Post-Glacial Lake Nipissing Waterworn Assemblages from the Southeastern Huron Basin Area

Chris J. Ellis and D. Brian Deller

Artifacts from eight locations in the Thedford embayment area have been modified by the post-glacial waters of the Lake Nipissing phase prior to about 4000 to 4500 years ago. The location of these sites relative to other inferred pre-Nipissing strandlines in the region and detailed external artifact comparisons provide new' information on the age and sequence of early preceramic occupations in the lower Great Lakes.

Introduction

While the general trend in the lower Great Lakes throughout much of the earlier part of the post-glacial sequence was for water levels to be much lower than modern lake levels, the Nipissing transgression of circa 5000 BP was an exception. At that time, water levels rose to a height above the modern Lakes Huron-Michigan levels and inundated a number of sites ranging from Paleo-Indian to early Late Archaic in cultural affiliation. In some situations the result has been deeply buried sites (i.e. Larsen 1985; Lovis 1983) while in other cases waterworn sites are at the surface and can be easily distinguished from more recent components by the presence of water-rolled and heavily patinated lithic artifacts (Deller 1976b; Deller, Ellis and Kenyon 1985). As such, the Nipissing transgression provides a convenient horizon marker in the area.

In this paper we describe Nipissing water-rolled surface collected assemblages from one area of the southern Lake Huron basin in Ontario. The emphasis is on the chronological implications of the materials in an effort to suggest some refinements in the early cultural-historical sequence in the lower Great Lakes area, particularly the poorly known post-fluted point time period.

Study Area and Geological Background

The focus of this paper is the Thedford embayment, a roughly triangular shaped area located at the southeastern corner of the Lake Huron basin (Fig. 1). The southern and eastern boundaries of this area are defined by the abandoned strandline of the Nipissing phase. During Nipissing times the area was a shallow bay. The northwestern border of the area is the modern Lake Huron shore which is lined by a series of well-developed sand dunes formed on a baymouth bar of the Nipissing phase (Cooper 1979:35). Partially because of the encompassing baymouth bar, drainage of the area is poor and prior to modern alterations designed to make the area suitable for market gardening, the area was predominantly low and marshy and contained a small lake (Smith Lake). The major drainage through the area today is the Ausable River and its tributaries such as Parkhill Creek (Fig. 2).

The sequence of pro- and post-glacial lake level changes throughout the Great Lakes is a complex one and the southern Huron basin is no exception. By about 12,500 years ago, the Warren series of pro-glacial lakes had formed between the Wyoming Moraine south of the study area and the retreating ice-sheet (Fig. 2) at elevations between approximately 217 and 223 m (710-730 ft; Cooper 1979:29; Fullerton 1980). These lakes fully inundated the Thedford embayment as well as much of the surrounding region. By about 11,000 BP, water levels had dropped and stabilized to the main pro-glacial Lake Algonquin level at about 184 m (605 ft; see Karrow et at 1975) which is the same level in the area as the later Nipissing level (see below). As the ice-margin retreated. an outlet was opened near North Bay, Ontario and Main Lake Algonquin drained via this outlet at about 10.400 BP (Karrow et al 1975). Water levels at that time dropped much below modern levels, eventually to form Lake Stanley in the centre of the Huron Basin (Hough 1963).

Around 5500 BP, isostatic rebound had closed the North Bay outlet and water levels gradually rose again in the Huron basin to form the Nipissing phase. The Nipissing phase is generally seen to be composed of two parts: an earlier three-outlet phase or Phase I and a later two-outlet phase or Phase Il (Larsen 1985; Lewis 1970). The highest or maximum level of the lake was Phase I which achieved an elevation of about 184 m in the study area. This is the same as that inferred for Algonquin. The maximum Nipissing level or Phase I was attained and maintained roughly between 5000 to 4500 BP based on numerous C-14 dates from the southern

Huron basin summarized by Karrow (1980:Table 1). Some of these dates are derived from locations in the Thedford embayment. More recently, a date has been obtained through geological/paleo-environmental studies carried out in conjunction with archaeological studies at the Parkhill Paleo-Indian site (Roosa 1977) located at the southeastern apex of the triangular area shown in Fig. 2. The date on a hemlock log from a location co-extensive with the maximum area of inundation of the lake is 4570 ± 95 BP (I-9355).

Since the strandlines of both pro-glacial Lake Algonquin and post-glacial Nipissing Phase I attained the same maximum elevation (184 m), the existing strandline in the area is usually referred to as the Nipissing-Algonquin strandline (Cooper 1979). However, the sediments of the Algonquin strandline have been effectively removed and reworked by the Nipissing transgression (Karrow 1980) in the embayment area and technically, therefore, the strandline should be referred to solely as Nipissing. Unaltered Algonquin strandline deposits only occur to the north where differential uplift has resulted in the separation of the Nipissing and Algonquin beaches. Within the study area, known or suspected Algonquin age lake deposits are restricted to a buried location at Parkhill Creek 400 m south of the Parkhill site. These sediments were probably deposited in an inlet of Algonquin and are dated at 10,870 ± 90 BP (WAT-376) (Dr. Alan Morgan: personal communication 1985). Other possible Algonquin age deposits are reported from out in the Thedford embayment (Karrow 1980:1274). While it should seem that the Algonquin strandline in the study area was almost co-extensive with the Nipissing strandline as it exists today (Dr. Alan Morgan: personal communication 1985), it cannot be assumed that their beaches were *exactly* co-extensive since the amount of Nipissing erosion of the earlier Algonquin beach has not been determined.

The Nipissing strandline as it exists today is variously developed. East of the Ausable River, it is visible as about a 2 m gradual rise in elevation. West of the Ausable River, the Nipissing beach is backed by a well-developed and abrupt shorecliff up to 10 m in height.

After circa 4500 BP downcutting in the Huron outlet resulted in the lake levels falling from the maximum (Phase I) level of Nipissing. After fluctuating through a series of levels at progressively lower elevations such as Phase II of Nipissing (181 m) and Algoma (179 m), essentially modern levels were attained. Based on the age of these post-Nipissing lake levels derived from other areas of the Lakes Michigan/Huron basins (i.e. Larsen 1985), at least "nearshore" areas of the embayment

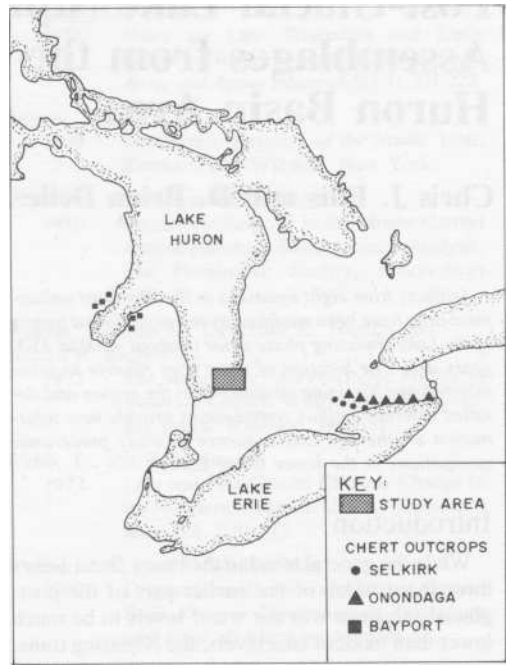

Fig. I
Location of study area and chert outcrops.

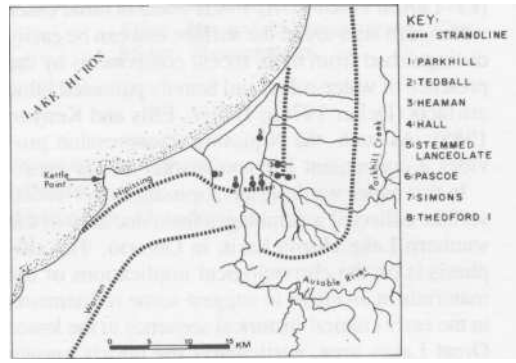

Fig. 2
Location of sites discussed in text.

were probably exposed shortly after 4500 BP. Certainly by about 4000 BP these nearshore areas of the embayment, where almost all of the archaeological material reported here has been recovered, had been exposed to judge from radiocarbon dated archaeological manifestations (Kenyon I980a:19).

Based on the foregoing, it seems that many of the inundated sites in the area probably pre-date

the initial Nipissing transgression of about 5500 to 5000 BP. It should be noted, however, that some of the sites located around 184 m in elevation might have been contemporaneous with the Nipissing I phase. In particular, this would include sites at the base of the "shorecliff" of the maximum Nipissing level (i.e. on the beach of this lake phase). Given minor seasonal and perhaps more long-term minor fluctuations in lake levels (Larsen 1985), the actual beach may have been exposed fir habitation and then flooded several times during the existence of the lake. Moreover, we should expect some degree of shoreline erosion during the life of the lake which would have effected sites or artifactual material already in place. Thus, at least sites in nearshore areas or on the Nipissing I beach itself may date as recently as 4500 to 4000 BP when the lake began to drain from its maximum level.

The Sites

The discovery of the Parkhill Paleo-Indian site (Fig. 2) in the early 1970s stimulated an intensive surface survey in the area of the Thedford embayment (Deller 1976a, 1979). Excluding isolated finds, one result has been the location of at least 18 sites yielding fluted point associated material above and ringing the Nipissing-inferred Algonquin shoreline (Deller, Ellis and Kenyon, 1985). Although much work focused on the areas above the shoreline given the acknowledged productivity of such areas for fluted point sites, sections below the strandline were also surveyed, particularly since previous research had not produced fluted point materials below the real or inferred Algonquin level (cf. Farrand 1977). Hence, extensive investigations were needed to test if this was a significant pattern and, thus, a reliable minimum age indicator of the fluted point associated occupation of the region.

A by-product of these investigations was the discovery of numerous Paleo-Indian to Late Archaic finds distinguished because they had been water-rolled and/or altered by the post-glacial Lake Nipissing transgression. Generally these artifacts exhibit two attributes indicative of inundation and probable incorporation in Nipissing produced sediments. First, most of the material exhibits smoothed and/or polished surfaces and edges. Artifacts from the beach *per se (e.g.* Figs. 6 and 13) tend to be much more smoothed and polished than those recovered from locations of deeper water some distance out in the embayment (e.g. Figs. 3 and 4a-c). In some cases, this smoothing makes determination of artifact characteristics, such as edge grinding or fine serrations, difficult to determine although in most cases the presence or absence of such characteristics can be discerned.

The second distinctive characteristic of the artifacts is the fact that the vast majority (62 of 73 or 85% exhibit a well-developed dark yellowish brown to dark brown to strong brown surface discolouration (7.5 YR 3/4; 7.5 YR 4/4; 7.5 YR 4/6; 7.5 YR 5/4; 10 YR 4/6 in the Munsell colour coding system). Regardless of the chert source of which a tool was made, the same range of surface discolouration is evident. The visual assignment of cherts to sources is fraught with its own difficulties and the presence of such discolouration makes the identification of chert sources even more difficult. Nonetheless, it is possible in many instances to identify the cherts from which the artifacts were made such as Bayport (Dustin 1935; Luedtke 1976), Kettle Point (Janusas 1984) and Onondaga (Parkins 1977) with some degree of confidence (principal outcrops are shown in Figs. I and 2).

The surface discolouration of the artifacts is probably best described as a patina. Examination of artifacts in cross-section on margins broken by recent action indicates that this patina is a very thin rind which has coated the surface. It is probably the result of the subjection of magnetite (Fe_3O_4) or some other ferrous mineral in the cherts to an oxidizing atmosphere which have changed the ferrous minerals to limonite (Geothite;$HFeO_2$) with the distinctive brown colour (Dr. Eric Reardon: personal communication I985). In turn, the limonite was precipitated over the exposed surfaces of the artifacts as the "rind." Most of the artifacts lacking or having a poorly developed patina (8 of 11 cases) were made of Onondaga chert. This might indicate Onondaga chert has a lower ferrous mineral content and has tended to react less strongly to submergence in Nipissing waters and/or sediments.

