist of small blade-like flakes retouched along both lateral edges. Since they show little evidence of use they are thought not to have been used, or perhaps used for fine work (Chapman 1977:86 and figure 23h). The Kassel examples (Table 4) are slightly wider than those from Tennessee but sample sizes are small in both instances. The Kassel examples vary considerably in the extent of retouch. In some instances retouch covers the entire dorsal surface of the flake (ie Figure 4:c,d) and contributes to a regular edge form (note that ventral retouch on these specimens intrudes only 2 mm to 3 mm leaving the medial portion of the flake's surface unscarred). On other examples continuous unifacial retouch of the lateral edges has had little effect on the size or shape of the flake (Figure 4:a,b). Three of the four retouched bladelets were found close together toward the southwest end of the excavations (Figure 10). The retouched bladelets are shown in Figure 9 (c-f) next to specimens classed as drills. In addition to their differences in size it is also notable that the bladelets are thinner and flatter in cross section than is the case with the thicker and more pointed drills.

Burins

Often referred to with reservations in Ontario contexts, as pseudo-burins, two such specimens were identified from the Kassel site. Recovered from 1 S7E and 458E (Figure 5), these examples are quite similar in form though they differ in size, measuring 26 mm and 14 mm long, 42 mm and 23 mm wide and 5 mm and 3 mm thick, respectively. Both specimens were made on the distal-lateral extremity of primary flakes by removing burin spalls from the distal edge. The burin spall removed from the larger specimen was initiated from a small tabular surface remnant located on the flake's lateral edge. The smaller specimen could be classified as a dihedral burin, one burin spall having been removed from the lateral edge and this flake scar subsequently used as the striking platform for the removal of another burin spall from the distal edge. Fine dorsal retouch is also present and continuous on the distal edge of the smaller specimen and may represent an intentional modification to dull this edge for hafting or for manual use. Alternatively, this retouch may have been intended to strengthen the edge for removal of the burin spall. As with the larger specimen use retouch of the distal burin facet originates from the lateral edge.

Scrapers

Eighteen scrapers were identified from the Kassel site. They comprise an assemblage which is distinctive because of their small size and extensive resharpening, compared with scrapers from most other Archaic assemblages. While similarities exist between these examples and those reported from Tennessee, it is not clear whether these forms are characteristic of the Bifurcate Base Tradition, the Early Archaic in general, or whether they are simply a regional expression with broad temporal affinities. Many of the attributes which are highlighted in the morphological types appear to relate to scraper resharpening, exhaustion and discard, as is discussed in more detail below. The following scraper descriptions divide this apparent reduction sequence into several stages to assist in the visualization of successive changes in form. Table 5 provides the metrics and provenances of these tools.

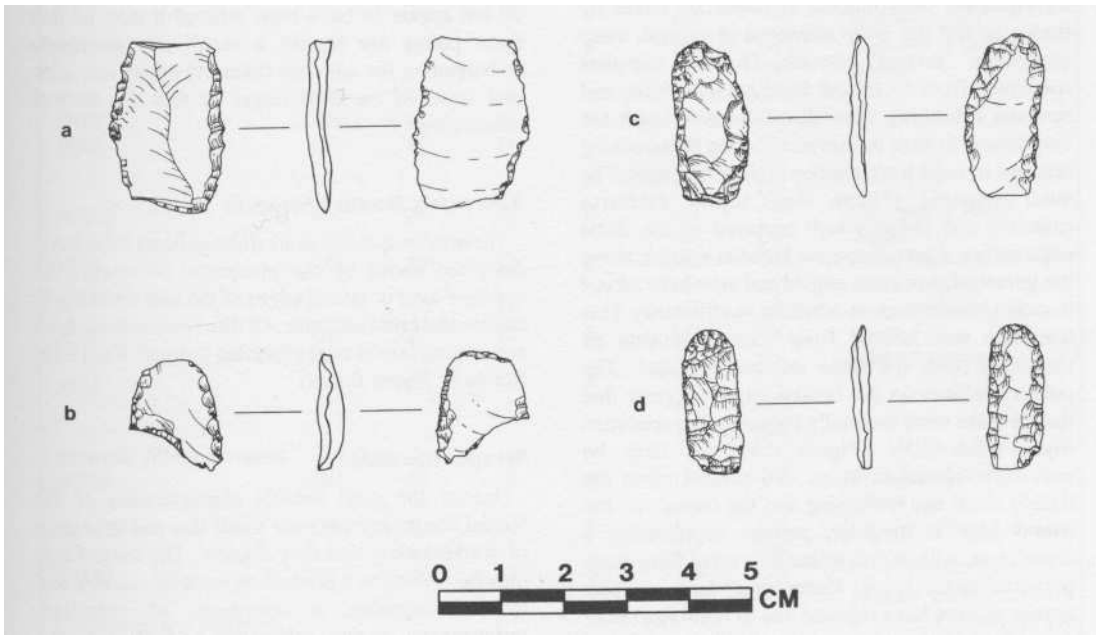

Figure **4.** Retouched Bladelets: a - 8S11E, b - 1N6E, c - 5S9E, d - 8SIOE

Table 4. Kassel Retouched Bladelet Metrics (mm.)

Provenance	Length	Width	Thickness
0SI0E	24	9	3
0S11E	28	18	4
559E	27	12	3
1N6E	--	15	4

Flake Scrapers

These are large scrapers having steep unifacial retouch along at least one edge with little additional modification to shape or thin the tool. They are distinguished from utilized or retouched flakes by their size and the more advanced or refined, steep continuous "scraper" retouch. The two complete specimens from 4N4E and 4S9E are technically end scrapers exhibiting steep distal dorsal retouch but they appear to have been rejected when resharpening resulted in large irregularities in their bit edges. The latter example (Figure 6:a) shows extensive rounding and polish which occurred on the distal edge before it was damaged. Bifacial retouch along the lateral edge is acute angled and may have served in cutting rather than as a hafting modification. This specimen was refitted from three fragments all recovered from the same one-metre square. The pebbly surfaces on the broken edges suggests that these breaks were thermally induced. The specimen from 7N5E-4N5E (Figure 6:b) can only be tentatively identified as an end scraper since the flake's distal end is missing and the retouch on the lateral edge is irregular, perhaps representing a denticulate, with dorsal retouch forming three teeth proximal to the break. These rather large scrapers appear to have been rejected due to breakage rather than to exhaustion.

Unifacial End/Side Scrapers

These scrapers form the largest portion of the scraper assemblage, being represented by ten specimens. The end and side scraper categories have been united here because of the difficulty in distinguishing the two scraper types on small specimens which display such extensive workmanship that the striking platform and flake orientation are often indiscernible. I suspect that similar difficulties have led others to apply the terms end and side scraper to specific specimens on the basis of utilized edge length and maximum tool dimensions (cf. Chapman 1977:57) rather than in reference to flake orientation. However, here, this approach seems arbitrary since these metrics are within millimetres and it is doubtful whether they were taken into consideration by the craftsmen. It is of interest to note that several end/side scrapers, as well as the three specimens classed as alternate scrapers, exhibit converging (lateral?) edges creating a rather pointed (distal?) end. Since these projections do not appear to have been utilized it may be that these points are simply a result of extensively resharpening the adjacent (lateral?) edges and indicate some of the final stages of tool use or tool exhaustion.

Alternately Bevelled Scrapers

These three specimens are distinguished from those described above by the placement of retouch on opposite long or lateral edges of the tool resulting in trapezoidal cross sections. All three examples exhibit converging lateral edges forming pointed distal ends (Table 5, Figure 6:k-m).

Scraper Discussion

One of the most notable characteristics of the Kassel site scrapers is their small size and the extent of workmanship that they display. The assemblage may be viewed as a product of material scarcity and tool resharpening, a continuum of reduction, resharpening, re-use, exhaustion and discard. The first stage is represented by the large retouched flake scrapers which may be examples of tools lost or rejected due to breakage during the early 'stages of their use/reduction sequence (ie. Figure 6:a,b). Two of the three large flake scrapers, for example, were found in several fragments while the remaining specimen appears to have been rejected due to an error made during resharpening. The larger end/side scraper from 1 S6E (Figure 6:c) appears to be the distal end of an end scraper, yet fine retouch on the lateral edges suggests that these edges were receiving most use while the distal end is not as finely retouched and is beginning to show the protrusion or point common to many of the smaller end/side or alternate scrapers (ie. Figure 6:g-i, k-m). If complete it would have been longer than most of the other end/side scrapers and it is expected that this specimen was rejected due to breakage before it was exhausted.

Table 5. Kassel Site Scraper Descriptions

Scraper Type/ Provenance	Chert Type	Metrics (mm) Leng.	Width	Thick.	Retouch Loc.	Shape	Comments
Flake Scrapers							
7N5E-4N5E	ON	44+	39	11	LD	CV	Denticulate?
4N4E	ON	35	43	13	DD	CV	
4S9E	ON	51	34	11	DD	CV	Three frags from same
					LB	CV	unit. Thermal breaks
End/Side Scrapers							
7N3E	ON	19	16	6	LD	CV	Ovate - all edges
					LD	CV	steeply retouched
					PD	CV	most use appears on
					DD	CV	flake's distal end
6N7E	KP	21	19+	7	DV	?	
					LV	?	Nodular cortex
6N7E	KP	22	18	6	LD	CV	Converging lateral
					LD	CV	edges
5N6E	ON	23	16	3	LD	CV	
1N7E	ON	26	28	9	DD	CV	
1N9E	KP	18	17	7	DD	CV	
					LD	CV	
					LD	CV	
1N10E	ON	26	18	6	LD	CV	Converging lateral
					LD	CV	edges
1S6E	ON	20+	23	7	DD	CV	Distal fragment of
					LD	?	end/side scraper
					LD	?	(not exhausted?)
2S8E	ON	22	20	6	LD	CV	
					LD	CV	Nodular cortex
2S8E	ON	26	18	8	LD	CV	
					PD	CC	
					DD	CC	
Alternate (Side) Scrapers							
5N7E	ON	25	17	5	LD	CV	Converging lateral edges
2S10E	ON	20=	13	5	LD	CV	
					LV	CV	
2S12E	KP	26	17	5	LD	CV	
					LV	CV	Nodular cortex
Unidentifiable Fragments							
6N8E	KP	22	14+	**4**	LD	CV	
2N10E	ON	17+	15+	4	?V	?	

