CUMMINS SITE: A LATE PALAEO-INDIAN (PLANO) SITE AT THUNDER BAY, ONTARIO

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ABSTRACT

The paper presents the results of a preliminary investigation of the Cummins site (DcJi-1), an extensive quarry workshop and habitation of the Plano period, circa 7000 BC, located on a glacial beach at Thunder Bay on the north shore of Lake Superior. Test excavations that uncovered debitage concentrations, hearth and pit features are described together with over 2,000 recoveries. Artifacts from the area suggest an occupation extending over several millennia and a gradual change from a specialized to a general hunting, fishing and gathering economy. A cremation yielded the earliest burial date thus far in Ontario of 6530 BC.

INTRODUCTION

Residents at Thunder Bay on Lake Superior had for many years recovered taconite stone

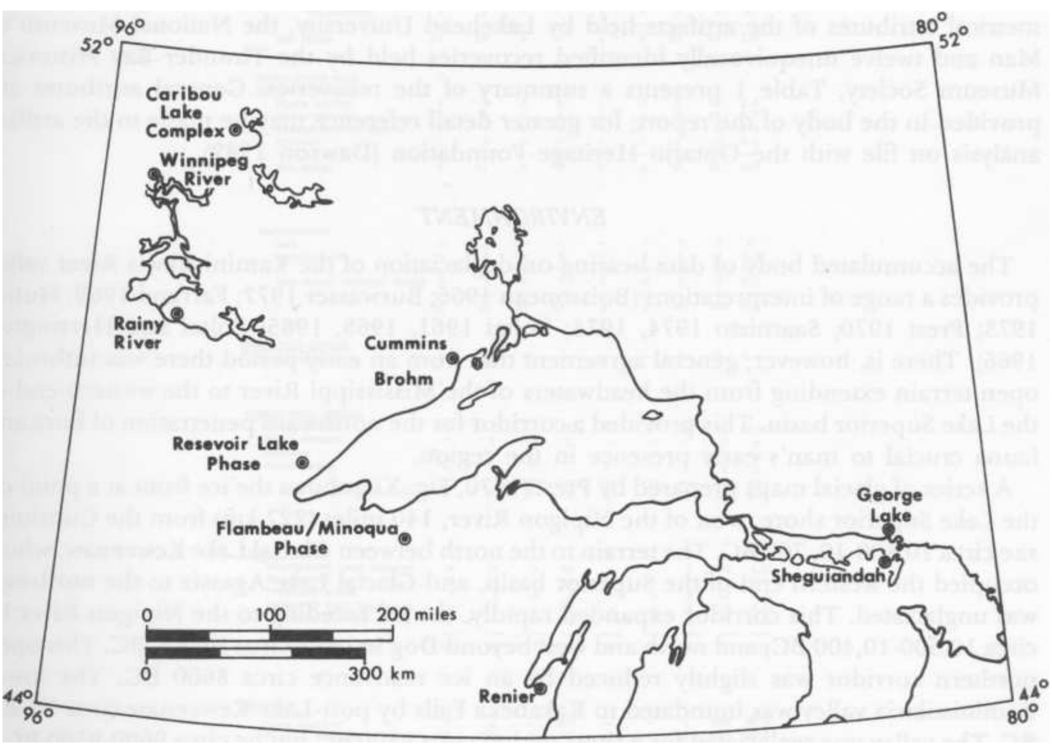

Fig. 1. Plano locations referred to in the text.

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tools along the high, relic, beach ridges of the Kaministikwia River valley (Lee 1958) but the vast extent of the deposits did not become known until 1962. In that year Hugh Cummins, a local collector reported a major site approximately 165 ft (50.3m) above and six miles (9.6 **km)** west of the present lake shore (Dawson 1962) (Fig. 1). The following year the author, under a National Museum of Man salvage grant, made an exploratory examination of the site and named it after the collector.

With the assistance of local residents, including the artist Sue Ross and the authoress Shiela Burnford who first wrote about the site (Burnford 1964), a surface collection was made and it was immediately evident that, while severely damaged by gravel pit operations, the site had been an early, extensive (estimated 200 acres) quarry workshop and habitation site. In concert with Dr. J.V. Wright of the Archaeological Survey of Canada, the site was surveyed (Wright 1963) and a series of test excavations were opened (Dawson 1963). These activities established the placement of the site in the Late Palaeo-Indian (Plano) period. Subsequently the site has been frequently referred to in the literature (Fox 1975, 1980a; Mason 1980; Ross 1979; Steinbring 1976; Wright 1972a).

In the 1970's further surface collections were made by the Archaeological and Historic Sites Branch of the then newly created Ontario Ministry of Culture and Recreation and by other parties, e.g. the University of Winnipeg. In 1976, a relatively undisturbed portion of the site was acquired by the Ministry for future investigation (Fig. 2, fenced area).

This report describes the initial work undertaken in 1963 and provides discrete and metrical attributes of the artifacts held by Lakehead University, the National Museum of Man and twelve unequivocally identified recoveries held by the Thunder Bay Historical Museum Society. Table 1 presents a summary of the recoveries. General attributes are provided in the body of the report; for greater detail reference may be made to the artifact analysis on file with the Ontario Heritage Foundation (Dawson 1982).

ENVIRONMENT

The accumulated body of data bearing on deglaciation of the Kaministikwia River valley provides a range of interpretations (Boissoneau 1966; Burwasser 1977; Farrand 1969; Huber 1973; Prest 1970; Saarnisto 1974, 1975; Zoltai 1961, 1963, 1965; Zoltai and Herrington 1966). There is, however, general agreement that from an early period there was unbroken open terrain extending from the headwaters of the Mississippi River to the western end of the Lake Superior basin. This provided a corridor for the northward penetration of flora and fauna crucial to man's early presence in the region.

A series of glacial maps prepared by Prest (1970, Fig. XII) shows the ice front at a point on the Lake Superior shore, west of the Nipigon River, 140 miles (227 km) from the Cummins site circa 10,800-10, 700 BC. The terrain to the north between Glacial Lake Keweenaw, which occupied the western end of the Superior basin, and Glacial Lake Agassiz to the northwest was unglaciated. This corridor expanded rapidly, the ice receding to the Nipigon River by circa 10,500-10,400 BC, and north and west beyond Dog Lake by circa 10,200 BC. This open northern corridor was slightly reduced by an ice readvance circa 8600 BC. The lower Kaministikwia valley was inundated to Kakabeka Falls by post-Lake Keweenaw circa 10,200 BC. The valley was reglaciated for a short period circa 9800 BC but by circa 9600-9500 BC it was again inundated (Glacial Lake Duluth). This was followed by the rapid retreat of the Superior ice lobe, the formation of Lake Minong in the entire Superior basin between 8300-7500 BC and the swift replacement of the tundra by a spruce forest (Saarnisto 1974).