To date eight locations yielding waterworn artifacts have been found (Fig. 2). Most are situated on the slope of the shoreline ridge in areas that would have been exposed to heavy wave action on or adjacent to the Nipissing beach (around 184 m). The material from each location is described below. This description proceeds from locations yielding the oldest material to those where more recent material predominates and focuses more on artifacts of some diagnostic value. The following by no means describes all of the material from each site. Rather, it largely covers that material to which we could gain access for detailed and extended study.

Parkhill Site/Parkhill Creek

At least three waterworn fluted points have been recovered from the study region. One of these is from the Pascoe site described below. The other

two (Defier 19766: P1.5J, 1979: Fig. 5:22a) are classic examples of Barnes points (Ellis 1984; Roosa 1965; Storck 1983) recovered adjacent to the Parkhill (AhHk-49) site (Fig. 2).

Neither of these points have been examined in detail for this paper. One is from a local collection. It lacks precise provenance but was recovered from Parkhill Creek in a situation of secondary deposition. The other is from the Nipissing beach *per se (i.e.* at the base of the strandline rise) immediately adjacent to the Parkhill site.

Tedball Site

The Tedball site is located on a slight sandy rise west of the Ausable River (Fig. 2) at an elevation of 181.4 m (595 ft). The location is about 1 km north and lakeward of the most pronounced (10 m high) shorecliff in the area. It consists of a surface concentration of tools and flaking debris.

Seven tools recovered from the site have been examined. Most notable is a classic example of a Holcombe point (Fig. 3a; Fitting, DeVisscher and Wahla 1966; Wahla and DeVisscher 1969), complete except for presumed use-damage at one basal corner. This point is extremely thin (Table 1) and exhibits a plano-convex cross-section suggestive of manufacture on a thin flake. These traits are characteristic of Holcombe points as are a relatively shallow basal concavity (3.4 mm); a well-executed, narrow, transverse, parallel to collateral, somewhat "unpatterned" surface retouch; lateral edges which expand moderately from the base; a position of maximum width at or above mid-point; and short (7.8 and 7.7 mm) basal thinning rather than fluting. The tip end has been resharpened as indicated by changes in flaking, thickness and edge outline. The material is unknown although it does not appear to he a chert from a recognized Ontario or Michigan source.

The remaining six tools are similar to Paleo-Indian artifacts reported elsewhere. Two multiple gravers or piercers, each with three or more spurs were recovered (Figs. 3b,c). One of these is of Kettle Point chert. Scrapers are represented by an side scraper (Fig. 3d) and an end scraper (Fig. 3e). The former exhibits a broad (40.2 mm long) concave working edge on one margin formed by normal or dorsal retouch (edge-angle of 45-60°)

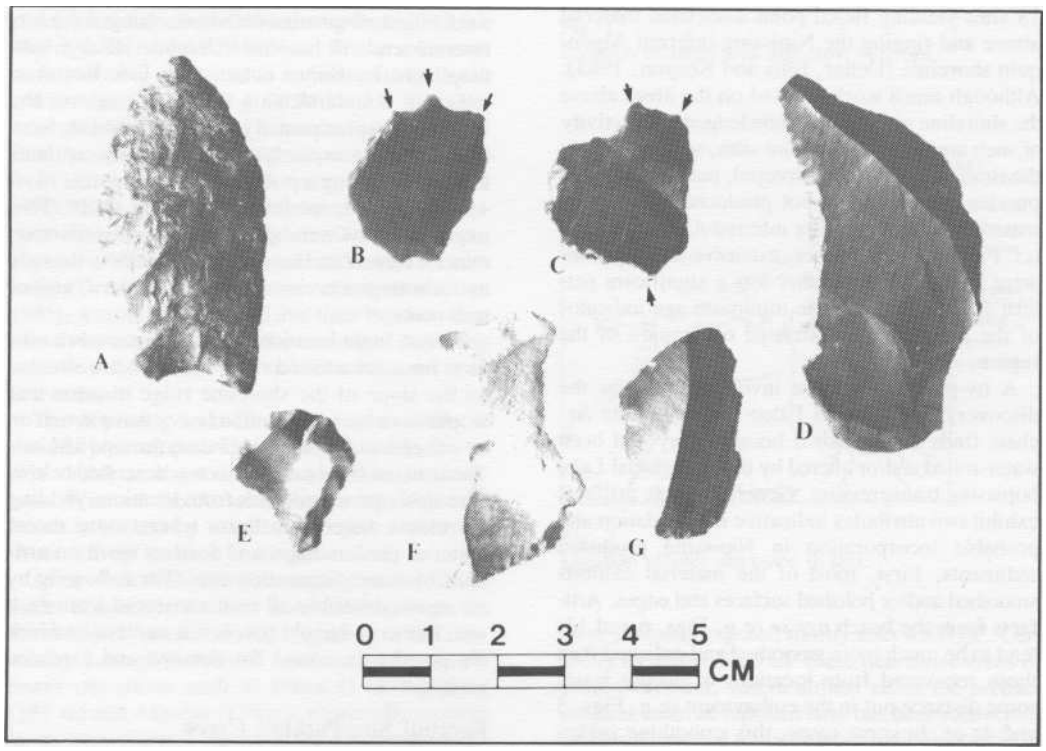

Fig. 3
Holcombe Tools, Tedball Site. A: Holcombe Point; B-C `gravers"; D: Side Scraper; E: End Scraper; F-G: Retouched Flakes.

TABLE I

Paleo-Indian Point Variables
(measurements in mm)

Site	Point Form	Figure[3]	Length	Width	Thickness	Basal Width	Stem Width[4]
Tedball	Holcombe	3a	50.3	25.0	4.8	19.0+	
Heaman Area I	Unstemmed Lanceolate	4a	86.0+	23.0	8.1	10.8	
Heaman Area I	Unstemmed Lanceolate	4b	48.1+	14.7	5.1		
Heaman Area I	Unstemmed Lanceolate	4c		22.4	8.1		
Hall	Stemmed Lanceolate	9b		23.9	6.8		21.5
Near Smith Lake[1]	Stemmed Lanceolate		55.0	24.0	7.0		22.0
Pascoe	Unstemmed Lanceolate	4d		23.0	5.0		
Pascoe	Unstemmed Lanceolate	4e		20.6	5.8		
Heaman[2] (Above Nipissing Beach)	Stemmed Lanceolate	9a		27.6	7.7		25.2

1: based on Deller 1976b: Table 3
2: not waterworn
3: refers to accompanying figures
4: measured just below the shoulders

TABLE 2

Waterworn End Scrapers
(measurements in mm)

Site	Figure[1]	Lengt	Width	Thickness	Bit Width	Bit Depth	Bit
Tedball	3e	21.7	20.0	5.0	20.0	8.6	50-65°
Heaman Area I	5f	52.0	31.1	8.2	31.1	9.9	60-80°
Heaman Area I	5e	54.1	33.5	9.4	33.5	13.2	60-80°
Hall	9c	73.0	29.2	10.4	18.7	6.5	50-60°

I: refers to accompanying figures

while the other margin has a 32.8 mm long convex working edge of 35-40° formed by ventral or inverse retouch. This tool is made on a quite large (55.2 x 31.0 x 5.2 mm) biface thinning flake. Such items have been referred to elsewhere in studies of fluted point associated materials as "flakes from biface cores" (Ellis 1984:100-101) to distinguish them from the much smaller biface thinning flakes produced in thinning smaller bifaces such as fluted point preforms. The apparent purposeful production of quite large biface thinning flakes in anticipation of use as flake blanks for various scraper forms is a common technological practice in Paleo-Indian industries (Knudson 1973; MacDonald 1968:65; Wright and Roosa 1966:857).

The end scraper does not exhibit lateral spurs or notches, has lateral retouch along only one edge and is of a small overall size (Table 2), especially when compared to forms from fluted point sites. Based on the illustrated sample of end scrapers

from the Holcombe site (Fitting, DeVisscher and Wahla 1966: Fig. 8), it is our impression that a relatively small size may serve to distinguish Holcombe end scrapers from those associated with the fluted point industries.

The final two tools from Tedball (Fig. 3f,g) are small flakes which exhibit a fine (under 2.5 mm long), discontinuous retouch along both margins. Both are on small biface thinning flakes but the larger of the two (Fig. 3f was removed from the end as opposed to the lateral edge of the biface.

Heaman Site

The Heaman site (Fig. 2) has been briefly reported elsewhere (Deller 1976b). The site is located both below and above the Nipissing beach. The area below the strandline includes two discrete concentrations of artifactual material (Area I (AhHk-5l) and Area II (AhHk-86), the water-worn nature of which was noted but not emphasized by Deller (1976b:16).

Area I

Area I is located about 150 m from the Nipissing strandline. It appears to represent solely a Late Paleo-Indian occupation. In all nine tools have been recovered. There is little in the way of lithic debris on the surface at present and all specimens were recovered some years ago during the removal of trees from the area.

Three points or fragments thereof have been recovered (Fig. 4a-c; Table 1). All are of a lanceolate unstemmed form with moderately convex lateral edges, show evidence of resharpening at the tip, lack evidence of basal thinning, exhibit lateral basal grinding and a transverse, collateral flaking which extends to or slightly over the mid-line on all retained surfaces. This flaking does not appear to have been applied serially or in a consistent or patterned manner. Rather, it, as well as a superimposed, fine, edge regularization retouch, appears to have been applied in a somewhat irregular manner in a form referred to by Bradley (1974:193) as "selective non-patterned flaking." Although all three points have relatively smooth biconvex cross-sections, there is a slight medial ridge on one face of two of these items (Fig. 4a,b).

The largest point (Fig. 4a) is complete except for a slight tip impact and exhibits a lightly ground convex base. Another (Fig. 4c) also has a slight tip snap due to impact and is missing most of the base such that only a small segment of the laterally ground basal edges is present along one margin. The final point (Fig. 4b) has slight snaps at tip and base probably also due to impact through use as a projectile. This point is much smaller than the other two and might indicate temporal and/or functional differences. Another unwaterworn point of the same technology and form was recovered above the beach at the Heaman site (Deller 19766: Pl. IAI).

Two other bifaces have been recovered from Area I. The first (Fig. 5a) of Kettle Point chert, is a large (85.8 x 32.3 x 7.6 mm) well-made biface with a piano-convex cross-section and no evidence of longitudinal curvature. The surface of the biface is covered by large, broad, thinning flake scars. Superimposed over such flaking along one edge is a well-executed, continuous, parallel-to-collateral bifacial retouch which forms a 30-40° edge. Such retouch forms a regular convex edge in plan and a straight edge in profile. The opposite margin is haphazardly flaked, is sinuous in plan and profile and has been lightly ground perhaps to form a hacking. Formally, and perhaps functionally, this tool resembles the backed bifaces frequently recovered from fluted point sites in southwestern Ontario (Deller and Ellis 1984:46) although it does not exhibit the flat right-angled back of the earlier forms.

The second biface (Fig. 5b) is somewhat fragmentary. It appears stemmed but this may be due to edge breaks incurred prior to water-rolling and an original more oval form is suggested. The tool had a slight bevel at one end prior to a break and perhaps was functionally an end scraper. Extant surfaces are covered by a collateral, transverse flaking. The tool is quite thin (5 mm) and exhibits a piano-convex section suggesting manufacture on a thin flake.

The remaining tools from the area are unifacial forms. One (Fig. 5c) is a triangular-shaped flake with a massive spur or borer at one end and denticulated lateral margins. Another (Fig. 5d) is simply a large expanding biface thinning flake of Onondaga chert which has fine continuous retouch on all complete margins.