Abbreviations:
Chert Type:
ON Onondaga KP Kettle Point

Retouch:
Location L:
P Proximal
D Distal
L Lateral

Location R:
D Dorsal
V Ventral

Shape:
CC Concave
CV Convex

Measurements are in mm. + Indicates incomplete measurement due to breakage, .

The end/side and alternate scrapers are, for the most part, complete specimens. Their small size and the greater number of retouched edges exhibited by these specimens suggest that they have been extensively reworked or resharpened and discarded upon exhaustion. It is noteworthy that five of the eighteen scrapers are made from Kettle point chert, far exceeding the appearance or use of this material elsewhere in the assemblage. A similar preference for Kettle Point chert for use in the making of scrapers has been documented in both Archaic (Lennox 1986b:228) and Late Woodland (Lennox 1981:244, 1984:68) assemblages and has been attributed to the material's resistance to dulling by abrasion.

The Kassel site scrapers, as a single artifact class, were widely distributed throughout the excavations with no apparent spatial patterning as to scraper types or raw materials.

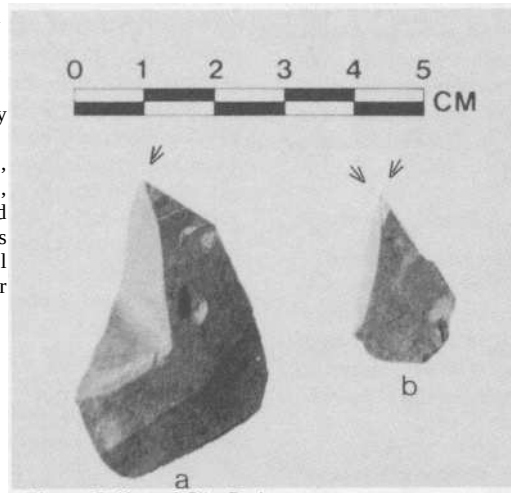

Figure 5. Kassel Site Burins

Miscellaneous Bifaces

Aside from the points, a point preform and drills described below, fourteen other bifaces recovered from Kassel appear to have been rejected at an early stage in their reduction due to breakage. With three exceptions, they are small edge fragments or midsections that offer few insights as to the form of the complete specimens other than to suggest that they were thick bifaces with sinuous edges, attributes usually associated with early stage preforms rather than with finished tools. Three of the larger specimens suggest that ovate-triangular forms were the norm, with lengths (48+ mm, 40 mm, and 31+ mm) widths (32 mm, 36 mm, and 40 mm) and thicknesses (7 mm, 10 mm, and 10 mm) appropriate for knife or projectile point preforms. An additional specimen from 0N9E-2S9E is also triangular or ovate-triangular in form and while it exhibits nearly complete length (61 mm) and width (36 mm) measurements, both faces of the tool consist of almost continuous potlidded surfaces leaving only 6 mm of the specimen's original thickness. What little remains of the tool's original surface suggests that this was a large yet refined and well thinned biface, perhaps a knife.

It is of interest to note the distribution of this artifact class since almost all examples were recovered from the southern half of the excavations (Figure 10).

Point Preform

A small, nearly complete biface appears to have been an unfinished point or point preform (Figure 7:a), comparing favourably to the example from the Blue Dart site (Table 6). This ovate-pentagonal

Table 6. Kassel and Blue Dart: Point and Preform Metrics

Provenance	Length	Shoulder Width	Stem Width	Thickness	Figure Reference
Kassel Points					
4S8E	25	20	10	3	7:c, 8
4N6E	24	15	9	3	7:a, 8
4S11E	(29)	(22)	-	4	7:d, 8
2S8E	35+	(25)	-	5	7:e, 8
Kassel Preform	35	28		6	7:a
Blue Dart Point	33	29	15	5	13a, 14a
Blue Dart Preform	39	30		5	13b, 14b

Measurements are to the nearest millimetre. () Indicates estimated measurements from point fragments..
+ Indicates incomplete measurement of remaining fragment.

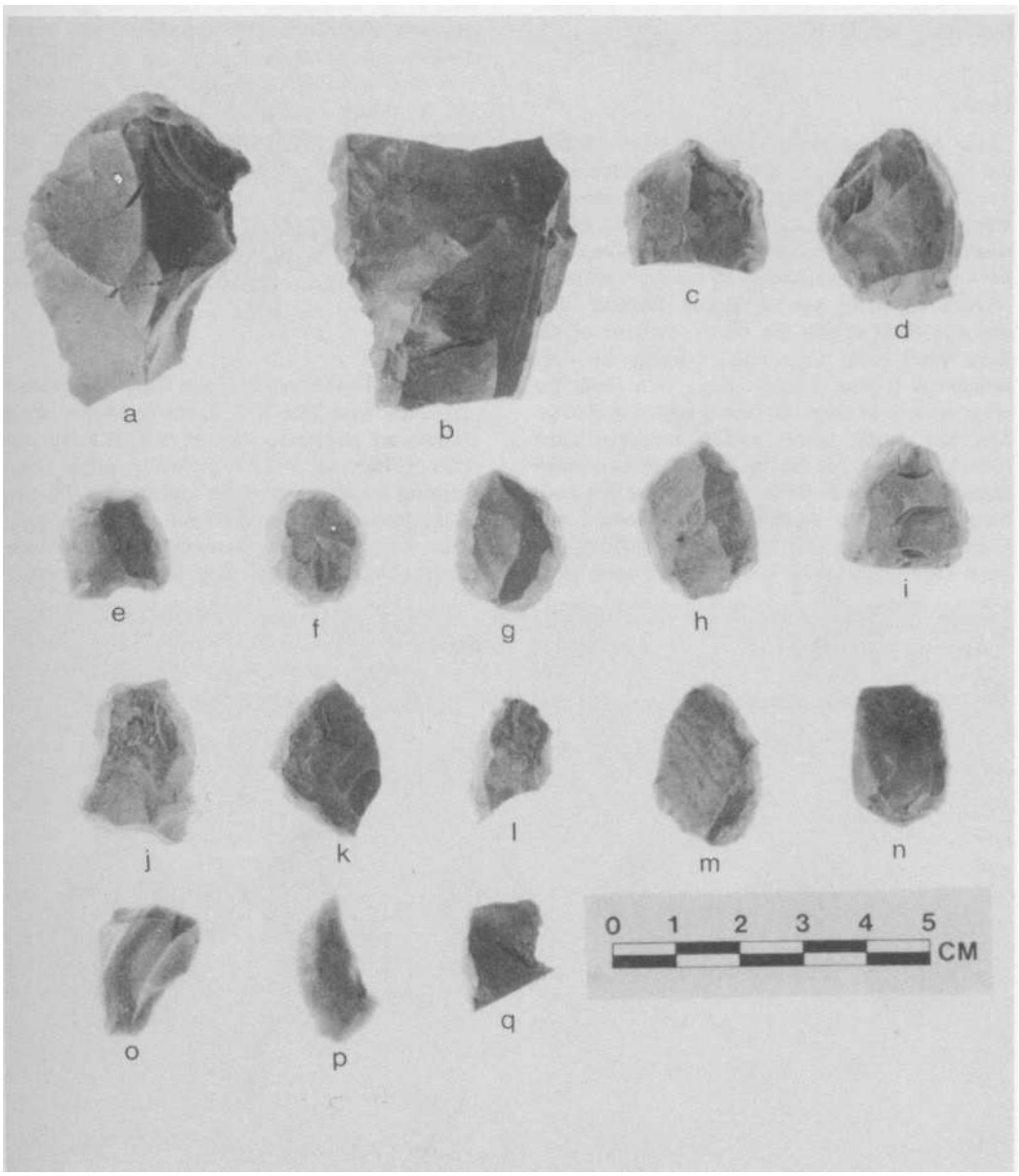

Figure 6. Kassel Site Scrapers

a,b Flake Scrapers (4S9E, 7N5E-4N5E)

c-j, n,o End/side Scrapers (IS6E, 1N7E, 1N9E, 7N3E, 6N7E, 1N10E, 2S8E, 2S8E, 5N6E, 6N7E)

k-m Alternate Scrapers (5N7E, 2SI0E, 2S12E)

p, q Fragments (6N8E, 2N 10E)

biface was refitted from two fragments recovered from 659E and 7S 11 E.

Points

Four complete or nearly complete points identify the Kassel site as a member of the Bifurcate Base Tradition and within this Tradition the points most closely correspond to the Lecroy type. Two of the smaller, complete specimens (Figure 7:b and 7:c) have been made on flakes with the most intrusive retouch appearing on the dorsal surfaces. The opposite faces exhibit the ventral surfaces of the flake blank with edge retouch being the only refinement (Figure 8:b and 8:c). As a result the cross sections of these two points are plano-convex. The two larger points exhibit biconvex cross sections as a result of the fine bifacial retouch which extends across both faces. One of these has been burnt, resulting in the loss of one shoulder and slightly more than half of the base including the basal edge (Figures 7:d and 8:a). The other point fragment (Figure 7:e) shows an interesting set of five breaks. The tip was broken from the remaining portion of the blade and these fragments were recovered from the same excavation unit suggesting that this damage occurred *in situ.* The other four missing fragments include both shoulders and both sides of the bifurcated stem. This breakage pattern may have resulted when the hafted point was turned at right angles to the shaft during use as a projectile. Two other small biface tips from 1S7E and 6S12E, and a biface midsection from 2N9E-1N9E appear to be point fragments but offer few interpretive details. Point and preform metrics are provided in Table 6.

No evidence of basal modification, either grinding or burination (cf. Justice 1987:91-2, Prufer and Sofsky 1965:31) occurs on the Kassel site examples.