Burwasser, using Farrand's elevations (1960), recently retraced the Minong strand lines, registered in the Kaministikwia-Thunder Bay area (1977). He identifies strand lines of the

TABLE 1
CUMMINS SITE FREQUENCY OF RECOVERIES

	LU SURFACE		TEST TRENCHES					TOTAL	
BIFACIAL TOOL SERIES		NMM	I	II	III	IV	V	f	%
Projectile points	7	-	-	-			2	9	0.4
Projectile point preform	-	2	-	1			3	6	0.3
Sub total	7	2	-	1	0	0	5	15	0.7
Bifacial knives									
Large, ovate	6	-	-	-	-	-	-	6	0.3
rectangular	5	-	-	-	-	-	-	5	0.2
Small, rectangular	5	-	-	-	-	-	-	5	0.2
Fragments	5	3	1	1	-	-	4	14	0.6
Sub total	21	3	1	1	0	0	4	30	1.3
Bifaces									
Preforms	8	6	1	1	-	-	7	23	1.0
Rejects	5	10	1	-	-	-	8	24	1.0
Fragments	4	43	4	1	5	-	19	76	3.3
Sub total	17	59	6	2	5	0	34	123	5.3
Bifacial Trimmed Flake Knives	8	2	-	-	-	-	9	19	0.8
Drills	3	-	1	-	-	-	2	6	0.3
Bifacial Core Tools	13	9	2	5	2	-	10	41	1.8
Sub total Bifacial Tools	69	75	10	9	7	0	64	234	10.3
UNIFACIAL TOOL SERIES									
Scrapers									
Large - Random	6	5	1	4	-	-	7	23	1.0
Side	5	1	1	1	1	-	3	12	0.5
End	4	3	-	-	-	-	4	11	0.5
Uniface	1	5	1	-	-	-	1	8	0.4
Triangular	2	1	-	-	1	-	-	4	0.2
Small - End	3	2	1	1	-	-	12	19	0.8
Side	1	-	1	-	-	1	7	10	0.4
Triangular	-	1	-	-	-	-	1	2	*x*
Sub total	22	18	5	6	2	1	35	89	3.8
Flake tools with Marginal Retouch									
Flake Knives	4	7	2	4	-	-	5	22	1.0
Spoke-shaves	3	3	1	3	-	-	5	15	0.7
Ridged-backed flakes	2	-	1	2	-	-	3	8	0.4
Gravers	-	1	2	-	-	1	1	5	0.2
Sub total	9	11	6	9	0	1	14	50	2.3
Perforators									
Awl	-	1	-	-	-	-	-	1	*x*
Perforators	-	1	-	2	-	-	1	4	0.2
Sub total Uniface Tools	0	2	0	2	0	0	1	5	0.2
	31	31	11	17	2	2	50	144	6.4
SPALL TOOL SERIES									
Scraping spalls	6	1	-	-	-	-	2	9	0.4
COBBLE TOOL SERIES									
Hammerstones	2	1	-	2	-	-	8	13	0.6
Anvil stones	-	1	-	1	-	-	-	2	*x*
Abrader	-	-	-	-	-	-	1	1	*x*
Paint stone	-	-	-	-	-	-	1	1	*x*
Sub total Cobble Tools	2	2	0	3	0	0	10	17	0.8
CORES									
Unprepared core rejects	6	15	6	56	-	-	9	92	4.0
Unprepared cores	9	18	-	44	-	-	7	78	3.5
Prepared cores	3	3	1	2	-	1	2	12	0.5
Prepared core fragments	-	3	-	4	-	1	4	12	0.5
Taconite pebbles	-	-	-	2	-	-	1	3	0.1
Sub total Cores	18	39	7	108	0	2	23	194	8.6
DEBITAGE									
Core shatter	2	2	-	652	-	-	3	659	29.0
Flakes, shatter	29	2	3	381	-	-	46	461	20.3
parallel	11	-	-	65	-	1	11	88	3.8
utilized	1	2	2	43	-	1	20	69	3.0
cortex	21	9	4	195	1	-	10	240	10.5
thinning	11	-	3	47	1	-	11	73	3.2
expanding	15	1	-	59	-	-	2	77	3.4
Sub total Debitage	90	16	12	1442	2	2	103	1667	73.2
TOTAL RECOVERIES	216	164	40	1579	11	6	252	2268	97.7

early post-Minong stage in the immediate vicinity of the Cummins site at an elevation between 233 and 245 m (765 ft and 805 ft) a.s.l. Recoveries from the Cummins site came from sands immediately below a thin layer of humus indicating that they were deposited about the time of the deposition of the beach sands. The beach is registered at 231 to 233 m a.s.l., thus the occupation dates to the early post-Minong Lake stage. This would place the occupation at circa 7000 BC.

LITHIC TECHNOLOGY

The basic material used was taconite, a silicious iron formation of the Lake Superior basin. This granular variety silica consists of chert or jasper with hematite, magnetite, siderite and hydrous iron silicates (Leet & Judson 1961; Moorhouse 1959). While jasper taconite (red) dominated, green, grey and black taconite were also utilized. The variations in the inclusions resulted in unwanted fractures and hence considerable spoilage. Minor utilization was also made of chert (Gunflint), slate (silicious mudstone), quartz and Hudson Bay Lowland flint which are also present in the region and Knifelake siltstone from the Quetico area to the west (Fox 1980a).

The location of the site adjacent to a red (jasper) taconite outcrop provided an abundance of raw material. This placed little if any limitation on the core techniques used, hence a number of techniques are evident. The most common cores are blockey vein plates. These produced an abundance of irregular and shattered flakes. Thick bifacial prepared cores are also common. Most have extensive abrasions along the long axis which provided a series of striking platforms. Well controlled blades resulted which were suited for tool preforms. The process of flake production produces flakes with bifacial striking platforms. Prepared polyhedral cores which produce true blades are virtually absent. The situation appears to be similar to the Sheguiandah quartzite quarry site on Manitoulin Island were several thousand such cores were recovered from the Palaeo-Indian levels of the site (Lee 1953, 1954, 1955, 1957).