The final two tools are large, well-made, triangulоid end scrapers (Fig. 5e,f; Table 2) which are similar in form and size to those recovered from fluted point sites. Both exhibit an extensive, short, bilateral retouch which tapers the lateral edges — probably for hafting purposes. One (Fig. 5f also has been completely flaked over the dorsal surface, while the other has had a pronounced bulb partially trimmed away. Again, such modifications might have facilitated hafting.

Area II

This area is situated at the base of the Nipissing strandline at approximately 184 m. Six waterworn tools have been recovered. Two are notched point fragments, only one of which is complete (Fig.

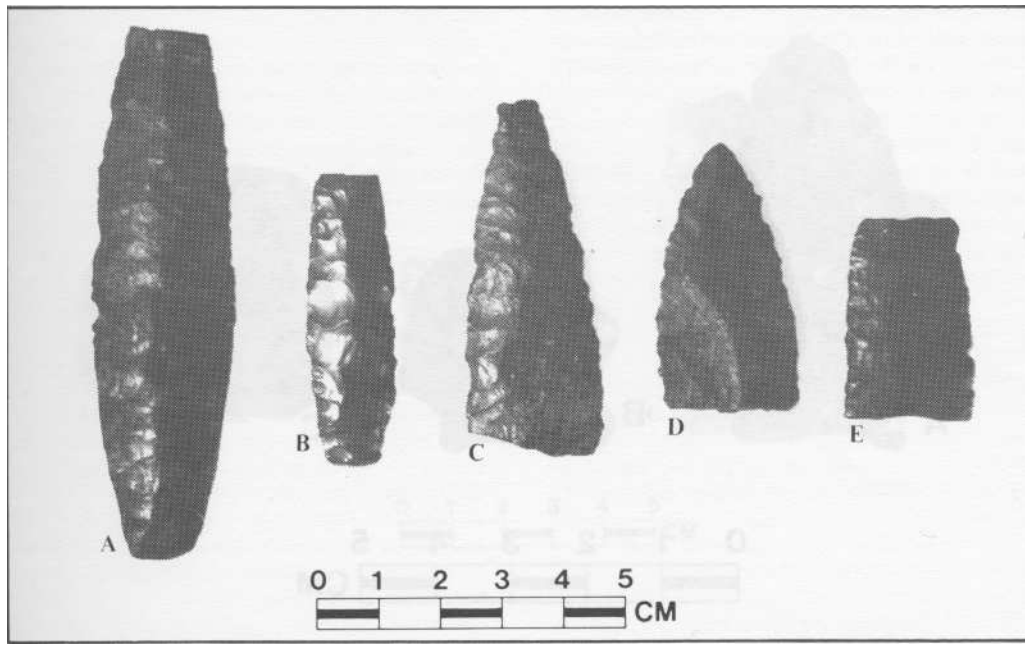

Fig. 4
Unstemmed Lanceolate Points. A-C: Heaman Site: D-E: Pascoe Site.

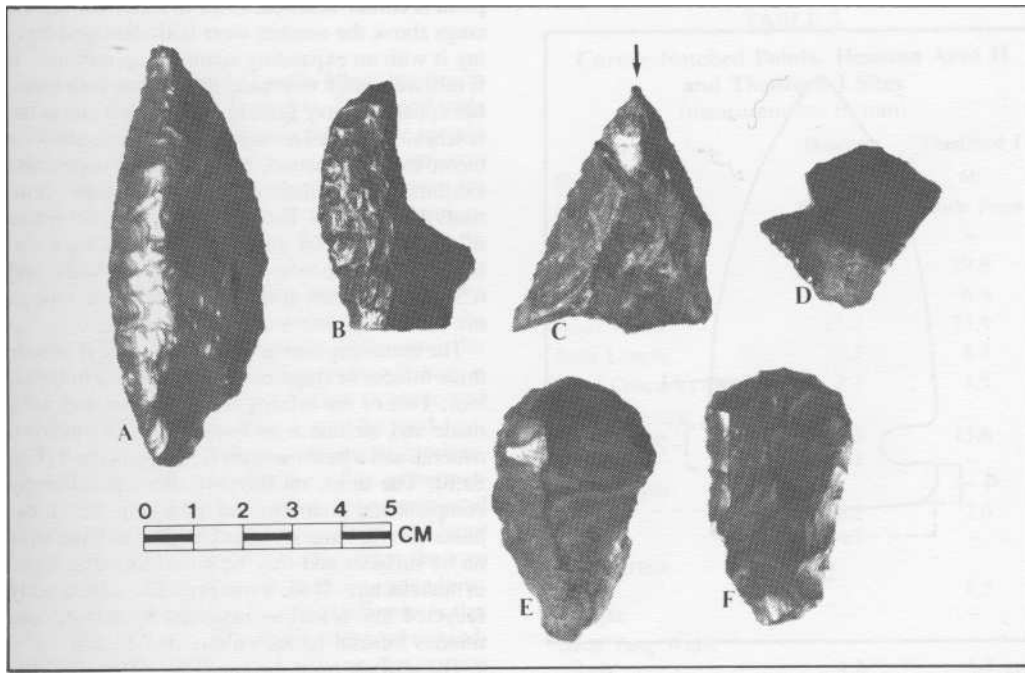

Fig. 5
Other Tools. Heaman Area I. A-B: Bifaces: C: Spur/Denticulate (Arrow shows spur location): D: Retouched Flake: E-F: End Scrapers.

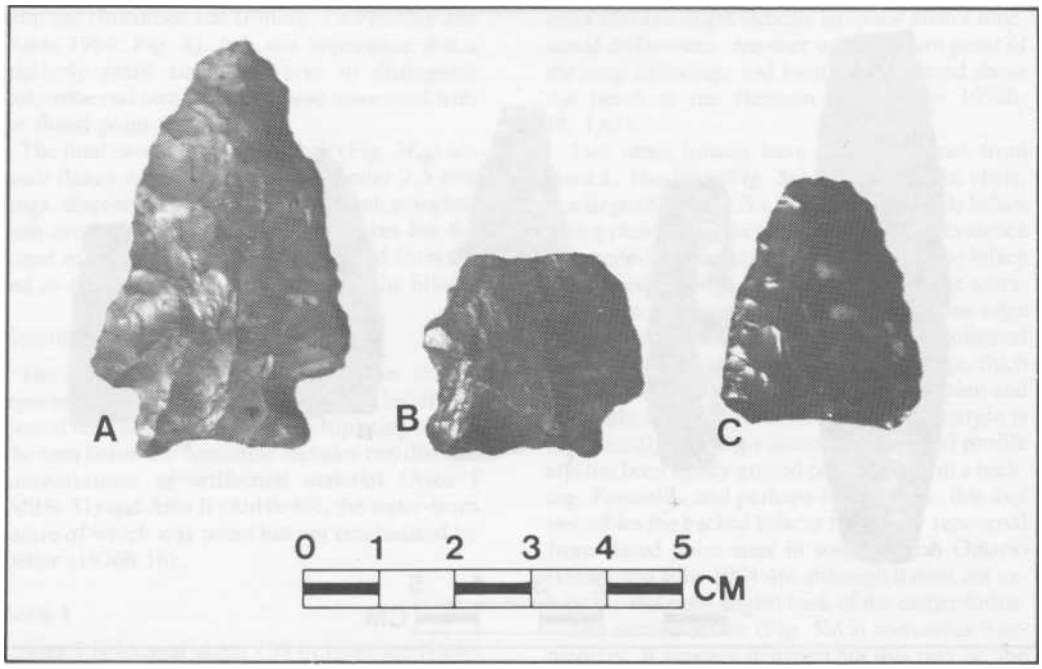

Fig. 6
Notched Points. A.C: Heaman Area II: B: Thedford I Site.

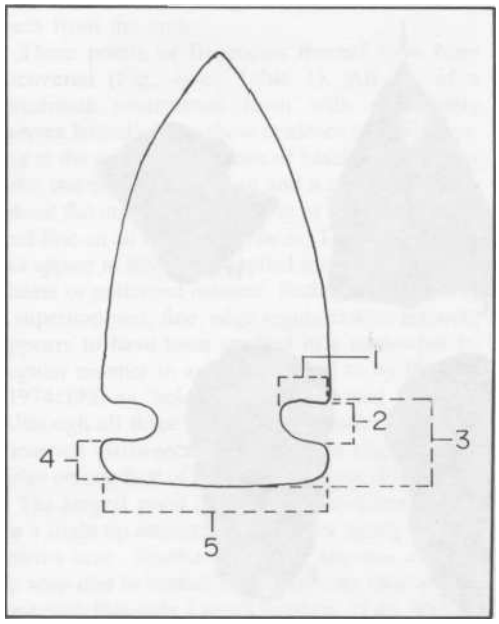

Fig. 7
Measurement of Notched Point Variables. I: Notch Depth: 2: Notch Width; 3: Stem Length; 4: Basal Tang Width; 5: Basal Width.

6a,c: Table 3). Details of the notched point measurements are shown in Fig. 7. The complete point is corner-notched. Prior to water-rolling the tangs above the notches were both damaged leaving it with an expanding stemmed appearance. It is relatively large with basal thinning on both faces, has apparent heavy grinding on the base and in the notches, exhibits knobby basal corners, shows a biconvex cross-section, has a slight tip impact and exhibits convex blade edges with probable remnants of serrations. The other point (Fig. 6c) is also of Onondaga chert and is represented by a tip-impacted fore-section with a 26.3 mm width and 6.5 mm thickness. It may be of the same type as the more complete example.

The remaining four artifacts from Area II include three bifaces or fragments thereof, and a unifacial tool. Two of the bifaces are wide, thin and well-made and include a mid-section on an unknown material and a base made on Kettle point chert (Fig. 8a,b). The third, on Bayport chert, is relatively complete and is narrow and thick (Fig. 8c). It exhibits several hinge terminated thinning flake scars on its surfaces and may be a preform abandoned in manufacture. If so, it was probably subsequently recycled into a tool as indicated by a fine, continuous bifacial retouch along one edge.

The uniface from the site (Fig. 8d) is of Kettle Point chert. It is finely denticulated on almost all margins and also exhibits a notch adjacent to the platform end on one edge.

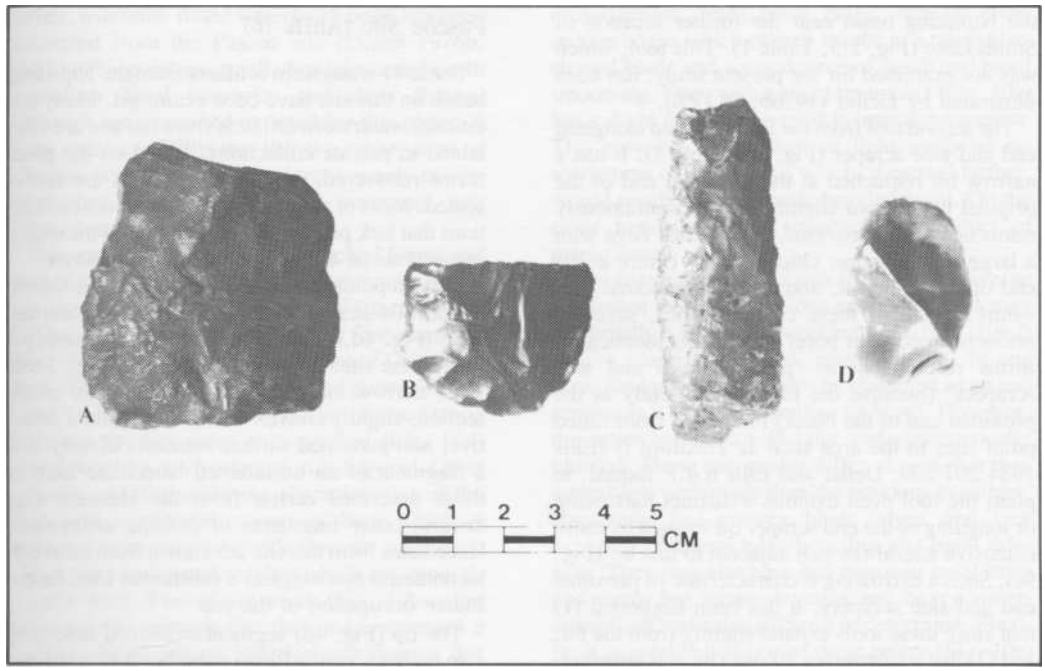

Fig. 8
Other Tools. Heaman Area II. A-C: Bifaces: D: Notch/Denticulate.