Drills

Two small and narrow bifaces with straight bases and thick triangular and diamond shaped cross sections are elsewhere cited as straight sided base drills (Chapman 1977:75). While slight edge rounding is noted toward the tapered (distal?) ends of the tools, fine retouch at the rounded, slightly wider, ends or bases appears excessive as a basal finishing technique and may in fact indicate an alternative orientation and/or use for these specimens. The examples from Kassel were both recovered from 2S8E and measure 34 mm and 29 mm long, 11 mm and 8 mm wide and 7 mm and 5 mm in thickness (Figure 9:a and b). Similar examples are documented from the Kirk, Bifurcate

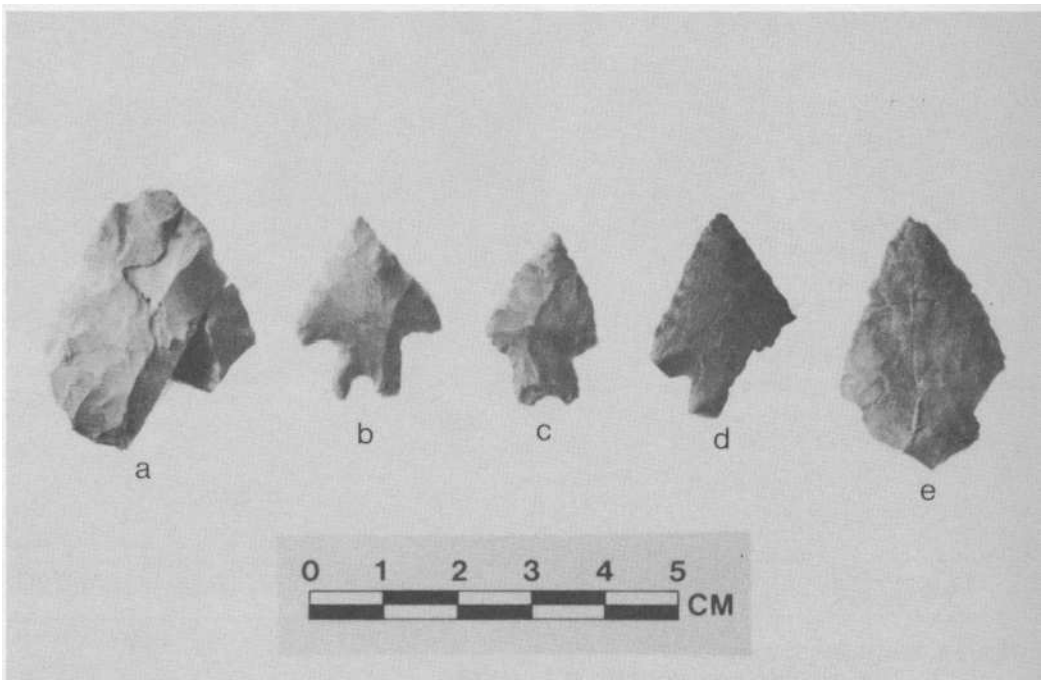

Figure 7. Kassel Site Points and Preform
a - Point Preform (6S9E-7S11E), b-e - Projectile Points (4N6E, 4S8E, 4S11E, 2S8E-2S8E)

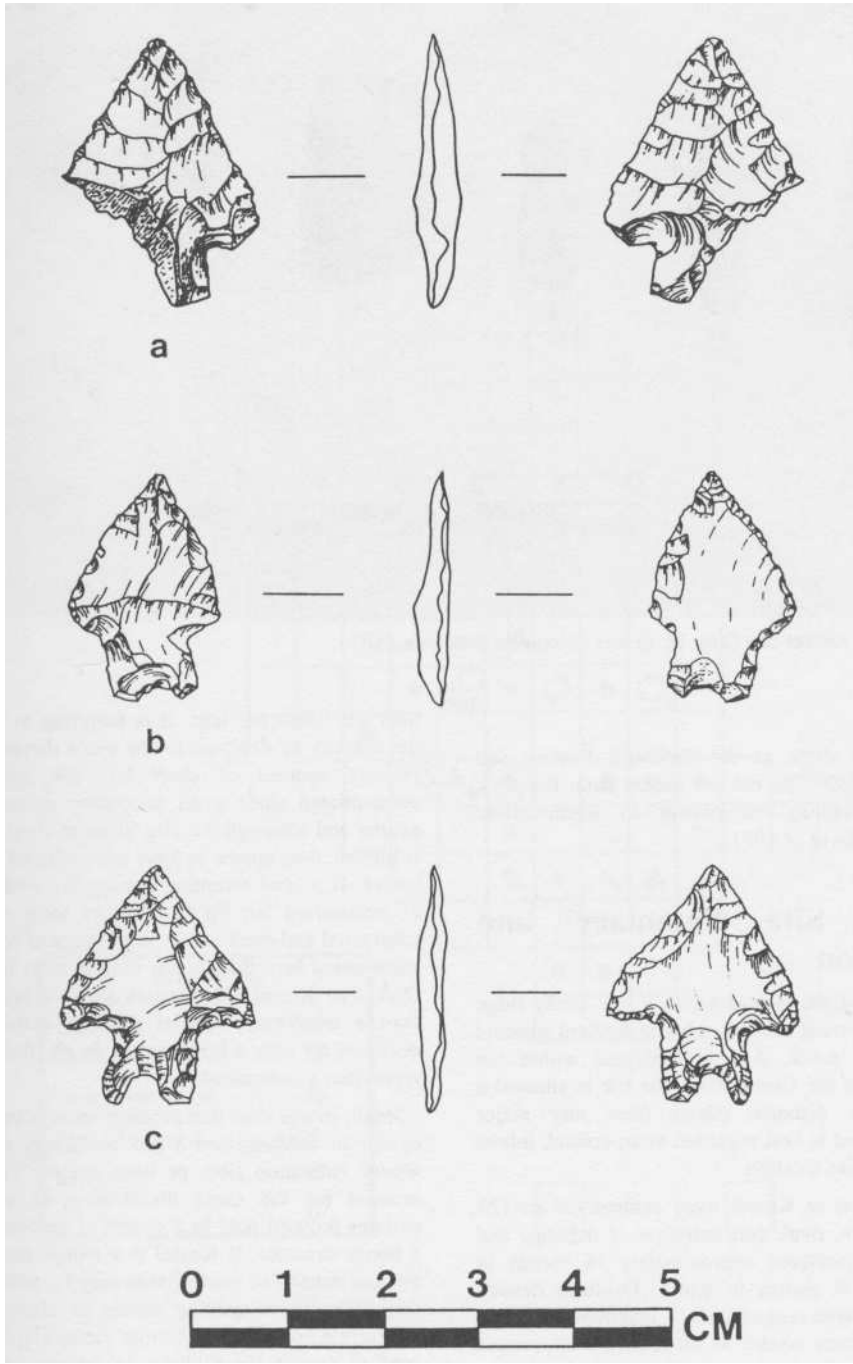

Figure 8. Kassel Site Points

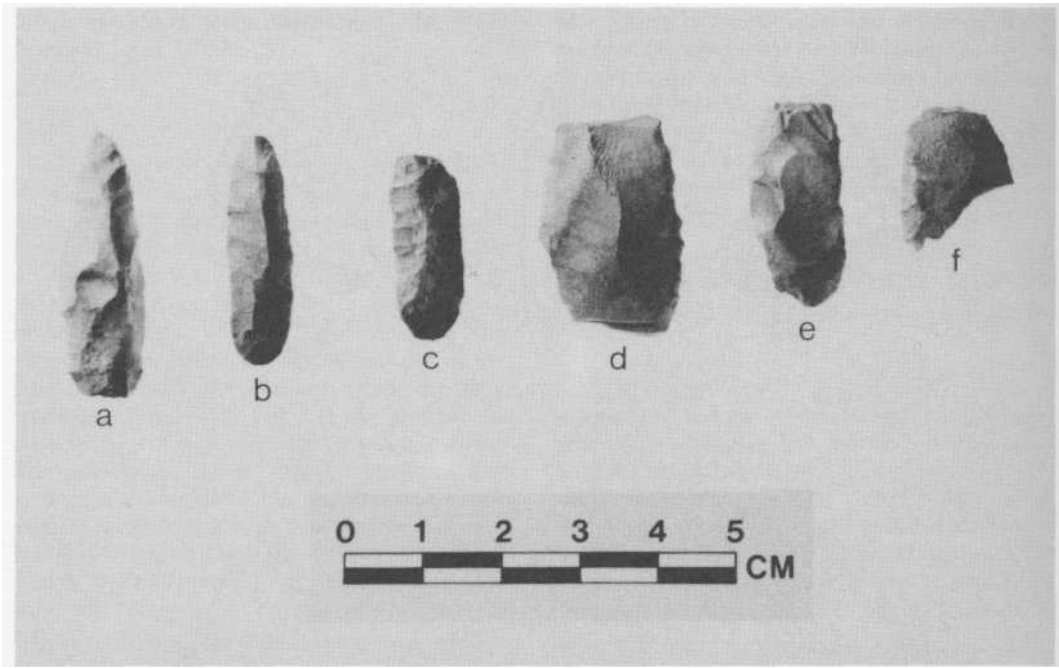

Figure 9. Kassel Site Drills (a, b) and Retouched Bladelets (c-f)

and Stanly strata at the Icehouse Bottom site (Chapman 1977:78) but are absent from the Kirk Horizon, Nettling component in southwestern Ontario (Ellis *et al* 1991).

Kassel Site Summary and Discussion

The Kassel site is located on a low sandy ridge bordered on three sides by a broad wetland adjacent to a small creek. Although located within the watershed of the Grand River the site is situated a considerable distance inland from any major waterway and is best regarded as an upland, inland or interior site location.