Flakes suggest the use of percussion with variation of form resulting from the angle of impact, the form of impactor and the intensity of the blow. Preparation of blades probably also required the use of punch techniques and pressure flaking for sharpening and trimming of margins of small tools. The manufacturing techniques correspond to those seen at the Debert site, Minas Basin region Nova Scotia (MacDonald 1968). There is also sparse evidence for limited use of bipolar percussion associated with pebble cores of non-taconite material. Regrettably, the collection was unsuited for mico-wear analysis, the surface recoveries having been exposed to natural abrasion while the in situ recoveries suffered post-excavation damage. Only future studies of recoveries from primary contexts could be confidently given archaeological significance.

EXCAVATION

Test trenches were opened in areas which appeared to have a minimum of surface disturbance. A total of $22m^2$ (775 ft^2) were excavated horizontally to subsoil. Test Trenches I, II and V were opened in the habitation area along the 233 m (765 ft a.s.l.) beach ridge and Test Trenches III and IV were opened in the quarry area at the 240 m (800 ft) elevation (Fig. 2).

The stratigraphic situation corresponds to that at the Brohm Plano site on the southeast side of Thunder Bay (MacNeish 1952:25) were cultural refuse occurred in beachsands immediately below the humus. At the Cummins site a narrow stratigraphic horizon 51 to 102 mm (2 to 4 in) defined by the concentration of debitage occurred immediately below a

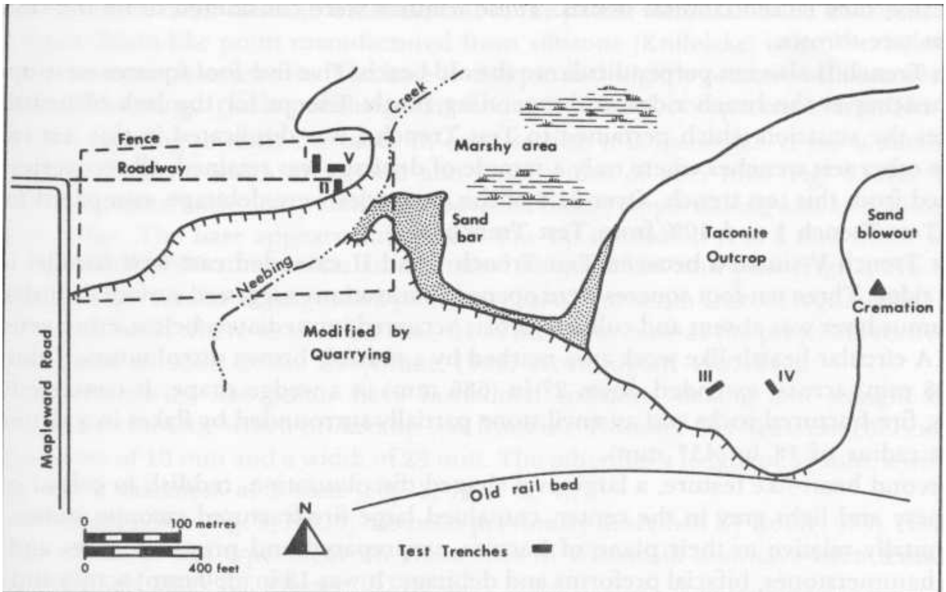


Fig. 2. Cummins site.

thin veneer of humus. Any debitage which did occur at a lower level was associated with features.

Many agents of disturbance have been active in the deposit over the thousands of years following occupation - seasonal frost action and disturbances due to vegetation (root action and tree-throws) and faunal (animal and insect) burrows have broken up much of the close associations between artifacts and have blurred the outlines of cultural features. Reddish-brown to grey soil discolouration suggestive of remnant hearth features were recorded as well as a number of intrusive noncultural features. More recently timber cutting has disturbed the surface. The present forest cover is sparse second growth, comprised of willows, alders, spruce, pine, poplar and birch, but the most devastating factor has been recent bulldozing in search of gravel.

Test Trench I extended north/south perpendicular to the relic beach ridge. Twelve five-foot squares were opened commencing at a point approximately 30.5 m (100 ft) back of the ridge. The beach appears to have formed part of a small south facing embayment. Below a 2 in (51 mm) level of humus, cultural refuse occurred in a concentrated 4 in (102 mm) layer. Flake debitage tended to occur in zonal concentrations associated with preform rejects broken during initial flaking.

Two cultural features were recorded. One which appears to have been a hearth consisted of a circular concentration of small fire fractured rocks roughly 18 in (457 mm) across commencing about 2 in (51 mm) below the surface and extending down 6 to 8 in (152-203 mm). The interior was grey in colour. The second consisted of a reddish discolouration roughly 2 ft (610 mm) in diameter which occurred approximately 6 in (152 mm) below the surface and extended down gradually to a maximum depth of 23 in (584 mm). It contained a sparse amount of debitage and was considered a possible hearth pit for heating taconite prior to flaking.

There were also irregular brown soil discolourations associated with a line of sandy gravel deposits which extended down 15 to 17 in (371-431 mm). Except for a few sporadic recoveries, they lacked cultural debris. These features were considered to be the result of ancient tree-throws.

Test Trench II also ran perpendicular to the old beach. Five five-foot squares were opened commencing at the beach ridge and extending north. Except for the lack of hearth-like features the situation which pertained to Test Trench I was duplicated in this test trench. Unlike other test trenches where only a sample of debitage was retained, all recoveries were retained from this test trench. Over 91% of the recoveries were debitage, compared to 30% from Test Trench I and **40%** from Test Trench V.

Test Trench V situated between Test Trench I and II extended east-west parallel to the beach ridge. Three ten-foot squares were opened. Excavations suggested surface disturbances: the humus layer was absent and cultural debris occurred immediately below a thin veneer of grass. A circular hearth-like work area marked by a reddish-brown discolouration about 20 in (508 mm) across, extended down 27 in (686 mm) in a wedge shape. It contained flake debris, fire-fractured rocks and an anvil stone partially surrounded by flakes in a semi-circle with a radius of 18 in (457 mm).