Hall Site

The Hall site is located on the Nipissing Beach just east of the Ausable River (Fig. 2). Several tools from the site are in a local collection but the sample examined here consists solely of two artifacts recovered in one brief surface examination by Deller. The first is the fore-section of a contracting stemmed point (Fig. 9b; Table I) with a tip impact and a snapped base. The lateral edges are heavily ground from just below the shoulders. The tip end has been resharpened as indicated by changes in plan and profile outline and an irregular surface flaking. Otherwise, the surface flaking is of a collateral, transverse, selective, unpatterned nature and terminated just across the mid-line. Several other points with the same general techno-morphological characteristics, such as a contracting stemmed appearance, have been recovered from the area. For example, a point of Upper Mercer chert (Fig. 9a; Table I) is from the area of the Heaman site above the Nipissing strandline. This item differs slightly from the Hall point in that it exhibits remnants of partially removed expanding thinning flake scars primarily on that portion of the tool beyond the stem. Another point of this nature which is waterworn and complete, was recovered northeast of Hall, about 2.3 km within

TABLE 3

Corner-Notched Points, Heaman Area II and Thedford I Sites
(measurements in mm)

	Heaman	**Thedford I**
Figure[1]:	6a	6b
Lithic Material:	Onondaga	Kettle Point
Length:	55.0	
Width:	34.1	29.8
Thickness:	7.7	6.6
Basal Width:	22.7	23.4
Stem Length:	10.2	8.7
Basal Concavity Depth:	2.1	1.5
Basal Thinning		
Obverse:	15.2	13.6
Reverse:	10.1	—
Notch Depth		
Left:	6.2	2.0
Right:	6.7	
Notch Width		
Left:		8.5
Right:		
Basal Tang Width		
Left:	4.2	4.4
Right:	3.3	3.0

I : refers to accompanying figure

the Nipissing basin near the former location of Smith Lake (Fig. 2:5; Table 1). This tool, which was not examined for the present study, has been illustrated by Deller (1976b: PI.IVE).

The second tool from the Hall site is an elongated end and side scraper (Fig. 9c; Table 2). It has a narrow bit retouched at the proximal end of the original blank, two slightly convex continuously retouched lateral margins, a retouched edge with a large spur or borer chipped in its centre at the end opposite the bit, and lacks longitudinal curvature. In all of these characteristics, save the retouched end with borer, the tool is identical to forms referred to as "proximal end and side scrapers" (because the bit is consistently at the proximal end of the blank) recovered from fluted point sites in the area such as Thedford II (Ellis 1984:207-209; Deller and Ellis n.d.). Indeed, in plan, the tool even exhibits a distinct narrowing or tonguing of the end scraper bit formed by more extensive lateral retouch adjacent to this bit (Fig. 9c). Such a narrowing is characteristic of proximal end and side scrapers. It has been suggested (1) that since these tools expand slightly from the bit, and (2) that a narrow (ca 20 mm) bit was apparently desired by the user, that more extensive lateral retouch near the bit represents attempts to keep the bit narrow during resharpening.

Pascoe Site (AhHk-76)

Some 41 waterworn artifacts from the Nipissing beach on this site have been examined. Many additional waterworn artifacts from the site are contained in private collections. Based on the point forms recovered, several components are represented. Most of the artifacts are from local collections that lack precise provenance data so the spatial separations of the components is not known.

Sixteen points are present in the collections examined. Of these, two fragments, a mid-section and a tip (Fig. 4d,e) indicate a Paleo-Indian occupation of the site. The mid-section (Fig. 4e; Table 1) is narrow and thick with a biconvex cross-section, slightly convex lateral edges and a selective, non-patterned surface retouch. Clearly it is a fragment of an unstemmed lanceolate such as those described earlier from the Heaman site. Several other fragments of definite unstemmed lanceolates from this site are known from local collections and this suggests a substantial Late Paleo-Indian occupation of the site.

The tip (Fig. 4d) segment examined here may also be from such a Plano point but it is relatively wide and thin (Table I) with a slight piano-convex transverse section and could be from a fluted or a Holcombe point. In this regard, and as noted

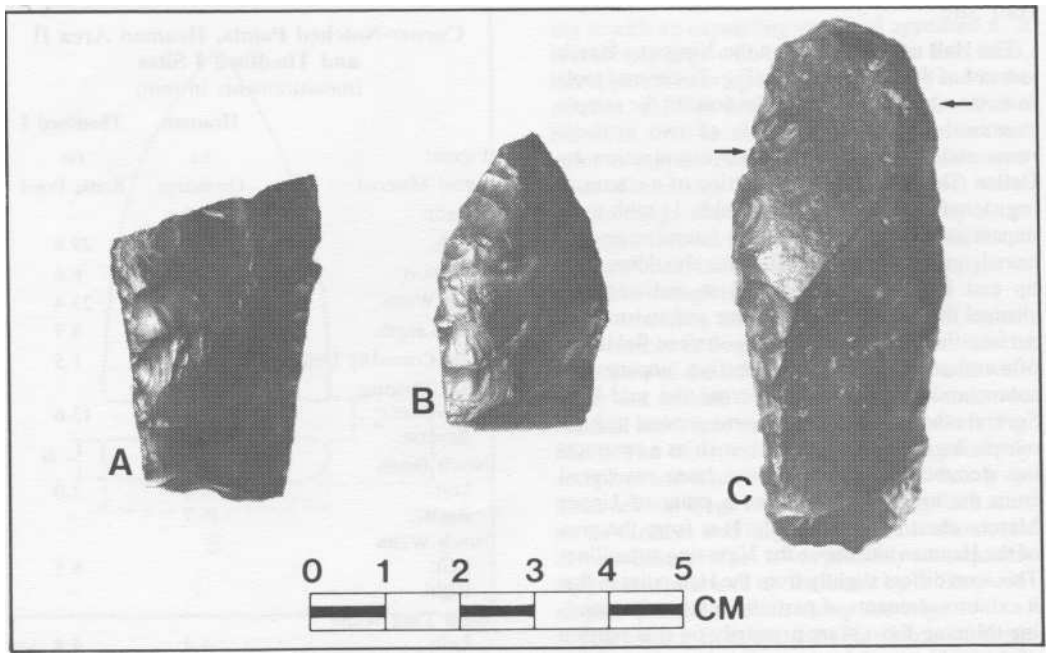

Fig. 9
Hall and Heaman Site Tools. A: Contracting Stemmed Point, Heaman Site; B: Contracting Stemmed Point, Hall Site; C: End and Side Scraper, Hall Site (arrows show extent of deliberate bit narrowing).

earlier, a definite fluted waterworn point has been recovered from the Pascoe site (Deller I976b: P1.5L). This point is a small atypical example with a shallow basal concavity and short fluting. Although not examined in detail for this paper, it is the opinion of Ellis that this is a tip segment of a Barnes point which snapped transversely in use, subsequent to which a shallow concavity was reflaked at the base.

The remaining 14 points are notched forms and most of these for *descriptive* purposes can be placed into two classes referred to here as Classes I and H. Class I points are represented by five examples (Fig. 10b-t), almost all of which are of Onondaga chert. These are large, broad-bladed points (Tables 4 and 5). Four are definitely corner-notched while the other appears more side-notched (Fig. 10d) even though the notch orientation is diagonal. Other defining and distinguishing characteristics of the class are: a straight to convex base which is estimated to be relatively wide (few are complete), a long stem and broad notches which are generally quite deep. Two of the points (Fig. 10b-c) are homogeneous enough that they may represent a discrete type of cultural-historical significance, that is, they may represent a restricted occupation in time at the Pascoe site. Besides the characteristics outlined above, these two points share a biconvex cross-section, wide basal tangs, straight fore-section edges which overall results in a triangular-shaped blade and some degree of notch and basal smoothing. One, with a slight tip impact (Fig. 10c) has a slight fore-section twist in transverse section. This may be the product of light unifacial re-sharpening of the margins which, if carried further, would result in an alternate beveled point. On the other hand, it might simply be a product of manufacture.

The remaining three points (Fig. 10d-t) diverge somewhat from the previous examples. This may be partially a result of reworking. Two (Fig. 10e,f) exhibit blunted, rounded, reworked tips. In one case, the tool could perhaps be classified as an end scraper as it exhibits a shallow tip bevel. However, the other has been bifacially and symmetrically blunted. These two points differ also in that they appear less well-made than the previous examples, apparently had convex blade edges and lack evidence of lateral edge beveling and basal thinning. They may also have had narrower basal tangs and stems but incompleteness and heavy water-smoothing make this difficult to determine. Finally, it is notable that one of these points (Fig. 10e) has a plano-convex cross-section and one surface is almost completely covered by an original ventral facet of the flake blank upon which it was made.

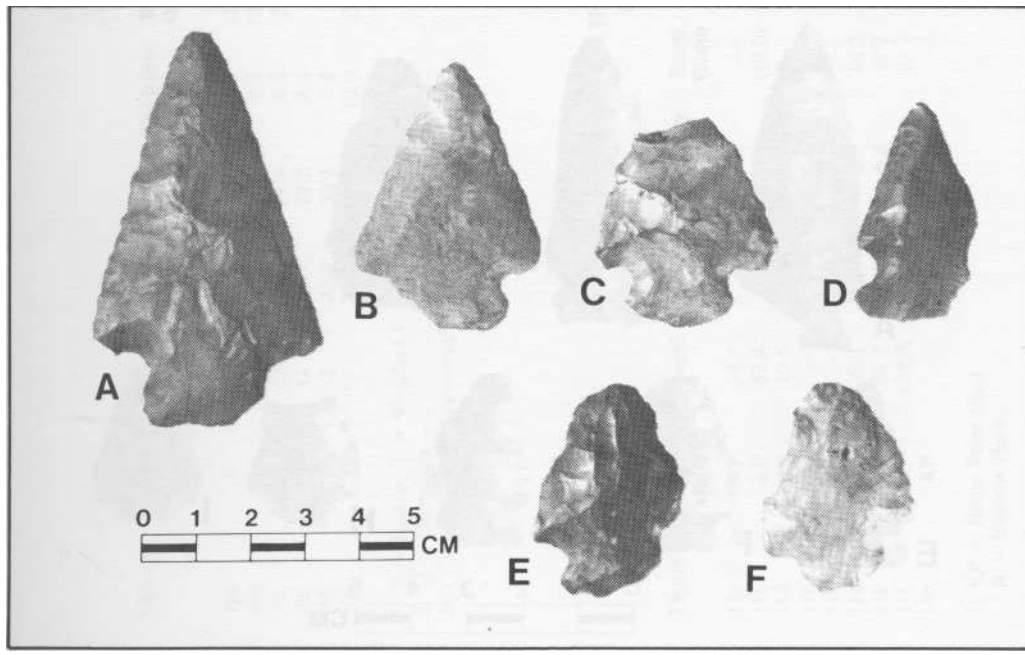

Fig. 10
Class I Points. A: Thedford I Site; B-F: Pascoe Site.