Excavations at Kassel were centred on an 127 square metre, oval, concentration of debitage and tools that measured approximately 16 metres in length and 9 metres in width. Debitage density within this area ranged from a maximum of fifty-three per metre square to an arbitrary excavation limit of one-metre squares that produced less than five pieces of debitage. The Kassel site lithic assemblage is meagre compared to that of most Archaic sites excavated in southwestern Ontario. Debitage densities are low over most of the site area with 75% of the excavation units producing less than ten flakes per unit. It is tempting to attribute the scarcity of debitage to the site's distance from primary sources of chert but this cannot be substantiated since good secondary sources exist nearby and although the size of these chert pebbles is limited, they appear to have been utilized to some extent. It is also tempting to suggest a short period of occupation but the number of tools is rather substantial and there is a broader range of tool types represented here than is the case at sites like Blue Dart. The Kassel site appears to have been more than a temporary, special purpose activity area occupied for only a brief period. In all likelihood it represents a base camp.

Small, inland sites that produce more than a small cluster of debitage and a few tools may represent winter habitation sites or base camps. This may account for the close distribution of activities, perhaps focused near to a hearth or perhaps within a house structure. If Kassel is a winter base camp, the low density of waste flakes may be attributed to the difficulty of gaining access to chert sources during the cold season. Similar reasoning has been used to explain the findings on several other sites recently investigated by the Ministry of Transportation (Lennox 19866, 1990) to a point of appearing redundant or lacking in imagination, but the fact is that few provincial highways are built on major waterways where warm season camps were probably concentrated in the limited space available in these

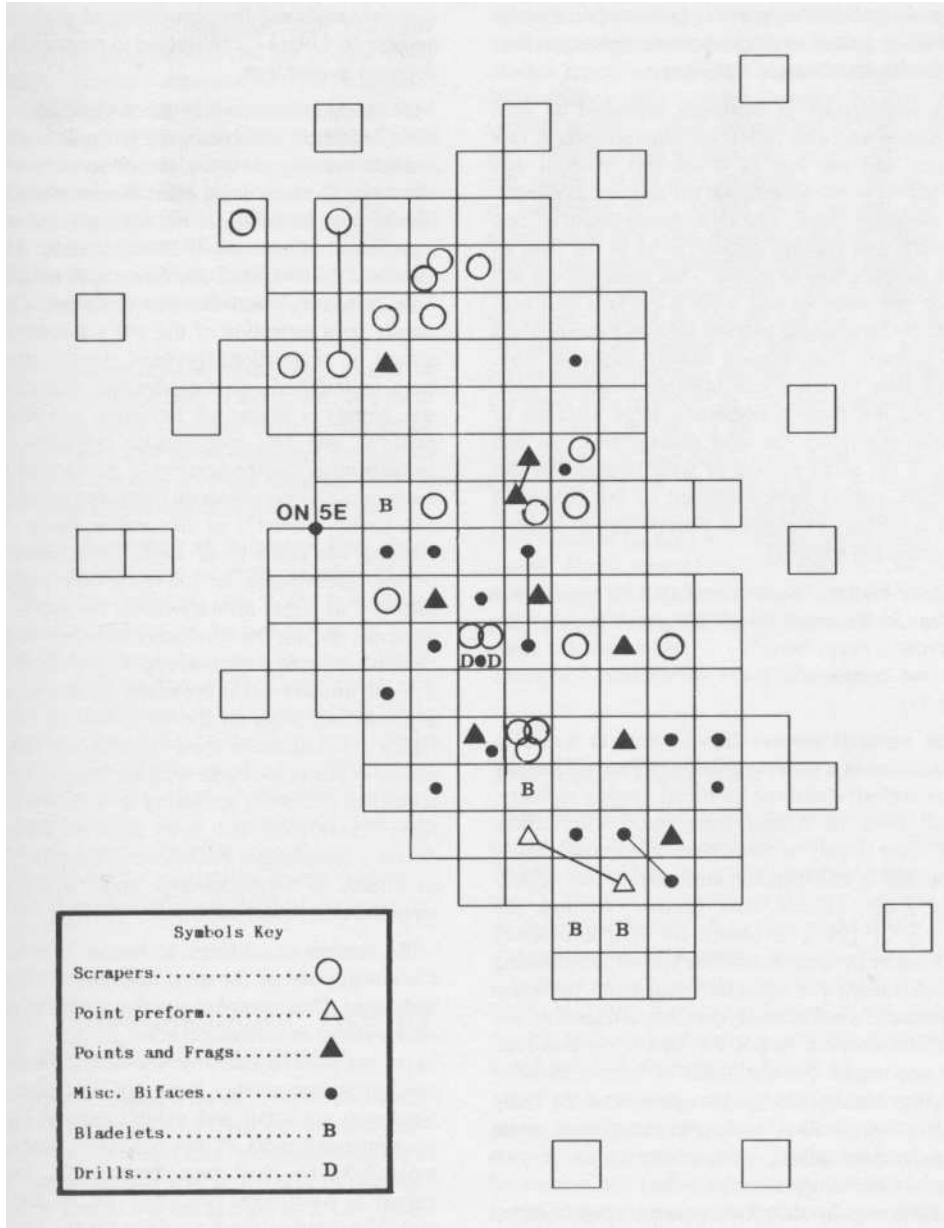

Figure 10. Kassel Site Artifact Type Distribution

resource rich areas. Such concentrations of warm season sites have resulted in what often appear to be large intensively occupied or rich archaeological components, but often prove to be those horizontally continuous mixed multicomponent nightmares that line the banks of major waterways.

The low density of materials deposited on sites like Kassel may also reflect the requirements of raw material and the way in which this material was handled between extraction at the source and deposition sometime later. The wise management of raw materials was perhaps critical, more to the lives of some peoples than to others. This management and use of raw material and tools is perhaps best portrayed by far-ranging peoples such as Paleo-lndians who seem to have carried enough toolstone from quarry sites to last a considerable length of time. This did not mean transporting large amounts of material but rather the wise management, use and reuse of the small amount of material that they did transport. Others have remarked on the burden of large quantities of material possessions in hunting and gathering societies.

"Of the hunter it is truly said that his wealth is u burden. In his condition of life, goods can become "grievously oppressive," .. . and so possess what they can comfortably carry themselves. " (Sahlins 1972:11)

Is the material conservation evident at Kassel a continuation of a pattern practiced during the Paleo--Indian period? Evidence for broad ranging mobility, in the form of distant lithic source utilization, contributes largely to the picture of material conservation during Paleo-Indian times and is also evident at the Early Archaic, Kirk horizon, Nettling site (Ellis *et al* 1991). Evidence for similar mobility practiced by the people who use Kassel, contributing to their regard for material acquisition, reduction and discard, is not as easily documented since exotic lithic materials are virtually absent. This, however, does not negate the likelihood of such a mobility pattern persisting into the later portion of the Early Archaic but it does make its recognition more difficult. Alternatively, the conservation of raw materials here may simply reflect the season of occupation or distance from primary sources rather than being a part of any broader temporal phenomenon.

At Kassel the absence of cores or core remnants and the scarcity of primary flakes and cortical surfaces suggests that there was little core reduction carried out here. This may be related to the site's distance from primary sources and perhaps, in part, to a reliance on pebble cherts for most of their immediate needs. Yet, assuming the use of pebble cherts, primary flakes with or without cortex are rare, suggesting that virtually all primary reduction occurred off the site and that the maintenance of complete tools and the completion of preforms, and perhaps tool blanks, contributed to most of the site's debitage assemblage.

On Archaic sites where the early stages of the lithic reduction sequence were not practiced due to material scarcity or where secondary source pebble cherts are the only local chert source available, the bipolar core technique is not only present but well represented (Chapman 1977:57, Lennox 1984:62, 1986b:227, 1990:40,47-49, Lennox *et al* 1986:82). This, however, is not the case at Kassel. This may simply be a reflection of the site's function or the season of occupation, (perhaps shortly after tools were replenished), so that material reduction here was simply a matter of finishing tool blanks or preforms and tool maintenance activities such as resharpening. But the scarcity or absence of bipolar cores or *pieces esquillées* on Paleo-Indian sites (Ellis and Deller 1990:47) or the earlier Early Archaic Nettling site (Ellis *et al* 1991:10) suggests that a broader pattern may be emerging. The preferential selection of larger primary flakes for use is almost universal among the producers of stone tools. Yet here, where core reduction appears minimal and, as a result, primary flakes are relatively scarce, there is a greater emphasis on the utilization of secondary flakes for expedient tools. Retouched flakes are scarce in this assemblage with the specialized form, retouched bladelets, appearing as a distinctive tool form. These have also been reported from Early Archaic assemblages elsewhere in the province and as distant as Tennessee and may have restricted temporal or cultural affinities.

The scraper assemblage at Kassel is substantial, these being one of the most common artifact types recovered. Their morphology also seems to reflect a conservation or exhaustion ethic. Scrapers appear to have been utilized and reworked so that the complete specimens (presumably those not discarded due to breakage) are small and exhibit several bit edges encompassing most of the available edges of the tools. For the most part these small specimens appear to have been discarded due to their small size. Yet some of the Kassel specimens show great morphological similarity to those from such distant assemblages as Icehouse Bottom where arguments concerning restrictions imposed by raw material scarcity cannot be substantiated. Perhaps scraper form will also prove to be a sensitive cultural or temporal indicator. The preferential use of Kettle Point chert for the production of some of the Kassel site scrapers is notable, although this material is virtually absent from the rest of the assemblage. As

previously noted a similar preference has been documented for other Archaic, as well as Late Woodland assemblages.

Also present are the distinctive thin triangular bifaces interpreted as knives, and the straight sided base drills. Similar examples of the triangular bifaces are cited for Early Archaic corner-notched point assemblages (Ellis *et al* 1990:74, 1991:9) but their presence at Kassel indicates that they have broader cultural affinities. Similar drill types are documented from the Kirk, Bifurcate and Stanly strata at the Icehouse Bottom site (Chapman 1977:78) but they are absent from the Kirk Horizon, Nettling component in Southwestern Ontario (Ellis *et al* 1991).

A small ovate-pentagonal biface, very similar to the example from Blue Dart, is interpreted as a point preform. While other examples have been reported for bifurcate base components elsewhere, pentagonal point preforms are also reported for other Archaic stemmed point industries (cf, Ellis *et al* 1990:100).