A second heart-like feature, a large oval shaped discolouration, reddish in colour on the periphery and light grey in the center, contained large fire-fractured taconite stones lying horizontally relative to their plane of fracture, unprepared and prepared cores and core tools, hammerstones, bifacial preforms and debitage. It was 13 in (330 mm) across and 12 in (305 mm) deep.

A third cultural feature, roughly circular, grey in colour, 13 in (330 mm) across and 29 in (737 mm) deep, contained large taconite blocks, plus several burnt siltstones around the periphery of the feature. Debitage was lacking. The feature appeared to be a raw material cache.

In addition, there were four other features, wedge to cone shape in vertical outline, ranging from 18 to 22 in *(457-559* mm) across at the top and extending down 16 to 24 in (406-610 mm). They were reddish discolourations containing debitage. Their colour and shape suggest fire-pit features.

Test Trench III and IV were opened in the extraction and quarrying area, located approximately 1000 ft (305 m) to the southeast, across a former beach strand which formed an embayment for a marshy lake area which existed at the time of occupation to the east of the living and work area (Phillips 1982). Spruce wood recovered from the bottom of the large vein plates extended down 6 to 8 in (152-203 mm) to bed rock. The surface appeared a ten-foot square while Test Trench IV was three five-foot squares. Rock rubble consisting of arge vein plates extended down 6 to 8 in (152-203 mm) to bed rock. The surface appeared to have been disturbed by bulldozer action. A number of tools and retouched flakes were recovered indicating that some lithics were fashioned at the quarry. From a sandblow on the east side of the outcrop, disturbed remnants of a cremation burial were recovered. They represent the earliest recorded burial in Ontario, having been carbon dated at 8480 ± 390 BP (J.V. Wright, personal communication).

RECOVERIES

BIFACIAL TOOLS

Projectile Points (9)

The collection consists of 9 projectile points. Two have Agate Basin morphological traits and 2 Plainsview morphological traits. One is a Minoqua point, 1 an early side-notched point, 1 a triangular point, 1 a small lanceolate point and 1 is a tip fragment. The lanceolate point and tip fragment were manufactured from Gunflint, one of the Agate Basin-like points was manufactured from siltstone while the rest of the points were fashioned out of taconite.

The Agate Basin-like point manufactured from siltstone (Knifelake) is broken below the tip. The break resembles a burin. The base is oblique and slightly concave with one residual ear and basal thinning. It lacks polishing. The flaking is parallel, oblique transverse. The sides are parallel, tapering towards the base. In cross-section it is lenticular. It has a maximum thickness of 7 mm, a width of 27 mm and basal width of 20.5 mm (Fig. 3, No. 2).

The second Agate Basin-like point, has a bevelled blade, ripple flaking and a scraping face along one edge. The base appears unfinished. The tip is broken. It is 8 mm thick, with a maximum width of 26 mm. It has an estimated length of 90 mm plus (Fig. 3, No. 1).

Both points are similar to Angostura points typical of the South Dakota region some 1200 km to the southwest where in situ charcoal, from the same zone as the projectile recoveries, has been dated at 9380 ± 500 BP (Crane 1956; Wormington 1957:140).

The two Plainsview-like points have horizontal collateral flaking and straight bases. Grinding is absent. One with a broken tip was from the Thunder Bay Museum collection. It has a thickness of 10 mm and a width of 29 mm. The other has a length of 59 mm, a width of 30 mm and a thickness of 9 mm (Fig. 3, Nos. 3, 4).

The Minoqua point (Fig. 3, No. 5) has been previously described by Ross (1979). Notched projectile points of this type occur on Plano sites in Wisconsin and have been tentatively dated at 6000 to 5000 BC (Salzer 1974:45).

The side notched projectile point has a broken tip and base (Fig. 3, No. 6). Maximum shoulder width is 23.4 mm, the notch width is 6.1 mm and the depth is 4.8 mm. It had a maximum thickness of 6.8 mm and an estimated length of 37 mm. It appears to fall into the category Gryba classified as post-Palaeo from the early Plains Archaic period which he sees as predating the Boreal Forest Shield Archaic (1980:62). From the Upper Great Lakes region, side notched points, together with Plano points, have been recovered in association at the Sheguindah quarry site and the George Lake sites on the north shore of Lake Huron (Fitting 1970). While conclusive evidence of evolvement is absent, the situation supports the argument for the development of the Archaic out of the Plano tradition.

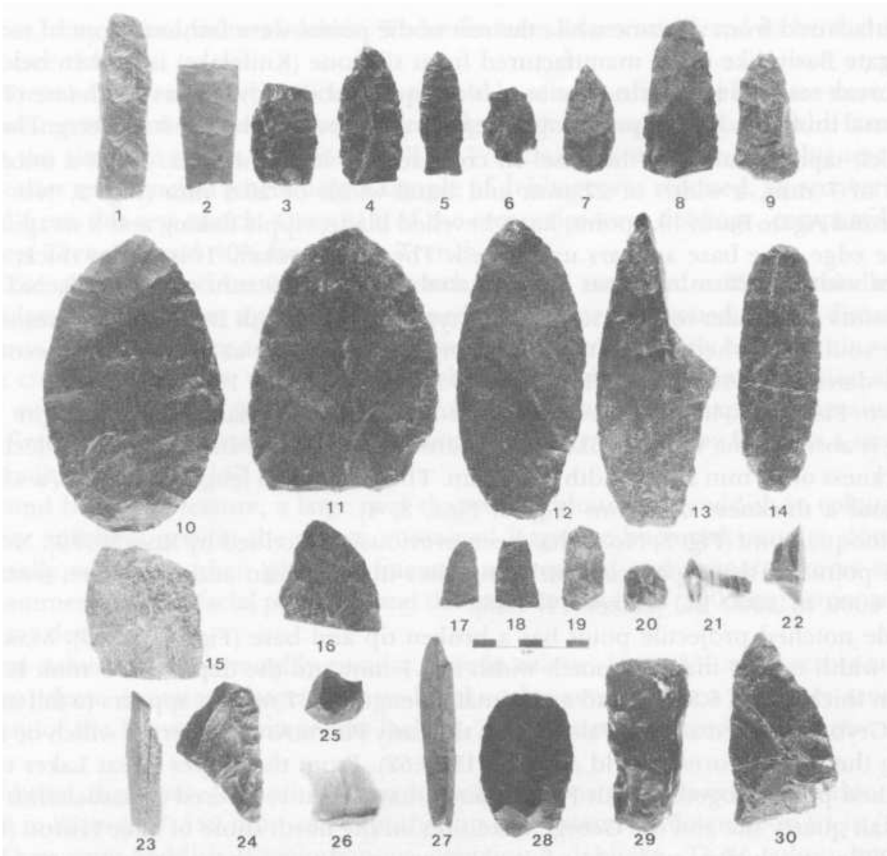
The lanceolate point was a small biconvex point, 23mm wide and 6.7 mm thick, with a broken tip. It had crude facial flaking, a straight base and parallel margins. The point was recovered together with a broken tip fragment from Test Trench V. These were the only point recoveries from the excavation.