The third and final Class I point (Fig. 10d) has been reworked by the application of a very steep alternate-edge bevel. In plan, with the tip facing away from the viewer, the bevel appears on the left edge. This point might be a heavily reworked version of the Class I points shown on Fig. l0b and c. However, it also has a somewhat wider base and longer stem than the other points, appears better made and has extensive attempts at basal thinning. Also, as noted above, it appears more side-notched than the other Class I points. This may be due to resharpening which theoretically can change what were initially corner-notched points into side-notched forms (see below).

The other nine notched points or Class II forms (Fig. 11; Tables 5), could be variously classified as side or corner-notched because maximum width can occur either at the base (side-notched) or above the notches (corner-notched). Indeed, in one case (Fig. l lb) the point appears side-notched on one edge and corner-notched on the other margin. It seems possible to us, however, that such variation *within this class is* largely a product of resharpening. In essence, and as implied above, resharpening of the lateral edges can not only result in reduced length but also in width reduction which often removes the barbs overhanging the notch and turns what were initially corner-notched forms into points which could be classified as side-notched. Such a process has led, in our opinion, to some confusion in point classification. For instance, and as Chapman (1977:39) has noted, the St. Albans side-notched bifurcate points from the east are actually corner-notched points which have been resharpened. Similarly, several points classified as Brewerton side-notched forms (i.e. Ritchie 1971: P1.7) appear to be simply resharpened versions of Brewerton corner-notched points.

Be that as it may, we would suggest that at least some, but perhaps not all, of these side-notched points from Pascoe were originally corner-notched to judge from the diagonal orientation of the notches. As a whole they can be distinguished from Class I points by their much smaller size (compare Tables 4 and 5) and their straight to concave bases, more convex blade edges, more pointed basal tangs and a total lack of edge beveling. Four of these smaller points represent a consistent and homogeneous series (Fig. 1 lb-d,g). All are of Kettle Point chert and are less well-made than the Class I examples. Other distinctive characteristics include: a plano-convex cross-section: broad, deep surface flaking: a paucity of fine marginal retouch which results in irregular fore-section and basal edges in plan: the uniform presence of a small facet of the original ventral face of the flake blank which,

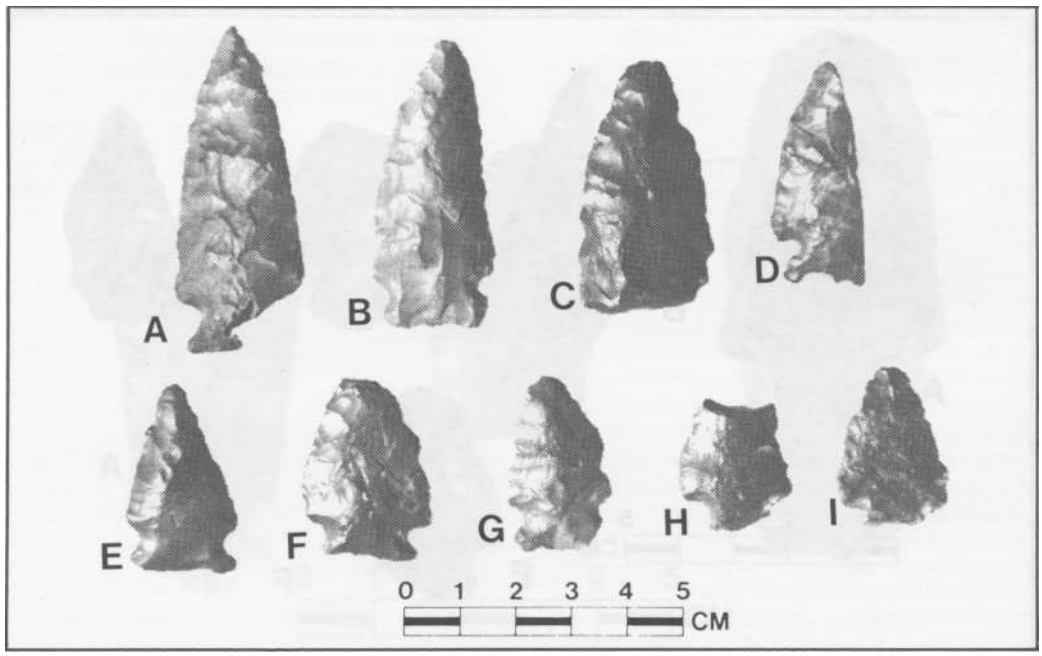

Fig. 11
Class II Points, Pascoe Site.

TABLE 4

Class I Point Variables

(measurements in mm)

Figure	Site[1]	Lithic[2] Material	Length	Width	Thickness	Basal Width	Notch (1)	Notch (2)	Depth (1)	Width (1)	Stem Length	Basal Tang Width (1)[3]	Basal Tang Width (2)[3]
10b	P	*O*	*50.3*	*35.0*	*6.8*	(22.0)[3]	4.3		*6.7*		11.0	*7.5*	
10d	P	?	41.4	—	8.2	(24.0)	4.1	—	9.1	—	13.4	6.5	
10c	P	O	—	34.4	8.6	20.4	4.7	4.1	9.3	7.3	11.8	4.4	5.0
10e	P	O	39.3	29.2	6.3	—	3.8		9.4		11.4	4.7	—
10f	P	O	38.63	0.3	7.4								
10a	T	?	73.2	41.7	10.0	(22.0)			(9.6)	(10.3)	12.5	7.4	

I: P = Pascoe, T = Thedford I
2: O = Onondaga
3: ( ) = estimated dimensions

TABLE 5

Class II Point Variables, Pascoe Site

(measurements in mm)

Figure	Lithic' Material	Length	Width	Thickness	Basal Width	Notch (1)	Depth (2)	Notch (1)	Width (1)	Stem Length	Basal Tang Width (1)	Basal Tang Width (2)
11a	KP	58.7	24.0	6.2		3.6		8.5		8.8	3.4	
11b	KP	52.4	22.7	8.0	(19.0)	2.0		6.1		9.0	4.2	
11d	KP	40.6	—	8.1	—	4.3		4.4		8.3	3.8	
11h	?	—	20.7	6.1	—	—		—			—	
11i	B(?)	—	20.6	5.3	----------							
11g	KP	32.1	19.0	5.6	16.2	2.0	—	5.6	—	8.8	3.7	—
11e	?	34.2	19.7	6.8	18.7	2.1	2.4	6.1	6.1	7.8	3.4	3.9
11f	KP	(38.0)	23.4	5.9	17.7	2.3	3.7	5.6	5.1	6.5	2.4	—
11c	KP	—	25.0	8.0	----------							

I: KP = Kettle Point chert B = Bayport chert

without exception, is near the base on one face of the point and along with the plano-convex cross-sections indicates manufacture on a thin flake; where observable, a lack of basal and notch smoothing; and the presence of unifacial basal thinning by larger flake removals on the convex face. Two of these points (Fig. 11 c,g) have a deliberate, largely unifacial, blunting and narrowing of the tip end which might suggest recycling.

Of the remaining five points, two (Fig. 11 h,i) with plano-convex cross-sections may also be related to the previous examples but are too incomplete for positive assignment. The final three points are distinguished from previous points placed in the class by the presence of light notch and basal smoothing, biconvex cross-sections, basal thinning on both faces (2 of 3), more fine marginal retouch, and a lack of original flake blank remnants (Fig. 11a,e,f). Two (Fig. 11a,e) are otherwise quite similar in terms of other characteristics such as a broad, deep, flaking to the four previously described Class II points and may be, in fact, examples of the same which differ mainly because they were not made on thin flakes or perhaps, in one case (Fig. I la) because it has been less resharpened or reworked.

The remaining point however, which exhibits slight use damage at the tip and a basal corner (Fig. 1 If), is well-made with a fine, well-executed surface finish, characterized by a large number of small, shallow, unpatterned flake scars. Also, it is relatively wide and thin despite obvious resharpening and has apparent fine serration remnants along both margins.

The remaining 25 artifacts from the site include six bifaces and 19 unifaces. The former (Fig. 12a,b) includes at least four made of Kettle Point chert which suggests they might be associated with the Class II points. Most of these bifaces were probably originally intended as point preforms but were left incomplete during manufacture. In four cases, reasons for their abandonment can be suggested. One split along a material flaw and three others have excessive thick points formed by the hinge-terminations of flake removals which precluded adequate thinning. One (Fig. 12b) however, has a small, well-executed, parallel marginal bifacial retouch which is suggestive of recycling and use.

The unifaces include only three formal tools. One is a large (49.2 x 39.8 x 7.6 mm) double convex side scraper (Fig. 12e) with a 40-65° beveled edge on one face on one margin and a 35-45° beveled edge on the opposite face on the other margin (i.e. an alternate retouch). Such a tool would not be out of place in a Paleo-Indian assemblage (most large fluted point sites in the area have yielded one or two examples of double alternate side scrapers). It seems possible then that this tool is associated with the fluted or Plano points. The two other formal tools may be also of a Paleo-Indian affiliation and consist of two gravers or piercers (Fig. 12c,d), one with 3 spurs (arranged in a coronet pattern) and another with 2 spurs. The former is of Kettle Point chert and has a denticulated edge on another margin while the latter, of an unknown chert, has a short, steep beveled working edge opposite the spurred margin.

The remaining 16 tools are simply retouched flakes (14) or chunks (2) which have a fine (under 2.5 mm long) continuous to discontinuous retouch on one or more margins. Four are Kettle Point chert, two are Onondaga and the rest are of unidentifiable materials. At least six (i.e. Fig. 12f-h) are based on biface thinning flakes, some of which are quite large. This large size might suggest an association with the Plano points.

Simons Site (AhHk-74)

This site is on the Nipissing beach adjacent to the Parkhill site (Fig. 2). Only four bifacial artifacts have been recovered. One item (Fig. 13a; Table 6) is a small complete point with broad (8.4 and 8.1 mm), shallow (2.5 and 2.5 mm) side-notches, although prior to resharpening it may have been corner-notched. A second artifact from the site is a triangular, straight-based cache blade of Onondaga chert (Fig. 13b). The remaining two bifaces (Table 5; Fig. 13c,d) are complete, oval in outline and may be preforms.

Thedford I Site

The final location yielding waterworn materials is west of and near the Ausable River on the Nipissing beach. Two waterworn points from the site were studied. The first point (Fig. 10a; Table 4) is a large corner-notched form from which the tangs overhanging the notches were broken prior to water-rolling. This point is virtually identical to the two homogeneous Class I points (Fig. 10b-c) reported from the Pascoe site. In common with the Pascoe points it is broad-bladed with a wide, straight, ground base; is basally thinned; has straight fore-section margins with, based on estimates, broad notches; and has wide basal tangs with rounded corners. Moreover, like one of the points from Pascoe (Fig. 10c), the fore-section exhibits a slight twist or beveling in cross-section which might result from either resharpening or manufacture. It differs from the Pascoe examples mainly in overall fore-section size. We suggest that this indicates it has not been as highly resharpened as the Pascoe points. Certainly basal character-

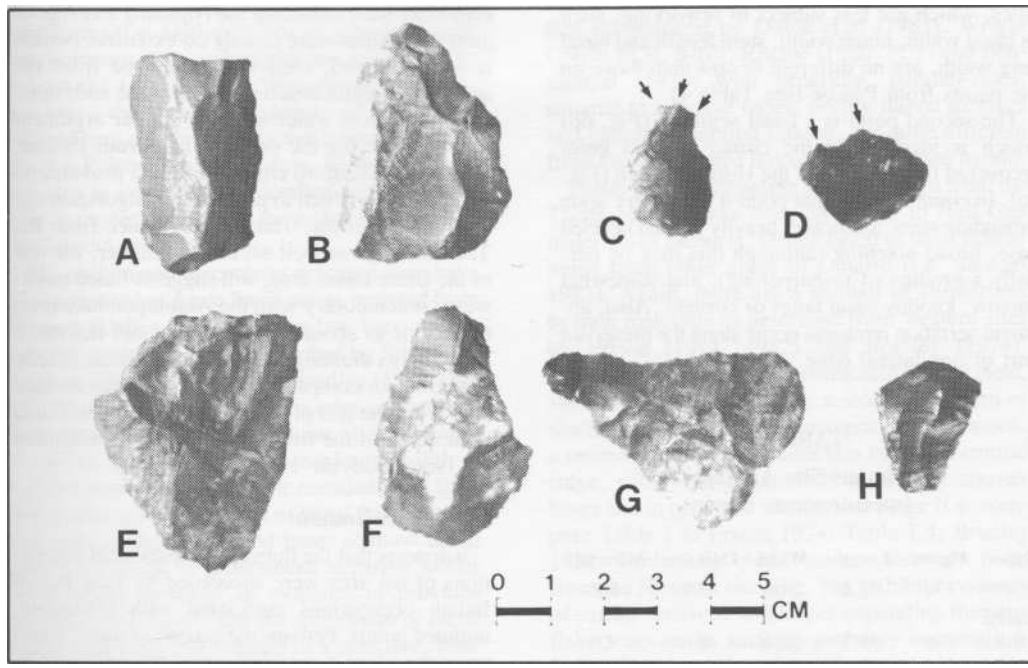

Fig. 12
Other Tools, Pascoe Site. A-B: Bifaces; C-D: "gravers"E: Double Alternate Side Scraper; F-H: Retouched Biface Thinning Flakes.