A broader discussion of bifurcate base point typologies is found in the concluding section of this report. The slight variation seen in the few Kassel site specimens appears to be a function of their reduction from either flake blanks or from bifacial, likely pentagonal, preforms. The latter points are slightly larger and biconvex in cross section while points made from flake blanks have been simply formed, predominantly through the removal of short flakes from the tool's edges, leaving large portions of the original flake blank unmodified. Does this variation separate those points manufactured at the site (restricted by the availability of raw materials) from those transported here as finished specimens or preforms?

Spatial Considerations: Activity Areas and House Structures

Excavations at Kassel were directed by the density of waste flakes recovered from one-metre square units. The limits of excavation were arbitrarily set at squares producing less than five pieces of debitage, resulting in continuous excavation of a 127 square metre area. The number and range of tool types present suggest that the site was a base camp and probably possessed a house structure. The size of the lithic scatter resembles others excavated in a similar fashion at Late Archaic sites such as Innes (Lennox 1986b) and Canada Century (Lennox 1990), where the presence of structures was argued from the distribution and density of lithic debitage. Similar arguments are difficult to make for Kassel because of the low debitage densities present here.

What is interesting are the distributions of artifact types across the site area. During the analysis all artifacts were plotted individually in search of clusters or patterns in their distributions. However none appeared particularly outstanding. When all artifact types were plotted together (Figure 10) a large artifact cluster, which included all tool forms (points, scrapers, drills, retouched bladelets, bifaces and preforms) was noted in the largest, more south-ern, portion of the area excavated. A smaller cluster of tools was found to the north where, with the exception of one point fragment, half of the scraper assemblage was recovered, somewhat isolated from the other tool types present at the site. It may be that the larger cluster represents the area of a house structure, with numerous and varied activities represented by the tools recovered there. The area to the north may represent an outside-of-house activity area, a place devoted to the processing of skins. If the southern artifact distribution does represent the location of a house structure, its size, approximately 11 m by 7 metres, is similar to structure size estimations reported for the Late Archaic components cited above. These examples range from 11 m to 16 metres long and from 7 m to 10 metres in width, placing the Kassel structure at the small end of this range.

The Blue Dart Site

The Blue Dart site is located approximately 800 metres east of the Kassel Site, on Lot 5, SSR, in Wilmot Township, Waterloo County, Ontario (Figure 1). The site is situated on the southern end of a north-south oriented ridge, on a slight sandy rise a few metres above the present wetland (350 m. A. S. L.). While Alder Creek is now diverted to the north of the highway, formerly it flowed to the south of the site and bordered the site on three sides with a broad wetland, as shown in Figure 11.

The Blue Dart site was identified and mitigated during the 1990 field season. Understandably, given the site's small size and low artifact density, it had been missed by our test pit survey in 1989 but was located when the proposed right-of-way was surface examined following its minor disturbance during logging activities. At this time three small flakes were visible close together on the surface. One-metre square test units excavated at five-metre intervals indicated the site's small size. Excavations were limited to thirty-four one-metre squares most of which were concentrated in a five by five metre area (Figures 11 and 12) centred on a single subsoil feature. The site produced a small but interesting

Table 7. Blue Dart Site Lithic Debitage Morphology and Material Types

Chert Type	Flake Type				TOTAL
	Primary	Secondary	Shatter	Frag.	
Onondaga	17	71	2	82	172
Kettle Point	1	7		9	17
Haldimand	-	6		2	8
Selkirk	1	-		1	2
TOTAL	19	84	2	94	199

assemblage consisting of one point, one point preform, three bifaces, four utilized flakes and 199 pieces of chipping debitage (Table 1). These artifacts and the single feature identified are described in the following sections.

Feature 1

Feature I was identified in square 3N1 W. The topsoil from this square produced the highest density of debitage from the site, fifty-two items. The feature was defined at the topsoil-subsoil interface as having irregular edges, being oblong in planview. It was oriented northeast-southwest measuring 89 cm long and 35 cm in maximum width. The feature was distinguished by its light grey-brown, sandy fill against the light reddish-brown, sandy subsoil and was basin shaped in profile with a maximum depth of 11 cm below the topsoil-subsoil interface. All feature fill (14 I) was removed for flotation, which produced twelve only pieces of debitage and also about fifty flakes and flake fragments that can only be described as microdebitage since they were recovered using a one millimetre mesh screen.

There was a reluctance at first to assign Feature 1 to the Early Archaic occupation since the density of artifacts within the feature seemed to be even less than that recovered from the topsoil above. It was thought that the feature might simply represent an undulation in the subsoil or be a byproduct of the indistinct vertical distribution of artifacts which is often seen, on Archaic sites, to overlap the topsoil-subsoil interface and diminish rapidly within a few more centimetres of depth. The fact that the feature was visible also raised questions of authenticity since subsoil features are rare on Archaic sites. Rather than being defined on the basis of soil coloration they are often visually imperceptible and usually definable only on the basis of their artifact contents. However, the feature was not recognized until the surrounding subsoil was exposed and what remained may only have represented the base of a slightly deeper feature.

When the volume of the identified feature remnant is considered against the volume of the topsoil excavated above it the density of artifacts from within the feature is not in fact low. Furthermore, the feature was the focal point of the site not only in terms of debitage and tool frequencies but also in the distribution of thermally altered tools and debitage, suggesting that the feature may have served as a hearth. Flotation and fine screening of the feature fill produced only a few pieces of wood charcoal, the largest being less than a centimetre in length. The wood charcoal was encrusted with a mineral deposit and thus appeared much the same as the surrounding soil matrix. Two pieces were large enough for species identification, being sugar maple and white pine (R. Fecteau, personal communication, January 1992). The latter, larger specimen was submitted to the Accelerator Mass Spectrometry Facility at the IsoTrace Radiocarbon Laboratory for dating. The following results as reported by Dr. R. Beukens (Personal communication, May 16, 1992) provide a sample age quoted as an uncalibrated conventional radiocarbon date in years before present (B.P.), using the Libby carbon 14 meanlife of 8033 years. The error represents the 68.3% confidence limit.

Sample Identification: Blue Dart Site Feature 1
Description: White pine charcoal
Weight used (mg): 162
Isotrace Lab number: TO-2952
Age (years B.P.): 8320 ± 60
The date is considered as acceptable, closely corresponding to those reported for similar cultural materials in Tennessee, West Virginia and Kentucky (see Justice 1987:91-95).

Lithic Debitage

The debitage from Blue Dart was analyzed according to material type and flake type or morphology. As indicated in Table 7, 86% of the debitage was of Onondaga chert with seventeen examples of Kettle Point chert, eight of Haldimand chert, and two of

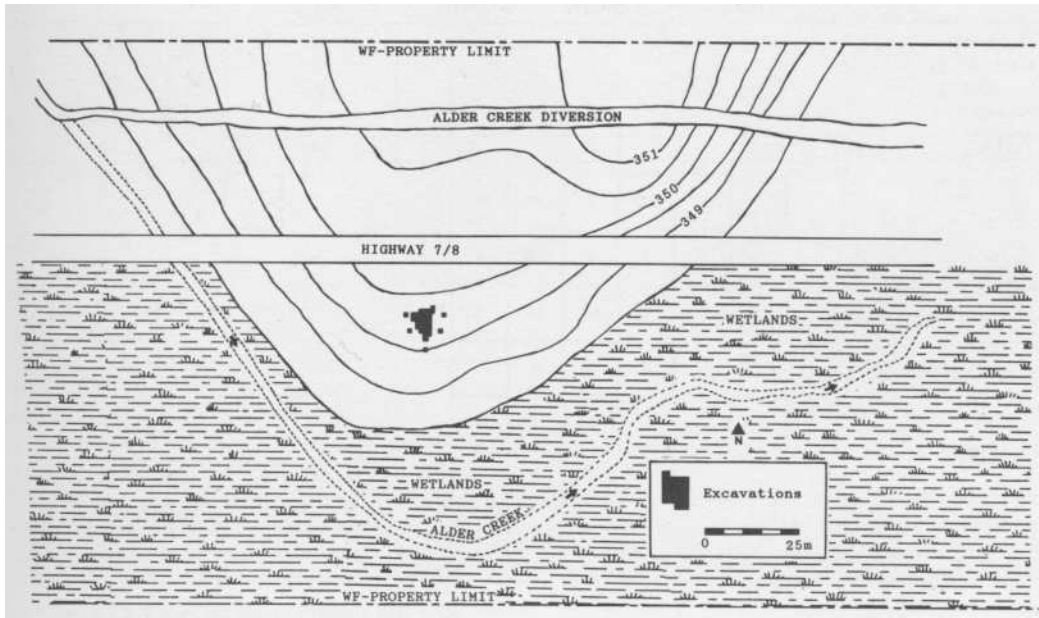

Figure 11. Blue Dart Topography and Limits of Excavation

Selkirk chert. Almost half of the debitage consisted of flake fragments that could not be identified as to morphological type. Most of the flakes that could be identified were secondary flakes, indicating that thinning and resharpening of bifaces constituted the major lithic reduction activity at the site. The few primary flakes recovered, along with the scarcity of cores and the five pieces of debitage that exhibit cortex suggest that little, if any, core reduction took place here. Notably, some of the tools are of Kettle Point chert but little of the debitage is of this material. Probably the tools of Kettle Point chert were brought to the site in a finished state while those of Onondaga chert required finishing and resharpening here. The few secondary flakes of Haldimand chert were undoubtedly derived in resharpening the large biface/knife described below. Likewise those secondary flakes of Onondaga chert may have been produced when preforms were refined into finished tools as the reduction of the point preform to the finished point would nicely illustrate.