The final specimen is a fire-fractured triangular point which is biconvex in cross-section with lateral grinding. It is from the Thunder Bay Museum collection. The convex base has not been thinned. It has a length of 48 mm, a width of 25 mm and a thickness of 7 mm (Fig. 3, No. 7). The point is one of a group of taconite points recorded by Wright in the Cummins collection (1963).

Wright recorded 5 other points in the Cummins collection. These were not located: a Plainsview point with ripple flaking, biconvex in cross-section with marked lateral grinding, a base width of 25 mm, a maximum thickness of 6 mm and a broken tip. A Milnesand point, also with a broken tip, had a bevelled blade, a scraping face along one edge, ripple flaking, biconvex cross-section, a base width of 23 mm and a thickness of 7 mm. The others were not typed. All have ripple flaking, 2 are plano convex and 1 is biconvex in cross-section. One has a lateral edge grinding, 1 has a bevelled blade and 1 has a scraping edge. All appear to fall within the late Plano period types; like other recoveries, oblique parallel collateral flaking ranges from fine to crude and even irregular flaking patterns.

Projectile Point Preforms (6)

There are 6 lanceolate recoveries with extensive bifacial flaking which were classed as



Fir 3 **Projectile points** bifaces and scrapers

	Projectile Point, Agate Basin-Like	TBMS	972-229-994C	S
2.	Projectile Point, Agate Basin-Like Tip Broken	LU	81-1	S
3.	Projectile Point, Plainsview-Like Tip Broken	LU	81-3	S
4.	Projectile Point, Plainsview-Like	TBMS	979-229-379A	S
5.	Projectile Point, Minoqua	LU	81-2	S
6.	Projectile Point Side Notched, Tip Broken	LU	81-4	S
7.	Projectile Point Triangular, Fire Fractured Face	TBMS	979-229-379A	S
8.	Projectile Point Preform	NMM	92	S
9.	Projectile Point Preform	NMM	153.	TTV-Sq.1,12"
10.	Large Bifacial Knife, Ovate Rounded Base, Taconite	LU	81-7	S
11.	Large Bifacial Knife, Ovate Straight Base, Taconite	TBHS	972-198-37C	S
12.	Large Bifacial Knife, Retangular Rounded Base	TBHS	972-229-392B	S
13.	Large Bifacial Knife, Rectangular Straight Base, Broken Edge & Tip	LU	81-10	S
14.	Small Bifacial Knife, Rectangular Rounded Base	TBHS	972-229-394D/F	S
15.	Bifacially Trimmed Flake Knife	LU	81-35	S
16.	Bifacially Trimmed Flake Knife	LU	81-32	S

	Drill	LU	81-5	S
18.	Drill Fragment	LU	81-6	S
19.	Drill	LU	81-203	S
20.	Small End Scraper	LU	81-76	S
21.	Small Triangular Scraper with Graver Spur	NMM	139	TTV-Sq.1
22.	Small Side Scraper	NMM	185	TTV-Sq.2
23.	Perforator	NMM	163	TTV-Sq.1
24.	Random Flake Knife	LU	81-22	S
25.	Graver	NMM	163	TTV-Sq.1
26.	Spoke Shave	NMM	201	TTV-Sq.2
27.	Ridged-Backed Falke	NMM	163	TTV-Sq.1
28.	Large Side Scraper	LU	81-86	S
29.	Large End Scraper	LU	81-75	S
30.	Large Triangular Margin Scraper	LU	81-71	S

projectile point preforms, as distinct from bifacial preforms. Three were from Test Trench V, 2 were from the surface (Fig. 3, No. 8) and 1 was from Test Trench I (Fig. 3, No. 9). They are Plainsview in form with crude minor ripple flaking and straight bases. Only 2 were complete; they have a length of 56 mm and 68 mm, a width of 27 mm and 34 mm, a thickness of 9.9 mm and 12.5 mm and a weight of 15 gm and 29 gm.

Bifacial Knives (30)

There are 30 examples of bifacial knives (MacDonald 1968) of which 14 are fragments which could not be classified. The remaining 16, all from the surface, were divided on the basis of size, form and technological features into Large Biface Knives (11) and Small Biface Knives (5). Nine are from the Thunder Bay Museum collection. Metrical attributes are given in Table 2.

Small Bifacial Knives (5)

The 5 recoveries of this type are essentially the same as the large variety except they are smaller and narrower (Fig. 3, No. 14). All are of the rectilinear variety. Rarely do broad thinning flakes completely cover the faces of the flakes. Most show transverse flaking of the parallel oblique variety, fine to crudely executed. They are lenticular in cross-sections. In 1 case one side is collaterally flaked while the reverse side in transversely flaked. Pressure flaked working edges are limited to those with broad thinning facial scars. They resemble projectile points but are larger in size. Two have rounded bases and 3 have straight base.

Large Bifacial Knives (11)

There are 11 examples of this type. Their size suggests that they were made on biface preform cores rather than flakes. Both faces are generally completely covered with broad thin expanding flake scars with diffuse bulbs of percussion, suggesting thinning by soft hammer techniques (MacDonald 1968:68). No cortex remains on any of the specimens. Evidence of edge polishing or use is sparse. All are pointed at one end and rounded or straight at the other end. Most have a small notch-like indentation at the blunt end but corresponding polishing on the opposite margin and on the intervening facial areas, which would be suggestive of hafting, is lacking. Eight were fashioned out of jasper taconite, 2 of Knifelake silstone and 1 of silicous mudstone. There are 2 distinct varieties based on form, ovate (6) and rectalinear (5).