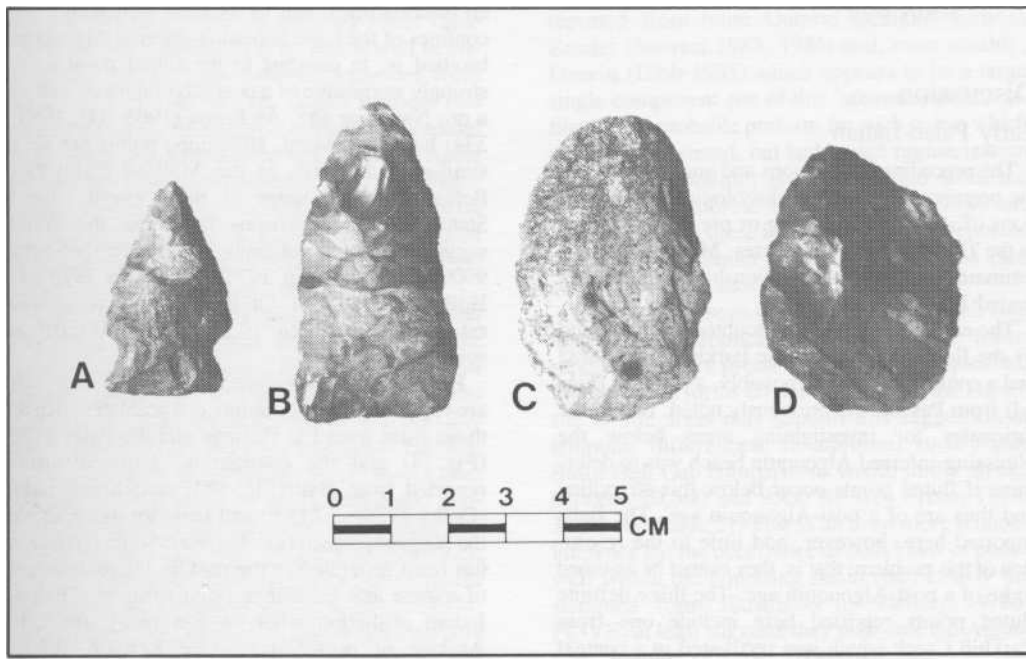

Fig. 13
Simons Site Tools. A: Side-Notched Point; B-D: Bifaces.

istics, which are less subject to reworking. such as basal width, notch width, stem length and basal tang width, are no different in size than those on the points from Pascoe (see Table 4).

The second point is a basal segment (Fig. 6b) which is identical to the corner-notched point recovered from Area II at the Heaman beach (Fig. 6a). In common with that point it has a very wide expanding stem: a concave, heavily ground beveled base: broad notching (although this may be partially a product of resharpening); and somewhat narrow, knobby basal tangs or corners. Also, apparent serration remnants occur along the preserved part of one lateral edge.

TABLE 6

Simons Site Artifacts
(measurements in mm)

Type	Figure	**Length**	Width	Thickness	Material'
Point	13a	38.8	21.6	7.4	KP
Cache Blade	13b	55.3	28.3	8.0	O
Biface	13d	48.2	36.0	9.4	O
Biface	13c	53.2	34.2	10.3	S

I: KP = Kettle Point chert O = Onondaga chert S = Selkirk chert

Discussion

Early Paleo-Indian

The preceding descriptions and analyses suggest the presence of several archaeological manifestations of a definite Nipissing or pre-Nipissing age in the Thedford embayment area. More precise age estimates and external relationships can be suggested here.

The earliest material is undoubtedly represented by the fluted points from the Parkhill Creek area and a complete point and possibly, a point tip (Fig. 4d) from Pascoe. As previously noted, one of the rationales for investigating areas below the Nipissing-inferred Algonquin beach was to determine if fluted points occur below this strandline and thus are of a post-Algonquin age. The finds reported here, however, add little to the resolution of this problem: that is, they cannot be assumed to be of a post-Algonquin age. The three definite fluted points reported here include one from Parkhill Creek which was recovered in a context of secondary deposition and two from the Nipissing beach itself. With regard to the latter finds, even if we were to assume the Nipissing and Algonquin strandlines were exactly co-extensive (which is unreasonable), such finds could be from the actual Algonquin beach or water plane and. thus. not from below water level. A similar argument can be made for the possible find from Pascoe. Hence. the Thedford embayment data provides no good basis on which to posit a post-Algonquin age for such materials. Thus, the evidence from the Thedford area as well as, for that matter, the rest of the Great Lakes area, still suggests fluted points were contemporary with the Algonquin lake level (i.e. prior to about 10,400 BP) or did not much post-date its draining. Such an age estimate is reinforced by, or compatible with, C-14 dates on such sites from the rest of the east which suggest fluted points date to the first half of the 11 th millenium BP (see Goodyear 1982).

Late Paleo-Indian

It appears that the fluted point associated occupations of the area were succeeded by Late Paleo-Indian occupations associated with lanceolate, unfluted points. Perhaps the earliest of these. based upon the closest morphological resemblances in outline shape and thickness to fluted points (see Deller and Ellis 1984; Ellis 1984:302-303), is represented by the Tedball Holcombe site. The status of Tedball as a definite site (as opposed to an isolated find), and its location well within the confines of the Lake Nipissing-inferred Algonquin lakebed is, in contrast to the fluted point data, strongly suggestive of a post-Algonquin as well as a pre-Nipissing age. As Roosa (1965:100, 1968: 334) has emphasized, Holcombe points are very similar to materials in the Midland/Plainview/ Belen/Milnesand range of the western United States. If such comparisons are reliable, this would suggest an age for Holcombe points older than circa 9900 BP (see Irwin 1971:47; Frison 1978:31; Holliday et al 1983). On these bases a rough age estimate of between 10.400 and 9900 BP is suggested.

Possible post-Holcombe Paleo-Indian materials are represented by unstemmed lanceolates such as those from Area I at Heaman and the Pascoe site (Fig. 4) and the contracting stemmed forms reported from Hall (Fig. 9h), near Smith Lake (Deller 1976b: PI.IVE) and from locations above the Nipissing beach (i.e. Fig. 9a). Some confusion has been generated in the past by the assignment of almost any lanceolate point form to a Paleo-Indian affiliation when in fact many are Late Archaic or post-Archaic (see Kenyon 1980a, 1980b: Ritchie and Funk 1973:120). Indeed, in the past some points from the Thedford area have been

said to resemble Scottsbluff Lake Paleo-Indian point forms (i.e. Deller 1976b). It now seems evident however, that such points are related to the widespread Late Archaic "Broadpoint" horizon. However, the waterworn nature of the points reported here clearly indicates that these lanceolates are of a Paleo-Indian affiliation. This interpretation also is supported by detailed similarities in point characteristics and by the probably associated bifacial and unifacial tools.

The unstemmed lanceolates reported here have been compared to Agate Basin points reported from the west (Defter 1976b) and in fact they closely resemble such materials as described by Frison and Stanford (1982:80-81) and by Bradley (1982: 184-185). Such similarities include: a relatively smooth lenticular or biconvex cross-section; slightly bowed or convex lateral edges with maximum width at or above mid-point; an oval or rounded base; light lateral edge grinding: a lack of basal thinning; occasionally, a lightly ground base; shallow facial flaking (i.e. lack of pronounced negative bulbar scars) which removed all evidence of previous manufacturing stages: and the application of facial taking and marginal retouch in a selective, non-patterned manner. They are not, however, identical to Agate Basin points. Of the two relatively complete waterworn points reported from Area I at Heaman, the largest (Fig. 4a) falls within the size range in all characteristics of Agate Basin points as reported at that site (Bradley 1982: Table 3.9) but the smaller point (Fig. 4b) is well below the lower range of the reported variables from western sites. Similarly, the largest of these two lanceolates (Fig. 4a) exhibits a slight longitudinal twist which apparently does not occur on Agate Basin points (Frison and Stanford 1982:811. Finally, these two points exhibit slight medial ridges on one face which, although present on Agate Basin points at that site, is an extremely rare characteristic (Frison and Stanford 1982:81).

In general, plano points of the same form and technology as the Heaman site Agate Basin-like materials are rarely reported from the lower Great Lakes. Exceptions include some material from northern Ohio (Payne 1982: Fig. 20) and possibly from western Pennsylvania (Lantz 1984: Fig. 8i). Most of the material from the Upper Great Lakes with, among other things, its stemmed and concave to squared-off bases and oblique flaking patterns, also appears much different (see Fox 1975; Julig 1984: Salzer 1974). However, some points assigned to the "Flambeau phase" by Salzer (1974: Fig. le, left) are similar to the points reported here in terms of flaking and outline shape, as are a few from Northern Ontario usually referred to as Agate Basin. "Plano" material from farther east such as that summarized by Doyle et al (1985), Wright (1978: Pl. II, 5-10). Ritchie (1980: P1.3) and Benmouyal (1976) with generally, parallel-sides. squared to concave bases, deeply flaked surfaces and patterned parallel flaking, are quite different from the unstemmed lanceolates examined herein.

Points of the contracting stemmed form from the Thedford area have been compared to Hell Gap materials of the west (Deller 1979) as have similar items from other areas of Ontario (i.e. Stewart 1983). Again, there are a number of similarities to such materials as described from western sites by Frison (1974, 1982) and Bradley (1974). Besides the presence of a contracting ground stem, such resemblances include: a selective pattern of shallow facial flaking and marginal edge retouch, a smooth biconvex cross-section lacking a central ridge, somewhat squared-off to slightly convex bases and in general a similar size range (i.e. compare Table 1 to Frison 1974: Table 1.4; Bradley 1982: Table 3.9). Also, the unwaterworn point from the Heaman site (Fig. 9a), exhibits evidence of earlier removed and larger expanding thinning flake scars on its surfaces probably because it is less resharpened than the waterworn mid-section from Hall (Fig. 9b). These larger scars appear to characterize many finished Hell Gap points (Bradley 1974:193).

Points similar to these stemmed forms have been reported from other Ontario locations such as Zander (Stewart 1983, 1984) and, most notably, Deavitt (Dibb 1985) which appears to be a large single component site of this "stemmed point" affiliation. A probable preform for such points which is slightly stemmed, but lacks edge regularization and lateral grinding, is also reported from the Hussey site (Storck 1979: P1.16a). However. beyond Ontario there is as yet very little reported material of a similar nature from the east (see references cited above).