Utilized Flakes

Three utilized primary flakes and what may be a utilized core remnant are all of Kettle Point chert. These specimens are large pieces of material, compared to most others on the site, and were likely transported here as blanks. One specimen, from 5N3W, is the proximal end of a primary flake. It exhibits convex lateral edges with fine, discontinuous, bifacial use retouch and some edge rounding perhaps from use as a cutting implement on soft materials. It measures 20 mm long, 35 mm wide and 7 mm in maximum thickness. Another primary flake from 5N2W measures 35 mm long, 30 mm wide and 10 mm thick. It exhibits bifacial use retouch along 21 mm and 22 mm of its straight distal and lateral edges respectively, use wear that might be expected from cutting harder materials. The remaining utilized flake from 4N0E measures 29 mm long, 18 mm wide and 5 mm thick. It shows unifacial use retouch for 17 mm along its concave lateral edge and may have been used as a spokeshave. This flake undoubtedly derived from a small chert nodule, perhaps an exhausted core, recovered from 5N0E. The core remnant measures 31 mm by 25 mm by 15 mm and exhibits unifacial use retouch and edge rounding on a 28 mm long convex edge.

Bifaces

The biface/knife of Haldimand chert was recovered from 3N1 W. It is ovate-triangular in shape, measuring 57 mm long, 42 mm in maximum width and 8 mm in thickness. Judging from the

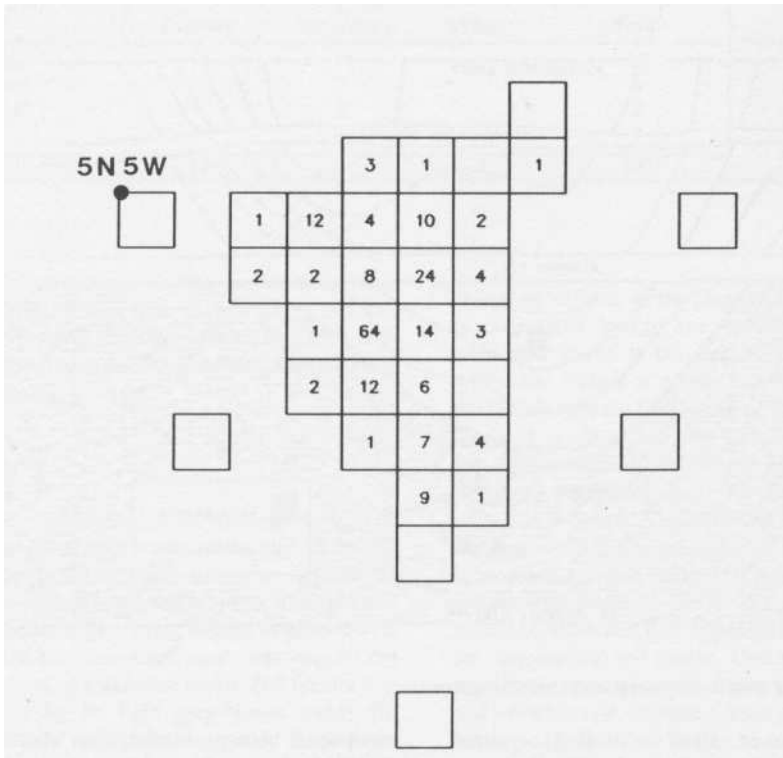

Figure 12. Blue Dart Debitage per Metre Square. (The artifact density as shown in square 3N1W combines the topsoil density of 52 with the 12 pieces of debitage recovered from Feature 1)

asymmetrical form of the tool and the secondary flakes of Haldimand chert represented in the debitage assemblage, one lateral edge was resharpened at the site while the opposite edge was left sinuous, unfinished, and was dulled perhaps to act as a backing. Basal thinning, apparent on one face of the tool, in combination with grinding of the base and adjacent lateral edges likely aided its hafting as a cutting implement (Figures 13:c and 14:c).

Two other bifaces were fashioned from Kettle Point chert. One small fragment, recovered from 4N0E, appears to have been a tool blank or preform. The tool's edges have been rounded perhaps in preparation for further thinning or from use. Another biface was fragmented due to exposure to intense heat. The three fragments recovered mend to form an apparently well thinned biface measuring 27 mm long, 12+ mm wide and 5 mm thick. Notably all three fragments were recovered from 3NIW, above Feature 1, and support the feature's interpretation as a hearth.

Point and Point Preform

The single projectile point recovered from the Blue Dart Site is a complete bifurcate base point and was the only artifact recovered from square 6NIE. It is made of Onondaga chert and may be described as short relative to its width (maximum length = 33 mm, maximum/shoulder width = 29 mm), with slightly barbed shoulders and a broad (15 mm) and deeply bifurcated (4 mm) stem (Figures 13:a and 14:a). There is no evidence of grinding or burination on the hafting element. In cross section the point is biconvex or lenticular, measuring 5 mm in maximum thickness. This example is slightly larger than those from the Kassel site (Table 6).

The point preform, from 3N1W, is also of Onondaga chert and may be described as weakly stemmed or pentagonal in form, similar to the example from Kassel. It is so similar in size and shape to the finished point, there is little doubt as to its identification (Table 6, Figures 13:b and 14:b). Prior to the recovery of the point the preform was thought to represent a finished point, typologically a Morrow Mountain I, with poorly defined shoulders

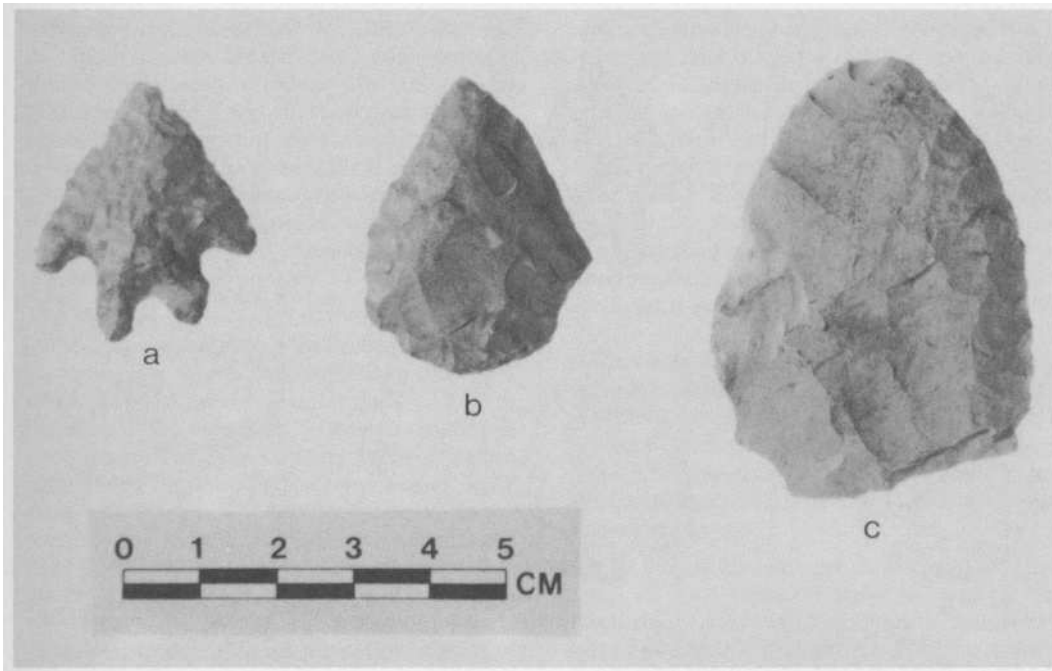

Figure 13. Blue Dart Point, Preform and Knife

and a short broad stem. Indeed, the specimen would have required very little modification to reduce it to the finished specimen, raising the question of other preforms in similar contexts being misclassified. A brief examination of the literature suggests that this may be the case. Often where there are stemmed points in a sequence there are short stemmed or pentagonal forms regarded as points. For example, there is a very similar specimen from Calloway Island (Chapman 1979:221, figure 57a) which is likewise noted to be similar to the Morrow Mountain I stemmed type. The Calloway Island example was recovered from Stratum V while other stemmed types including bifurcates were recovered from strata IV through X. The specimen is plano-convex in cross section "a percussion flaked primary flake brought to finished form by pressure flaking. The extreme proximal end still retains the striking platform" and it is likely that this is also a preform for one of the stemmed point types in these strata.

Blue Dart Summary and Discussion

The Blue Dart site is located 800 metres east of the Kassel site in an identical setting, on a low sandy ridge bordered by the broad wetland of the same small creek that the Kassel site is on. Blue Dart is small in area with the largest portion of the site being contained within a five metre square centred on Feature 1. The feature, interpreted as a hearth, yielded a very small sample of wood charcoal and an acceptable radiocarbon date for this component.

Debitage density is low over most of the site area, the debitage frequency totalling only 199 pieces. While there appears to be a high tool-to-debitage ratio, it is not significantly different from that of the Kassel site (Table 1). As at Kassel, this assemblage is dominated by secondary flakes reflecting mainly the reduction of preforms and tool blanks to finished forms, and tool maintenance activities including the resharpening of worn or dulled edges. This suggests that finished tools, preforms or blanks were prepared elsewhere and carried to the site in a finished or semi-finished state where they were used to replace lost, damaged or worn implements and maintained for immediate use. The assemblage of finished tools is small but their forms, dominated by hunting and butchering equipment, suggest that a restricted range of activities was undertaken here. Scrapers, common at Kassel, as well as a variety of other tool types represented in that assemblage, are absent from Blue Dart.