Large Ovate Knives (6)

Of the 6 recoveries, 3 have a rounded base (Fig. 3, No. 10) and 3 have a straight to oblique base (Fig. 3, No. 11). One rounded base subvariety was made from silicous mudstone and 1 straight base variety was made from Knifelake silstone. The rounded base variety has fine parallel pressure flaking along the entire length of their margins on both faces producing an edge that is regular in outline and straight in cross-section. Only 1 straight base variety has fine parallel pressure flaking along the entire length of both margins. The others have only sporadic parallel pressure flaking on the edge margins and in 1 case on only one face.

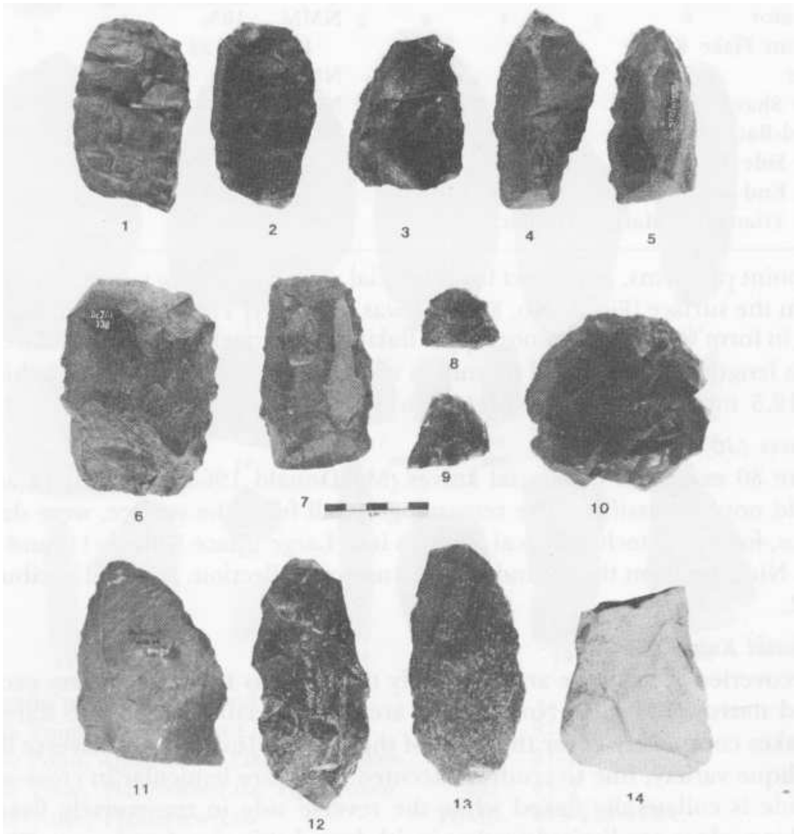


Fig. 4. Core tools and preforms

1.	Bifacial Core Tool Tabular	LU	81-92	S
2.	Bifacial Core Tool Tabular	LU	81-93	S
3.	Bifacial Core Tool Random	LU	81-70	S
4.	Bifacial Core Tool Trihedral	LU	81-27	S
5.	Bifacial Core Tool Trihedral Adze	NMM	216	TTV-Sq.3
6.	Bifacial Core Tool Trihedral Adze	NMM	238	S
7.	Bifacial Core Tool Trihedral Adze	NMM	238	S
8.	Bifacial Core Tool Exhausted Core Scraper, Gunflint	LU	81-111	S
9.	Bifacial Core Tool Exhausted Core Scraper, Gunflint	LU	81-112	S
10.	Spall Tool Semi Lunar Scraping Spall	LU	81-95	S
11.	Boulder Spall Converging Margin Siltstone	LU	81-87	S
12.	Biface Preform	LU	81-37	S
13.	Biface Preform	NMM	199	TTV-Sq.2
14.	Uniface Scraper Large	LU	81	S

Large Rectilinear Knives (5)

Of the 5 recoveries, 3 have a rounded base (Fig. 3, No. 12) and 2 have a straight base. On this variety the original sinuous edge is rarely retouched. One of the rounded base variety was made of silicous mudstone. The 2 straight base recoveries are broken diagonally from the point along a line of natural cleavage (Fig. 3, No. 13).

B facial Preforms (123)

There were 123 bifacial taconite preforms; 76 fragments, 24 rejects and 23 complete (Fig. 4, Nos. 12 & 13). Of the total, 47 (38.2%) were from test trenches. Fragments were edges 26, bases 29, tips 16 and mid-sections 5. Their weights ranged from 8 to 223 gm with a mean of 79 gm. Rejects were incomplete preforms, broken along a fracture plane. Nine had broken tips, 8 had broken edges, 4 had broken tips and edges and 2 had broken bases. Their weights ranged from 32 to 348 gm with a mean of 119 gm. One was a trihedral adze form.

The 23 complete biface preforms are ovoid in outline with rough irregular facial and edge flake scars. Platform edge preparation is occasionally evidenced by striations running across the biface edge. They have been divided into three varieties: small, less than 100 mm in length (11), large, greater than 100 mm in length (9) and trihedral forms (3). Six of the small preforms had straight bases, 4 with rounded tips and 2 with pointed tips; 5 had rounded bases, 3 with rounded tips and 2 with pointed tips. Seven of the large preforms had rounded bases, 6 with pointed tips and 1 with a rounded tip; 2 had straight bases and rounded tips; 4 were notched on one side. The 3 trihedral adze-like preforms had straight bevelled ends, roughly pointed poles and parallel sides. Metrical attributes are given in Table 2.

Bifacially Trimmed Flake Knives (19)

There were 19 recoveries of this type of taconite flake tool (Fig. 3, Nos. 15 & 16). Nine came from the excavations. They are prepared on small preforms to which bifacial edge retouching has been applied to produce a cutting edge. The retouching has been applied to produce a cutting edge. The retouching and surface flaking is less extensive than in bifacial knives and form adheres to the individual preforms. Eleven were rectangular, 5 were triangular and 3 were ovoid. The bifacial cutting edges are usually on the longest margins. Twelve had two cutting margins, 5 had one and 2 had three. Thirty of the margins were straight and 5 were convex. They range from 15 mm to 78 mm in length with a mean of **45** mm. Similar tools recovered at the Debert Site are considered by MacDonald (1968:47) to be temporary tools intended for slicing and cutting. Metrical attributes are shown in Table 2. *Drills (6)*

There were 6 drills, 3 from the surface and 3 from excavations. One was manufactured from Knifelake siltstone, the others were taconite. Four are small thin flake drills, lenticular in cross-section, except for the siltstone recovery which was plano-triangular. Tips are rounded, apparently from use-wear, bases appear broken at right angles to the lateral margins. They have bifacial marginal retouching and minimal facial flaking. Two from excavations have large broad bases. One had a retouched concave base 23 mm in width. The other has a straight unretouched base 34 mm in width. Both are asymmetrically bitriangular with facial and marginal retouching and pointed tips. Metrical attributes are shown in Table 2 (Fig. 3, Nos. 17, 18, 19).