If the comparisons to Agate Basin and Hell Gap materials are applicable, the lanceolate forms reported here are probably temporally sequential. The fact such forms do not co-occur on the known site or site areas may support this suggestion of temporal differences. In addition, such Agate Basin/Hell Gap comparisons would imply an age between 10,500 and 9500 BP (see Frison 1978: 32-34 and Table 2). This is an even more tenuous inference but the occurrence of both kinds of points well within the Nipissing Basin (particularly the stemmed form illustrated by Deller, 1976b: PI.IVE) at least suggests they post-date the Algonquin draining of about 10,400 BP.

Early Archaic

Accepting the above dating of the plano forms based on similarities to Agate Basin/Hell Gap materials, this would suggest contemporaneity with Holcombe (and, perhaps, late fluted point material). In addition, and more importantly from the perspective of the present paper, it suggests an overlap in time with Hi-Lo (Ellis and Deller 1982; Fitting 1963) and definite Early Archaic material including points assigned to the Kirk corner-notched cluster (Broyles 1971; Chapman 1976, 1977; Goodyear 1982). Hi-Lo points, although rare compared to their occurrence farther south in Ontario, occur as isolated finds above the Nipissing beach in the Thedford embayment area (Deller, Ellis and Kenyon 1985:6). These are estimated to date around 10,000 BP (Ellis and Deller 1982) based on similarities to Dalton materials (see Goodyear 1982) farther south. The Kirk-like materials (again, rare compared to farther south in Ontario and into northern Ohio; see Fox 1980; Payne. 1982; Wright 1978) also have been recovered from areas above the Nipissing beach, notably at the Parkhill site (Deller, Ellis and Kenyon 1985:8). Moreover, some of the waterworn material described earlier is of this affiliation.

In particular, the point base from Thedford I and the complete point as well as perhaps a fore-section segment from Area II at Heaman (Fig. 6) are good examples of points assigned to the Kirk corner-notched cluster. Similarities to this material include: an expanding stem; a wide stem versus overall width; a shallow, concave, ground base; a smooth, biconvex, thin, cross-section; selective facial flaking; the presence of serrations; narrow knobby basal tangs or ears; basal thinning and relatively straight to slightly convex fore-sections. Indeed, these Thedford embayment examples appear virtually identical in morphology, technology and size to the Kirk corner-notched "large variety" points from the southeastern United States (see Broyles 1971:64-65; Chapman 1977: Fig. 18a, 1978: Fig. 18a-c). In such areas, the Kirk corner-notched cluster as a whole is relatively firmly dated between 9800 and 8900 BP (Chapman 1976). Although it is sometimes claimed that "Kirk" materials from farther north date later than those in the south (i.e. Snow 1980:160), this is partially a product of a confusion of Kirk *corner-notched* materials with Kirk *stemmed* materials, the latter of which are now firmly dated to the beginning of the Middle Archaic (approximately 8000 BP) even in the southeast (Chapman 1979:32-33, 1980:129). Since the waterworn materials more closely resemble the "large variety" points (i.e. they have a basal width over 20 mm; Chapman 1979:33), they may post-date the Plano forms noted above as there is evidence that the larger forms are later in the Kirk sequence (i.e. closer to 8900 BP; Chapman 1978:54). On the other hand, the Kirk-like points above the Nipissing beach in the area are of forms more closely approximating the earlier "small variety" points.

Middle and Late Archaic

The remaining notched waterworn points (Classes I and I1) from the Thedford area probably post-date the Kirk Corner-Notched cluster points. In other areas of the east, Kirk corner-notched associated materials are followed in time by a series of bifurcate-base (St. Albans, LeCroy, etc.) and then Middle Archaic stemmed forms such as Kirk, Stanly/Neville and Morrow Mountain between approximately 8900 and 7000 BP. In turn, there is growing evidence that at least in the northern part of the east, assemblages characterized by side-notched points of various forms (Otter Creek, Godar, etc.; see Cook 1976:60; Lovis 1983; Lovis and Robertson 1985; Perino 1963; Ritchie 1971) come to predominate between about 7000 and 5000 BP. With one possible exception to be described below, waterworn points of this bifurcate/stemmed/side-notched affiliation are lacking in the present collections *(contra* to Deller, Ellis and Kenyon 1985:8). However, as with previously described point forms, such materials, particularly points resembling those in the Stanly/Neville types (Coe 1964:35; Chapman 1977:34-35; Dincauze 1976: 26-29) occur above the Nipissing beach in the area (Deller, Ellis and Kenyon 1985:8), including the Parkhill site.

On this basis, as well as the fact such points cluster on the Nipissing beach and are not known to occur out in the embayment, one might speculate that most of the remaining waterworn notched points post-date the side-notched forms and are contemporary with Phase I of Nipissing; that is, they date between approximately 5000 and 4000 BP. A possible exception is the heavily alternately beveled point from the Pascoe site which appears to be diagonally side-notched (Fig. 10d). On this point, the shape of the basal corners, the diagonal orientation of the notches, the ground base and, especially, the steep left bevel, are suggestive of affinities with the Thebes type-cluster (Winters 1963:19). It differs mainly in that the notches are quite broad. Thebes points are generally considered to be Early Archaic. However, Payne (1982:50-51) has noted that Thebes points have been recovered largely in multicomponent contexts. Based on similarities in lithic material preferences to later Archaic forms in his Ohio sample, Payne (1982:51) suggests they may be of Middle Archaic age. It is possible that they are a part of the wide-spread

Middle Archaic side-notched horizon noted above. Perhaps significant in this regard, a side-notched point, noted to be similar to the Thebes type cluster but with broader notches, was recovered from the lowest occupation zone at the Weber I site in Michigan dated to between 6200 and 4500 BP (Lovis 1983:86). This point then may not be contemporaneous with Nipissing I.

Although we suspect the remaining points are of a Nipissing I age, it is not easy to relate such points to dated forms elsewhere. Perhaps the earliest of these waterworn points is a corner-notched Class II point from Pascoe (Fig. 11 f). With its straight base, notch and basal smoothing, probable serrations, surfaces covered by a large number of small, shallow flake scars, small notch size and placement and short stem, this point resembles the Vosburg points (Ritchie 1971:55 and P1.32) dated to around 5000 to 4500 BP in eastern New York state (Ritchie and Funk 1973: Fig. 1).

The other Class II points (Fig. 11a-e,g) and some of the Class I points (Fig. 10e-f), fall within the range of form and size of the Brewerton side and corner-notched types respectively of Ritchie (1971: 16,18, Pl. 4 & 7). The Class II points in particular are similar in overall outline, shape, size of notches and basal corners to the Brewerton side-notched items although unlike the Brewerton forms, these points often have a plano-convex section and infrequently exhibit basal grinding. Moreover, such Brewerton forms are dated in New York state to around 3800 to 4000 BP (Ritchie and Funk 1973:46). This is somewhat recent for a Nipissing I age estimate.

Perhaps a closer resemblance to the present sample is to be found in the collections from the Morrison's Island-6 site in Ontario (Kennedy 1966: 105-106). As with the present sample, the points at that site are noted to be superficially similar to Brewerton side-notched forms. However, they differ from Brewerton forms and are similar to the present sample in that they can have plano-convex cross-sections and usually are not basally ground. Moreover, as with the present sample they can appear side-notched on one edge and corner-notched on the other edge. Notable also is the single radiocarbon date of 4700 BP at Morrison's Island-6 which is more compatible with the Nipissing age assignment of the present sample.

Having stated this, it is possible though that some of the smaller Class II points, particularly those shown on Figures 11e and 11g, are related to a series of small corner to side-notched Middle Archaic points recovered from the Weber I site in Michigan dated prior to 4500 BP (Lovis 1983:83: Deller, Ellis and Kenyon 1985:8). However, the lack of serrations, a rougher flaking and at least in one instance (Fig. 11g), the absence of notch and basal grinding and a plano-convex section, lead us to suggest closer resemblances to the Brewerton and particularly, the Morrison's Island-6 point forms.

Of the remaining notched points, the homogeneous series of 3 corner-notched points from Pascoe and Thedford I (Fig. 10a-c) are much different than Brewerton or related forms. They are, for example, much larger with thicker basal corners and broader notching than Brewerton corner-notched points. They do not closely approximate any known named type but are similar to some in the non-Dustin point series at the Schmidt side in Michigan (Harrison 1966: P1.1B upper row, right: lower row, centre). Unfortunately however, the age and affinities of such points at that site have been subject to a number of different interpretations (see Fairchild 1977: Lovis and Robertson 1985). At the present time, the best we can suggest is that such point forms are contemporaneous with Nipissing.

Acknowledgements

The field research reported herein was supported by grants from the Ontario Heritage Foundation awarded to Deller and from the former Canada Council to William B. Roosa. Research on the geological history of the area and the incorporation of information from the Parkhill site investigations was made possible by a Social Sciences and Humanities Research Council of Canada post-doctoral fellowship awarded to Ellis. We thank Ed McLeod, Gary Zimmer, Fred Heaman, Barry Heaman and other local residents for providing access to their collections and/or properties. William Lovis, James Robertson, Bill Fox, Ian Kenyon, Peter Sheppard and William B. Roosa provided helpful comments and advice on this paper. Drs. Alan Morgan, Jock McAndrews, Barry Warner, Paul Karrow and, especially, Eric Reardon, provided much needed insight into geological matters. We alone, however, are responsible for any errors or omissions.

References Cited

Benmouyal, J.
1976 Archaeological Research in the Gaspe Peninsula, Preliminary Report. In *Current Research Reports, Publication 3 (R.L.* Carlson, editor). Department of Archaeology, Simon Fraser University.

Bradley, B.
1974 Comments on the Lithic Technology of the Casper Site Materials. In *The Casper Site:*

A Hell Gap Bison Kill on the High Plains (G.C. Frison. editor), pp. 191-197. Academic Press. New York.

1982 Flaked Stone Technology and Typology. In *The Agate Basin Site: A Record of the Paleoindian Occupation of the Northwestern High Plains (G.C.* Frison and D. Stanford. editors). pp. 181-208. Academic Press. New York.

Broyles, B.J.
1971 Second Preliminary Report: The St. Albans Site. Kanahwa County. West Virginia. 1964-1968. *West Virginia Geological and Economic Survey, Report of Archaeological Investigations 3.*

Chapman. J.
1976 The Archaic Period in the Lower Little Tennessee River Valley: The Radio-carbon Dates. *Tennessee Anthropologist* 1:1-12.
1977 Archaic Period Research in the Lower Little Tennessee River Valley — 1975. *Department of Anthropology, University of Tennessee, Report of Investigations* 18.
1978 The Bacon Farm Site and a Buried Site Reconnaissance. *Department of Anthropology, University of Tennessee. Report of Investigations* 23.
1979 The Howard and Calloway Island Sites. *Department of Anthropology, University of Tennessee. Report of Investigations 27.*
1980 The Early and Middle Archaic Periods: A Perspective from Eastern Tennessee. In Proceedings of the Conference on Northeastern Archaeology (J.A. Moore, editor). Pp. 123-132. *University of Massachusetts-Amherst, Department of Anthropology, Research Report* 19.

Coe, J.L.
1964 The Formative Cultures of the Carolina Piedmont. *Transactions of the American Philosophical Society (N.S.)* 54(5).

Cook. T.G.
1976 Koster: An Artifact Analysis of Two Archaic Phases in West-Central Illinois. *Northwestern University Archaeological Program Prehistoric Records* I.

Cooper, A.J.
1979 Quaternary Geology of the Grand Bend-Parkhill Area, Southern Ontario. *Ontario Geological Survey Report* 188.