These factors suggest that Blue Dart was a hunting camp occupied for a brief period of time, a place where hunting tools may have been repaired or

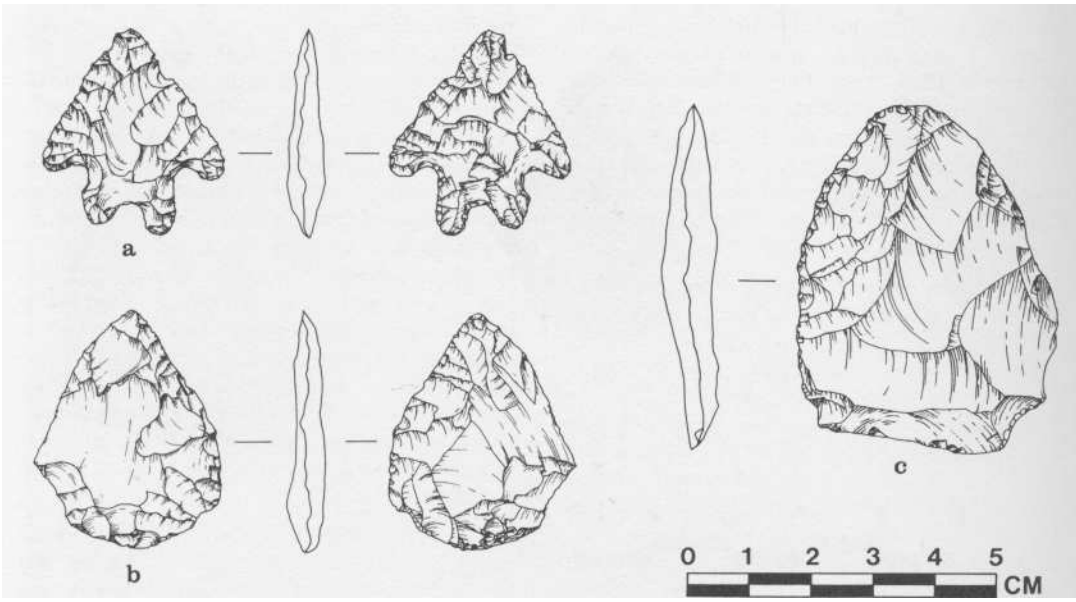

Figure 14. Blue Dart Point, Preform and Knife

refurbished for continued use, and where game was butchered for immediate consumption or for transport to a base camp such as Kassel. The absence of scrapers suggests that the refinement of skins or furs was not undertaken here. Perhaps there were none to be prepared but, more likely, this longer process was undertaken at a more substantial residence location. It may be that this specialized task was undertaken by women, who may have been absent from a hunting camp.

It is noteworthy that many of the tools recovered from Blue Dart were not exhausted or broken and discarded, but appear to represent finished and still functional tools, with a remaining use-life which would have precluded their intentional discard. The Blue Dart tool assemblage may represent simple loss, though the rate of unintentional tool deposition would then appear to be remarkably high. The possibility of a tool cache may be considered since most of the tools were derived from a small area, but support for this hypothesis is inconclusive.

Conclusions

The Kassel and Blue Dart sites represent two settlement types, a base camp and hunting encampment, attributed to the Early Archaic, Bifurcate Base Tradition. The sites produced good samples representing single components and are well defined temporally, contributing to our understanding of Early Archaic adaptations in this area. Being some of our first excavated examples from north of the Great Lakes, many of their characteristics suggest avenues for further research rather than definitive conclusions.

Based on a number of sites in the southeastern United States, the Bifurcate Base Tradition appears to date between 8000 and 9000 B.P., while the LeCroy portion of this sequence, to which the Kassel and Blue Dart sites are most comparable, dates to the latter part of this period. As summarized in Justice (1987:91) a date of 6300 B.C. ± 100 is reported from the St. Albans Site in West Virginia (Broyles 1971), while another date of 6470 B.C. ± 110 is reported from a LeCroy component in northern Kentucky (Collins 1979). Relative dating employing archaeomagnetically sampled hearths from Rose Island placed the LeCroy Phase at 6300 B.C. (Chapman 1977: 166). It is remarkable that the radiocarbon date of 8320 ± 60 B.P. from Blue Dart is in close agreement with dates reported elsewhere.

Larger samples from stratified Early Archaic components exist south of the Great Lakes, most notably from the Little Tennessee River Valley (cf. Broyles 1971, Chapman 1975, 1976, 1977, 1978, 1979), and indicate a sequence of point types and associated artifact styles within the Bifurcate Base Tradition. Broad comparisons over such great

distances are facilitated by the fact that developments within the Early Archaic are generally similar over much of eastern North America (Chapman 1975, Tuck 1974). Researchers have highlighted this aspect of these manifestations with reference to them as horizons (Ellis *et al* 1990, Tuck 1974). However, while it may be acknowledged that there are generalized regional trends, the precise comparability of distant assemblages may be of questionable applicability north of the Great Lakes.

As noted by Justice (1987:92), refinement of this tradition is confused. There has been an evolution in the application of the type definitions. The types which received attention earlier such as LeCroy (Kneberg 1956) were broadly defined resulting in later examples of the Tradition being subsumed under the earlier defined type name. Geographically close and similar in form, for example, is the proposed Lake Erie Bifurcate point type (Prufer and Sofsky 1965:35-36); however, this type alone, or in combination with other bifurcate base point types elsewhere reported, does not adequately represent the apparent range of forms present to the north of Lake Erie. The very limited collections available from Ontario exhibit a range of variability beyond the type definitions formulated elsewhere. While we are recognizing some attribute trends or clusters within this range, it will likely be some time before contributions from additional collections allow refinement of the sequence in the Great Lakes Region.

Some observations based on the sites reported here are noteworthy. Compared to Blue Dart, the Kassel assemblage is considerably larger. Kassel yielded five times the amount of debitage, a sizeable representation of scrapers and a much broader range of other tool forms (Table 1). Most tools at Kassel are distributed in an area measuring approximately 11 m by 7 m in the southern portion of the site while a smaller concentration of tools, principally scrapers, is found to the north (Figure 10). The larger area, with a broad range of activities represented, is probably a house floor while the small area, dominated by scraping tools, was probably a hide processing area. Together they appear to represent a base camp occupied for a longer period of time and by a larger group of people than was the case for Blue Dart.

Estimations of the length of time that the Kassel site was occupied and of the group size represented can only be speculative. Arguments in support of an estimation of the size of the residence unit would follow very closely those forwarded for the Late Archaic Innes site where two similar artifact clusters are represented (Lennox 1986b:234-238). There, estimations of floor area, estimations of the floor area requirement per individual, considerations of minimum band sizes for hunting and gathering societies, estimated from both archaeological and ethnohistoric sources, led to the tentative conclusion that there were two extended families present, or sixteen to twenty individuals. However, unlike Innes, floor area is more difficult to estimate from the lower density of debitage at Kassel. This may relate to the length of time that the site was occupied. the obvious conclusion being that Kassel was occupied for a much shorter duration, or equally valid, that the low debitage density may simply relate to the conservation or wise management of scarce raw materials. Given our limited knowledge of the Archaic in general, and more specifically the Early Archaic, combined with the fact that virtually no floral or faunal data relating to this specific area exist, it seems ludicrous to become involved in such a numbers game.

Blue Dart is a much smaller site with a limited array of tool forms focused on hunting and butchering equipment, distributed within a few metres of a hearth. It is interpreted as a kill site or butchering station, perhaps more broadly considered as a hunting encampment.

The Kassel and Blue Dart sites offer several important contributions. Theirs were the first substantial excavations of Early Archaic components, and specifically those belonging to the Bifurcate Base Tradition, in Ontario. They provide our first opportunity to examine the association of other tool forms with this long recognized point style. The Kassel and Blue Dart assemblages will aid in determining whether or not the seemingly distinctive tool forms may be considered characteristic of the Early Archaic in general or the Bifurcate Based Point Tradition specifically. The material conservation apparent in the debitage assemblage and also evident in other portions of the artifact inventory may be related to an earlier tradition of wide mobility range or may simply be the result of site location or season of occupation. These hypotheses will be testable with the excavation of additional components. Aside from these questions Kassel and Blue Dart provide examples of settlement - subsistence responses that are universal to hunters and gatherers. Base camps and butchering stations or hunting camps have been central elements of
settlement patterns and adaptive strategies throughout prehistory and these components stand as excellent examples.

The excavations of Kassel and Blue Dart also have implications for the investigation of similar components either in the course of cultural resource management, or in programmes designed for strictly research purposes. The decision to excavate Archaic

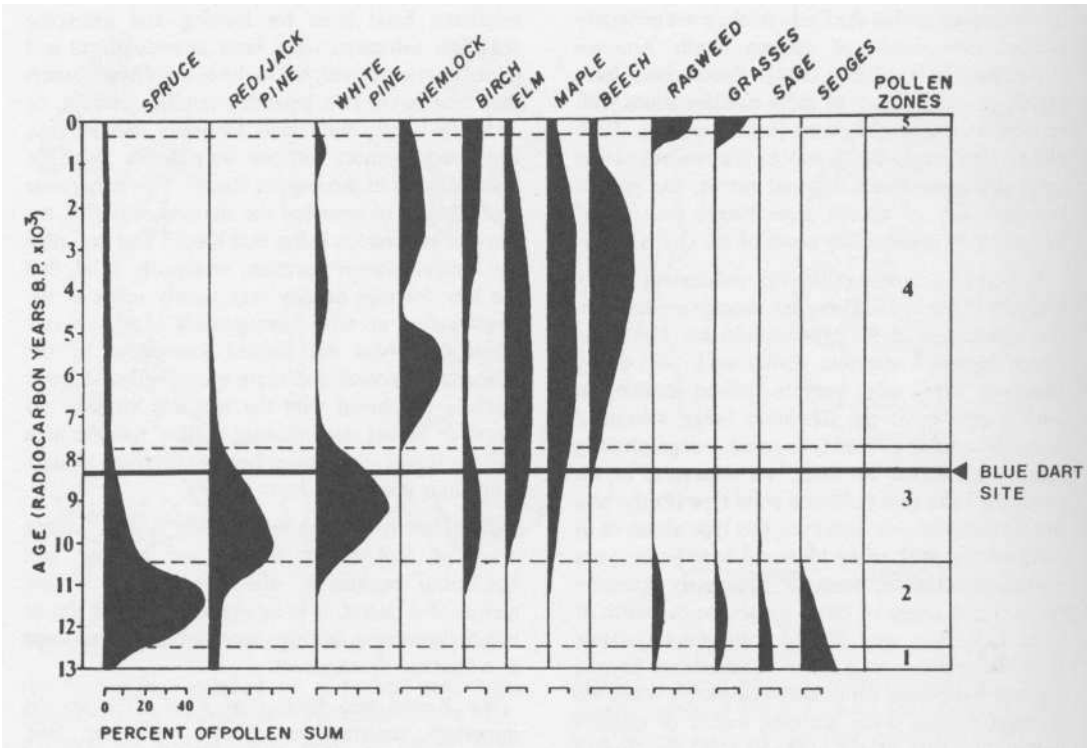

Figure 15. Generalized Pollen Diagram for Waterloo Region. (after Karrow *et al* 1990)

lithic scatters is often based on debitage density, sites producing high frequencies *of* debitage being "more significant or worthy of excavation" and sites of lower density, or areas peripheral to the focus of lithic debitage density, being less "worthy of excavation". Such decisions make several assumptions, none of which are necessarily correct. When site significance is tied to the density of waste flakes recovered, sites with low densities are routinely eliminated from further investigation because they are "less significant". However the assumption that sites with low debitage densities are not important selects against certain types of sites and perhaps also certain periods of prehistory where the reduction of lithic materials did not contribute large quantities to the density of artifacts across site areas. For example, most Paleo-Indian sites produce low debitage densities and, if for this reason alone their excavation was considered insignificant, we would lack an important portion of the prehistory of the Great Lakes region. Fortunately many Paleo-Indian sites are recognizable because of the use of distinctive raw materials and are therefore examined in greater detail for reasons other than artifact density. However, this raises questions concerning Paleo-Indian communities that may have used local materials. What about other periods in prehistory, or what about site types that are not represented by large amounts *of* lithic waste materials? Are some of these sites also not worthy of more detailed consideration? These are simple questions but how do we recognize, let alone evaluate, sites that have few artifacts, particularly if the few artifacts that are recovered consist largely of waste flakes? Solutions to these questions are not easily provided but at least knowing that such biases in our samples exist may be considered a step in the right direction.