Bifacial Core Tools (41)

There were 41 recoveries classed as bifacial core tools. These tools may or may not have been cores originally. They may simply represent discarded blocks, large flakes or preforms which have been bifacially fashioned and subsequently retouched to produce large, heavy cutting or scraping edges. Most have a natural fracture plane opposite the apparent working face. Others are blunted. They exhibit minor use-wear, battering and crushing and minor

TABLE 2
BIFACE: DISCRETE AND METRICAL ATTRIBUTES

	f	Dim.	Max.	Min.	Mean
Large Bifacial Knives Ovate Rounded Base	3	L	132	129	130
		W	78	64	71
		Th	15	12	13
		Wt	158	130	144
Ovate Straight Base	3	L	116	110	110
		W	82	73	78
		Th	14	11	12
		Wt	144	112	127
Rectilinear Rounded Base	3	L	119	94	109
		W	52	47	50
		Th	14	10	12
		Wt	97	55	82
Rectilinear Straight Base	2	L	136	110	123
		W	54	50	52
		Th	14	14	14
		Wt	113	90	101
Small Bifacial Knives Rectilinear Rounded Base	2	L	106	100	103
		W	33	32	32
		Th	70	110	90
		Wt	34	34	34
Rectilinear Straight Base	3	L	81	60	70
		W	44	29	38
		Th	13	9	10
		Wt.	51	19	32
Preforms Small	11	1	99	68	85
		W	70	26	47
		Th	35	10	21
		Wt	162	24	93
Large	9	L	156	103	121
		W	71	39	56
		Th	31	15	23
		Wt	266	92	156
Trihedral	3	L	107	82	93
		W	53	35	43
		Th	39	19	27
		Wt	240	66	132
Bifacial Trimmed Flake Knives	19	L	86	35	57
		W	58	23	38
		Th	18	7	30
		Wt	70	7	30
Drills - small	4	L	77	66	72
		W	38	21	30
		Th	13	8	11
		Wt	34	13	23
- large	2	L	38	29	33
		W	19	17	13
		Th	6	8	6
		Wt	5	6	6
Bifacial Core Tools - tabular	16	L	113	40	84
		W	72	34	49
		Th	25	15	21
		at	167	51	113
- random	14	L	117	64	87
		W	70	60	61
		Th	27	12	20
		Wt	178	71	114
- trihedral	8	L	113	40	84
		W	72	34	49
		Th	25	15	21
		Wt	167	51	113
- exhausted	2	L	45	29	37
		W	43	29	36
		Th	14	12	13
		Wt	20	20	20

L - Length; W - width; Th. - Maximum Thickness Dem.); Wt. - weight (gm..)

retouching, often bifacial. Two have graver spurs and 2 have gouged margins. Nineteen (46%) were from test trenches. Metrical attributes are shown in Table 2.

They are tabular (16) (Fig. 4, Nos 1,2), random (14) (Fig. No. 3), trihedral (8) (Fig. 4, Nos. 4, 5, 6, 7), and miscellaneous (3) in form. The scraping margins of the tabular variety range from 34 mm to 89 mm with a mean of 63 mm; the random range from 37 mm to 110 mm with a mean of 61 mm; and the trihedral range from 24 mm to 54 mm with a mean of 42 mm. Except for the miscellaneous variety they correspond to core scrapers described by Wright for the early Shield Archaic period (1972b:26). One was siltstone and the balance were taconite. The trihedral variety exhibit bevelled bit ends, and blunted, lateral margins. They appear to have been crude adzes similar in form to the early Shield Archaic recoveries in the region (Fox 1980b). Of the miscellaneous variety, 2 are exhausted Gunflint core scrapers (Fig. 4, Nos. 8,9) while the other appears to have been a taconite celt bit fragment. The latter has a width of 60 mm, a thickness of 13 mm and a convex bit end crudely bifacially retouched and crushed.

TABLE 3
SCRAPERS: DISCRETE AND METRICAL ATTRIBUTES

Variety	f		Flake			Major Scraping			Form			# of Margins		
		Dim.	Max.	Min.	Mean	Max.	Min.	Mean	St	cv	cc	1	2	3
Large-random	23	L	98	31	71	75	16	49	13	9	1	18	4	1
		W/Th	71	23	46	8.7	2.0	4.0						
		Th/Ang.	27.0	9.5	18.2	80	42	62						
		Wt.	100	12	65									
-Side	12	L	66	^{3}5	44	61	20	29	9	3	0	10	1	1
		W/Th	45	2^{3}	28	8.0	1.^{3}	2.7						
		Th/Ang.	15.0	7.0	9.3	87	39	51						
		Wt.	28	10	14									
-End	11	L	76	35	54	46	22	33	2	9	0	6	3	2
		W/Th	52	29	37	10.0	2.0	4.6						
		Th/Ang.	21.3	7.2	12.9	90	48	64						
		Wt.	82	11	^{3}4									
-Uniface	8	L	103	71	84	83	^{3}4	65	5	3	0	4	2	2
		W/Th	81	51	62	7.0	3.0	4.2						
		Th/Ang.	29.2	11.5	18.6	8^{3}	36	57						
		Wt.	151	59	102									
-Triangular	4	L	78	45	^{33}	59	19	^{3}5	3	1	0	1	3	0
		W/Th	41	25	33	^{3}.6	1.5	2.3						
		Th/Ang.	19.0	8.0	10.6	64	51	57						
		Wt.	119	11	55									
Small-	18	L	40	15	26	^{3}0	12	20	3	15	0	4	5	9
		W/Th	^{3}2	12	22	7.0	2.0	^{3}.5						
		Th/Ang.	10.2	^{3}.8	7.0	90	32	72						
		Wt.	8	1	4.6									
-Side	10	L	53	19	^{3}7	42	11	2^{3}	9	1	0	7	3	0
		W/Th	^{3}0	10	21	2.5	1.5	1.4						
		Th/Ang.	9.5	2.^{3}	5.4	63	^{3}8	5^{3}						
		Wt.	9	1	5.5									
-Triangular	2	L	5^{3}	29	41	25	23	24	2	0	0	0	2	0
		W/Th	25	20	22	1.5	1.^{3}	1.4						
		Th/Ang.	3.^{3}	6.0	4.6	42	30	36						
		Wt.	8	2	5									