Deller, D.B.
I 976a Paleo-Indian Locations on Late Pleistocene Shorelines, Middlesex County, Ontario. *Ontario Archaeology* 26:3-19.
1976b The Heaman Site: A Preliminary Report on a Paleo-Indian Site in Middlesex County, Ontario. *Ontario Archaeology* 27:13-28.
1979 Paleo-Indian Reconnaissance in the Counties of Lambton and Middlesex, Ontario. *Ontario Archaeology* 32:3-25.

Deller, D.B., and C.J. Ellis
1984 Crowfield: A Preliminary Report on a Probable Paleo-Indian Cremation in Southwestern Ontario. *Archaeology of Eastern North America* 12:41-71.
n.d. Thedford II: Investigations at a Paleo-Indian Site in the Ausable River Watershed of Southwestern Ontario. Report on file at the Ministry of Citizenship and Culture. Toronto. Ontario.

Deller. D.B., C.J. Ellis and I.T. Kenyon
1985 The Archaeology of the Southeastern Huron Basin. *Kewa, Newsletter of the London Chapter, Ontario Archaeological Society* 85(9):3-16.

Dibb. G.C.
1985 Late Paleo-Indian Settlement Patterns Along the Margins of the Simcoe Lowlands in South Central Ontario. Unpublished MA thesis, Department of Anthropology, Trent University. Peterborough. Ontario.

Dincauze, D.F.
1976 The Neville Site: 8,000 Years at Amoskeag. *Peabody Museum Monographs* 4.

Doyle, R.A., N.D. Hamilton, J.B. Petersen and D. Sanger
1985 Late Paleo-Indian Remains from Maine and Their Correlations in Northeastern Pre-history. *Archaeology of Eastern North America* 13:1-34.

Dustin, F.
1935 A Study of Bayport Chert. *Papers of the Michigan Academy of Science, Arts and Letters* 20:465-475.

Ellis. C.J.
1984 Paleo-Indian Lithic Technological Structure and Organization in the Lower Great Lakes Area: A First Approximation. Unpublished PhD Dissertation, Department of Archaeology, Simon Fraser University, Burnaby, British Columbia.

Ellis, C.J., and D.B. Deller
1982 Hi-Lo Materials from Southwestern Ontario. *Ontario Archaeology* 38:3-22.

Fairchild, J.D.
1977 The Schmidt Site: A Pre-Nipissing Village in the Saginaw Valley, Michigan. Unpublished MA thesis, Department of Anthropology, Western Michigan University, Kalamazoo, Michigan.

Farrand, W.R.
1977 Revision of the Two Rivers "Valders" Drift Border and the Age of Fluted Points in Michigan. *Anthropological Papers, Museum of Anthropology, University of Michigan* 61:74-84.

Fitting, J.E.
1963 The Hi-Lo Site: A Late Paleo-Indian Site in Michigan. *Wisconsin Archaeologist* 44(2):87-96.

Fitting, J.E., J. DeVisscher and E. Wahla
1966 The Paleo-Indian Occupation of the Holcombe Beach. *Anthropological Papers, Museum of Anthropology, University of Michigan 27.*

Fox, W.A.
1975 The Paleo-Indian Lakehead Complex. *Canadian Archaeological Association Research Report* 6:29-53.
1980 Nettling Points. *KEWA, Newsletter of the London Chapter, Ontario Archaeological Society* 80(2): -

Frison, G.C.
1974 Archaeology of the Casper Site. In *The Casper Site: A Hell Gap Bison Kill on the High Plains (G.C.* Frison, editor), pp. 1-111. Academic Press. New York.
1978 *Prehistoric Hunters of the High Plains.* Academic Press. New York.
1982 Hell Gap Components. In *The Agate Basin Site: A Record of the Paleoindian Occupation of the Northwestern High Plains (G.C.* Frison and D. Stanford, editors), pp. 135-142. Academic Press. New York.

Frison, G.C., and D. Stanford
1982 Agate Basin Components. In *The Agate Basin Site: A Record of the Paleoindian Occupation of the Northwestern High Plains (G.C.* Frison and D. Stanford, editors). pp. 76-135. Academic Press. New York.

Fullerton, D.S.
1980 Preliminary Correlation of Post-Erie Interstadial Events (16,000 to 10,000 Radiocarbon Years Before Present), Central and Eastern Great Lakes Region and Hudson, Champlain and St. Lawrence Lowlands. United States and Canada. *United States Geological Survey, Professional Paper* 1089.

Goodyear, A.C.
1982 The Chronological Position of the Dalton Horizon in the Southeastern United States. *American Antiquity* 47(2):382-395.

Harrison. S.
1966 The Schmidt Site (20SA192), Saginaw County, Michigan. *Michigan Archaeologist* 12(2):49-70.

Holliday, V.T., E. Johnson, H. Hass and R. Stuckenrath
1983 Radiocarbon Ages from the Lubbock Lake Site, 1950-1980: Framework for Cultural and Ecological Change on the Southern High Plains. *Plains Anthropologist 28:* 165-182.

Hough. J.L.
1963 The Prehistoric Great Lakes of North America. *American Scientist* 51:84-109.

Irwin, H.T.
1971 Developments in Early Man Studies in Western North America. 1960-1970. *Arctic Anthropology* 8(2):42-67.

Janusas, S.E.
1984 A Petrological Analysis of Kettle Point Chert and its Spatial and Temporal Distribution in Regional Prehistory. *National Museum of Man, Mercury Series, Archaeological Survey of Canada Paper* 128.

Julig, P.
1984 Cummins Paleo-Indian Site and Its Paleoenvironment, Thunder Bay, Canada. *Archaeology of Eastern North America* 12: 192-209.

Karrow, P.F.
1980 The Nipissing Transgression Around Southern Lake Huron. *Canadian Journal of Earth Sciences* 17:1271-1274.

Karrow, P.F., T.W. Anderson, A.H. Clarke, L.D. Delorme and M.R. Sreenivasa
1975 Stratigraphy, Paleontology, and Age of Lake Algonquin Sediments in Southwestern Ontario, Canada. *Quaternary Research* 5:49-87.

Kennedy, C.
1966 Preliminary Report on the Morrison's Island-6 Site. *National Museum of Canada Bulletin* 206:100-125.

Kenyon, I.T.
1980a The George Davidson Site: An Archaic 'Broadpoint' Component in Southwestern Ontario. *Archaeology of Eastern North America* 8:11-28.
1980b The Satchell Complex in Ontario: A Perspective from the Ausable Valley. *Ontario Archaeology* 34: 17-43.

Knudson, R.
1973 Organizational Variability in Late Paleo-Indian Assemblages. Unpublished PhD dissertation. Department of Anthropology, Washington State University, Pullman, Washington.

Lantz, S.
1984 Distribution of Paleo-Indian Projectile Points and Tools from Western Pennsylvania: Implications for Regional Differences. *Archaeology of Eastern North America* 12:210-230.

Larsen, C.E.
1985 Geoarchaeological Interpretations of Great Lakes Coastal Environments. In Archaeological Sediments in Context (J. Stein and W. Farrand, editors), pp. 91-110. *Peopling of the Americas Series, Center fin- the Study of Early Man, Institute for Quaternary Studies, University of Maine at Orono, Edited Volume Series* I.

Lewis, C.F.M.
1970 Recent Uplift of Manitoulin Island, Ontario. *Canadian Journal of Earth Sciences* 7:665-675.

Lovis, W.A. (editor)
1983 Archaeological Investigations at the Weber

I (20SA581) and Weber II (20SA582) Sites, Frankenmuth Township, Saginaw County, Michigan. Report submitted to the Saginaw County Road Commission, Michigan Department of Transportation, and U.S. Department of Transportation.

Lovis, W.A., and J.A. Robertson
1985 Rethinking the Archaic Chronology of the Saginaw Valley, Michigan. Paper presented at the 12th Annual Symposium, Ontario Archaeological Society, London, Ontario.

Luedtke, B.A.
1976 Lithic Material Distributions and Interaction Patterns During the Late Woodland Period in Michigan. Unpublished PhD Dissertation. Department of Anthropology, University of Michigan, Ann Arbor, Michigan.

MacDonald, G.F.
1968 Debert: A Paleo-Indian Site in Central Nova Scotia. *National Museum of Canada, Anthropology Paper* 16.

Parkins, W.
1977 Onondaga Chert: Geological and Palynological Studies as Applied to Archaeology. Unpublished MSc thesis, Department of Geological Sciences, Brock University. St. Catharines, Ontario.

Payne. J.H.
1982 The Western Basin Paleo-Indian and Early Archaic Sequences. Unpublished BA thesis, Department of Sociology, Anthropology and Social Work, University of Toledo, Toledo, Ohio.

Perino, G.
1963 Tentative Classification of Two Projectile Points and One Knife from West-Central Illinois. *Central States Archaeological Journal* 10(3):95-100.

Ritchie, W.A.
1971 A Typology and Nomenclature for New York Projectile Points (revised edition). *New York State Museum and Science Service, Bulletin* 384.
1980 *The Archaeology of New York State.* Harbor Hill Books. Harrison. New York.

Ritchie, W.A., and R.E. Funk
1973 Aboriginal Settlement Patterns in the Northeast. *New York State Museum and Science Service, Memoir* 20.

Roosa, W.B.
1965 Some Great Lakes Fluted Point Types. *Michigan Archaeologist* 11(3-4):89-102.
1968 Data on Early Sites in Central New Mexico and Michigan. Unpublished PhD Dissertation, Department of Anthropology, University of Michigan, Ann Arbor, Michigan.
1977 Great Lakes Paleoindian: The Parkhill Site, Ontario. In Amerinds and Their Paleoenvironments in Northeastern North America. (W.S. Newman and B. Salwen, editors), pp. 349-354. *Annals of the New York Academy of Sciences* 288.

Salzer, R.J.
1974 The Wisconsin North Lakes Project: A Preliminary Report. In: Aspects of Upper Great Lakes Anthropology (E. Johnson, editor), pp. 40-54. *Minnesota Prehistoric Archaeology Series* 11.

Snow, D.R.
1980 *The Archaeology of New England.* Academic Press. New York.

Stewart, A.
1983 Hell Gap: A Possible Occurrence in South Central Ontario. *Canadian Journal of Archaeology* 7(1):87-92.
1984 The Zander Site: Paleo-Indian Occupation of the Southern Holland Marsh Region of Ontario. *Ontario Archaeology* 41:45-79.

Storck, P.L.
1979 A Report on the Banting and Hussey Sites: Two Paleo-Indian Campsites in Simcoe County, Southern Ontario. *National Museum of Canada, Mercury Series, Archaeological Survey of Canada Paper* 93.
1983 The Fisher Site, Fluting Techniques and Early Paleo-Indian Cultural Relationships. *Archaeology of Eastern North America* 11:80-97.

Wahla, E., and J. DeVisscher
1969 The Holcombe Paleo Point. *Michigan Archaeologist* 15(4): 109-111.

Winters, H.
1963 An Archaeological Survey of the Wabash Valley in Illinois. *Illinois State Museum, Report of Investigations* 10.

Wright, H.T., and W.B. Roosa
1966 The Barnes Site: A Fluted Point Assemblage from the Great Lakes Region. *American Antiquity* 31(6):850-860.

Wright, J.V.
1978 The Implications of Probable Early and Middle Archaic Projectile Points from Southern Ontario. *Canadian Journal of Archaeology* 2:59-78.

Department of Anthropology
University of Waterloo Waterloo.
Ontario N2L 3G1

Box 40
Mt. Brydges, Ontario NOL IWO

Ellis. Chris J., and D. Brian Deller
1986 Post-Glacial Lake Nipissing Waterworn Assemblages from the Southeastern Huron Basin Area. *Ontario Archaeology* 45:39-60.