Sites like Blue Dart and Kassel are occupations characterized by low artifact densities but they are important. Perhaps all Archaic sites in this region are similarly characterized, or perhaps this is typical of most Early Archaic sites over a much broader area whose inhabitants continued the material conservation techniques of their Paleo-Indian ancestors. Have such sites been written off before knowing what they are? Have we been selecting mixed multicomponent (unstratified) sites for further investigations simply because *of* their high debitage density and ignoring low density sites that may

represent important single components, because of the paucity of artifacts (debitage) that they produce? The initial excavation of shovel and screened test pits at Kassel produced only a few flakes. The component was not temporally or culturally distinguishable until more detailed investigations were undertaken. Blue Dart was missed by shovel testing and was only identified by three flakes exposed on its surface after the soil had been slightly disturbed by logging activities.

The intensive surface collection and subsequent excavation of ploughed components has suggested that about 1% of the ploughzone's contents is visible on their ploughed and well weathered surfaces (Lennox 1986b:239). Had Kassel and Blue Dart appeared in a ploughed field they would probably have exhibited something in the order of twelve and two flakes respectively, and neither site would likely have produced any tools. They could conceivably have been written off as locations not requiring mitigation.

The evaluation of low density sites and their recommendation for further work takes on a new perspective with these data in mind.

These data also have implications for the suggestion that Early Archaic sites are rare. The scarcity of Early Archaic sites has led some researchers to suggest marginal environmental conditions related to a low carrying capacity of coniferous dominated forest environments as probable cause (Fitting 1968, Ritchie 1969, 1971). Others have argued for a more open and deciduous, essentially modern, environment by 10,500 B.P. for at least parts of southern Ontario (Roberts 1984:250). This indicates the difficulties of paleoenvironmental reconstructions based on tree pollen frequencies (Wright 1978). It is believed by these and others that the replacement of Paleo-Indian assemblages with those attributed to the Early Archaic followed the northward progression of deciduous forests and related plant and animal communities (Ellis *et al* 1990:68, Roberts 1985:107, Tuck 1974:76), but the precise nature of these interactions awaits clarification through further investigations.

In the Waterloo region the concentration of kettle lakes and wetlands has allowed the construction of pollen diagrams documenting the vegetation history of the area. The paleobotanical Fischer-Hallman (Karrow and Warner 1988) and Gage Street sites (Schwert *et al* 1985) are located only 5 km to the northeast of the Kassel and Blue Dart sites. Hofstetter Lake, a few kilometres to the west of Kassel and Blue Dart, has also been cored but since the pollen sequence seemed only to repeat the pollen distribution pattern of other locations in the area this core was never formally presented (P. Karrow: personal communication July 8, 1992). Figure 15 shows a generalized pollen diagram for the region and the placement of Blue Dart and presumably also the Kassel site within this succession. The components of the Bifurcate Base Tradition appear toward the end of Pollen Zone 3 and the beginning of Zone 4, a time during which pine pollen was declining and the frequency of pollen from deciduous species was beginning to dominate the spectrum. It is notable that this pollen transformation roughly coincides with the end of the Early Archaic, but some deciduous species appear earlier and persist throughout Pollen Zone 3 which roughly coincides with the span of the Early Archaic Period. This is the period of contention, with various interpretations of forest composition possible. As pointed out by others, the reconstruction of forest composition, related plant and animal communities and carrying capacity based on pollen frequencies during the Early Archaic may be suspect partly due to the masking of particular species by more prolific pollen producers such as pine (cf Wright 1978:69). While these environmental considerations may be important in understanding the distribution and density of Early Archaic adaptations in eastern North America, the apparent scarcity of Early Archaic components has also been attributed to other factors. Site locations along former and now inundated shorelines, a lack of recognition or directed research interest, low artifact density and small site size, have also been suggested as contributing to a near vacuum in the literature (Ellis *et al* 1990:68, Funk and Wellman 1984:88, Wright 1978). Certainly, the small sizes and low artifact densities which characterize such sites as Kassel and Blue Dart make their discovery and recognition difficult, especially using test-pitting as a survey technique. If such sites are ploughed they may be easier to locate but the low density of remains, particularly diagnostics, means that such Early Archaic "lithic scatters" would be difficult to assign to specific cultural manifestations. Their potential significance would thus be underestimated from the density and types of artifacts on their ploughed surfaces. Furthermore, if such sites happen to have been ploughed and surface collected prior to detailed investigations, their cultural affiliation would be made even more difficult if not impossible to assess. In this regard it is noteworthy that the Blue Dart site produced only one diagnostic point from which cultural affiliation could be determined.

A growing awareness of the Early Archaic research conducted south of the Great Lakes, research that has led to the recovery of good samples in dateable contexts, indicates that Early Archaic sites may not

be as rare in Ontario as once thought but that they have simply gone unrecognized. However, along with awareness has come expectation. We have held this work in such high regard that we have come to expect deeply buried or stratified components, and these have yet to be identified in Ontario. As Chapman concluded after excavation of the multicomponent stratified Icehouse Bottom site:

"Although it is apparently passé in the 1970s to be concerned with culture history and assemblages, these are the hard data for model building and processual studies. Too much has been written based on deflated sites and surface manifestations in which there were no controls of the time span represented by the artifacts. It is only with sites such as Icehouse Bottom and Rose Island that diagnostic and less diagnostic artifacts can be placed in perspective. We are still in this "formative stage" of Early and Middle Archaic studies in the eastern United States." (1977:125)

Well over a decade has passed and we are still at this "formative stage" north of the Great Lakes. In the meantime our small, often ploughed, Archaic sites, particularly when combined with a few negative experiences on mixed, multicomponent sites that defy sorting into the various occupations represented, appear to be of little significance. The value of their potential contribution is underestimated. However, that which we hold in high regard is not without its disadvantages. Stratified components have particular merits in terms of the fine temporal and stylistic control that stacked assemblages can provide, yet they undoubtedly have their drawbacks, not the least of which are the multiple occupations represented within single strata (perhaps by similar cultural manifestations but for different reasons) in such attractive or resource rich areas as the flood plains of major rivers; the comparability or representativeness of artifact type frequencies obtained from vertical shafts through horizontally staggered activity areas; and the vertical admixture which undoubtedly has a tendency to smear the textbook stratigraphy with which such sites are mistakenly attributed. While recognizing and appreciating the major contributions of these complex sites and their investigators, we should not underestimate the value of small sites, like Kassel and Blue Dart, which appear, if only on the basis of their low artifact yield, to be briefly occupied single components. This is one area where smaller sites in out of the way places, or in areas where the resource base is somewhat diffuse and numerous potential camp locations exist, may make positive contributions lessening the obstacles associated with multiple, superimposed, mixed occupations and the complexity of their investigations (cf Chapman 1977:106).

Despite the conclusions of numerous surveys which report isolated points or small mixed assemblages with such point forms included, substantial components of the Bifurcate Base Tradition do exist north of the Great Lakes awaiting discovery and excavation. In order to do this, however, we must reconsider the criteria that we use in site evaluation exercises, such that small, single component sites, that are not "rich" in a Late Woodland sense, get a chance to present themselves for what they are rather than what we would like them to be.

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Acknowledgements

The search for small sites, their discovery, excavation, analysis and reporting, requires support from a number of individuals and institutions to whom I am most grateful. The project was undertaken with the support of the Ontario Ministry of Transportation as part of their efforts to mitigate the impact of highway construction on Ontario's heritage resources. Dave Wake, Supervisor of the Environmental Unit and Ted Irving, Head of the Planning and Design Section, Southwestern Region, were directly involved with the approvals necessary for this project. They always seem to have the right questions and I thank them for their confidence that our work would provide suitable answers. Marty Sluyter, Project Manager, was always available to provide a time frame and construction details to allow the fieldwork to be properly scheduled. We are well ahead of construction - still! My thanks and appreciation are extended to the field crew: Elizabeth Alder, Christine Dodd, William Fitzgerald, Mike Gibbs, Wayne Hagerty, Malcolm Horne, John MacDonald, Harri Mattila, Carl Murphy, Beverly Morrison, and Dave Riddell who provided expert field assistance during various portions of the survey and salvage excavations. Thanks are also due to several of these individuals who assisted in report preparation: Bev Morrison - drafting, Wayne Hagerty - photography, and John MacDonald for his excellent artifact drawings. I am also grateful to Dr. C. J. Ellis for making his extensive collection of Early Archaic reports available for my use and for insightful discussions concerning this most interesting period of Ontario's prehistory. The helpful comments of Dr. P. Reid, editor of *Ontario Archaeology* and the anonymous reviewers were also appreciated.

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