L-Length, W-Width, Th-Maximum thickness (mm.), Angle Scraping Degrees ± 5 Wt-Weight (gm.), St-straight, Cv-convex, Cc-Concave

UNIFACIAL TOOLS

Scrapers (89)

There were 89 scrapers. They have been separated into two major categories: large over 10 gm (58 or 65%) and small under 10 gm (31 or 35%). The majority *49 (55%)* were from **excavations.** A few are fragmentary but all could be subdivided into distinct varieties: side scrapers, random scrapers, triangular scrapers, end scrapers and uniface blade scrapers. Their metrical and form attributes are given in Table 3.

Excluding the uniface blade variety, the scrapers can be classified under Irwin and Wormington's Plains Paleo-Indian types (1970), as 51 side scrapers and 29 end scrapers. The side scrapers are represented by 31 single, 19 double-edged and embrace all varieties, including 3 raclettes and two which could be classed as denticulates. End scrapers embrace the **3** major groups, triangular, large specialized and generalized including beaked, acute and bit varieties.

Large Scrapers (58)

The following varieties of large scrapers were present, random 23 (39.6%), side 12 (20.7%), end 11 (18.9%), uniface 8 (13.8%) and triangular 4 (6.8%).

Random Scraper (23)

These are large irregular taconite flakes lacking specific form which have been modified into scrapers with straight or convex margins. Minor bifacial retouching, and crude, rip-retouching is occasionally present. Over half *(55.5%)* are cortex flakes. One has a base notch and 1 a graver spur. Five have secondary scraping margins. These range from 7 to 63 mm in length with a mean of 32 mm, and have a mean height of 4.2 mm and mean angle of 64°±5°. Their scraping face configurations consist of convex (2), straight (2) and irregular (1).

Side Scrapers (12)

These are rectangular flakes smaller in size than the irregular variety which have been . modified along one straight to roughly convex margin (Fig. 3, No. 28). One was produced from a Knifelake siltstone flake, the others from taconite. One had a broken scraping margin, 1 had crude flaking like a preform and 1 ridged-backed form had a graver spur. Minor rip-retouching and ventral retouching was occasionally present. Three had a secondary scraping margin. These ranged from 22 to 55 mm in length with a mean of 36 mm, a mean height of 2.0 mm and a mean angle of 69°±5°.

End Scrapers (11)

These scrapers have a steep retouched margin (Fig. 3, No. 29). Six had one margin retouched. Lateral margins on 2 were crushed and 1 had extensive use-wear. Two had ventral retouching on one lateral margin. Retouched lateral margins ranged from 24 to 42 mm in length with a mean of 32 mm; a mean height of 2.6 mm and a mean angle of 48°±5°. Junctions with the distal dorsal margins were rounded.

Uniface Blade Scrapers (8)

These are uniface blades with edges modified to produce scraping faces which distinguish them from uniface blades (Wright 1972b:19) (Fig. 4, No. 14). They are ovoid in form and have a scraping face running along one edge and a portion of the other edges. The secondary margins range from 50 to 93 mm with a mean angle of 73°±5°. Most have ventral thinning and minor crushing and/or rip-retouching.

Triangular (4)

These scrapers generally have 2 scraping faces along edges which converge. Primary margins are staight while secondary margins have a straight to convex configuration, the latter range from 23 to 36 mm in length with a mean of 30 mm, a mean height of 2.4 mm and a mean angle of 50°±5°. One had rip-retouching and 1 had a graver spur (Fig. 3, No. 30).

Small Scrapers (31)

The following variety of small scrapers were present: end 19 (61.3%), side 10 (32.2%) and triangular 2 (6.4%), as described below.

End Scrapers (19)

These scrapers have a steep retouched distal dorsal margin (Fig. 3, No. 20). They were produced from taconite (10), Hudson Bay flint (7) Gunflint (2). Lateral margins are retouched or show use-wear. One had the reverse lateral margin retouched and 1 had a crushed or broken, lateral margin. Except for 1 which was concave these margins were straight. The right dorsal margin lengths ranged from 11 to 28 mm with a mean of 18 mm, and had a mean height of 1.9 mm and a mean angle of 60°±5°. The left distal dorsal margin lengths ranged from 11 to 29 mm with a mean of 19 mm, and had a mean height of 1.8 mm and a mean angle of 65°±5°. There were 12 right-angle junctions with the distal dorsal margins and 9 rounded junctions. Two had graver spurs at the junctions.

Side Scrapers (10)

These are small rectangular flake scrapers with one or more retouched margins (Fig. 3, No. 22). Four were produced from Gunflint and the rest were taconite. One with a notched base had rip-retouching. One had use wear only. Three with secondary margin retouching had a mean length of 22 mm, a mean height of 1.7 mm and a mean angle of 51° ± 5°. Three were raclette variety (Irwin & Wormington 1970).

Triangular (2)

There were only 2 examples of the variety with converging straight retouch margins (Fig. 3, No. 21). Secondary margins ranged from 15 to 21 mm in length, 0.5 to 1.5 mm in height and 47° to 57° in angle. One had ventral retouching and rip-touching and the other had a graver spur at the junction.

Flake Tools with Marginal Retouch (50)

Flake tools have been classified as flake knives (22), spokeshave (notched) (15), ridged-backed flakes (8) and gravers (spurs) (5). The grouping has been used for convenience to classify recoveries with minor modifications to flakes (MacDonald 1968:180). They have slight marginal retouching, lack indications for halfing and are readily available from the debitage. Over half 60% (30) were recovered from the excavations. Except for spokeshaves, thinness of the flake is advantageous in providing a sharp, easily retouched edge. Two spokeshaves were Gunflint while the balance of the recoveries were taconite. Their metrical attributes are shown in Table 4.

Flake-Knives (22)

These are thin flakes selected for their sharp edges and modified by use and minor retouching (Fig. 3, No. 24). They are the most rudimentary of the simple flake tools with marginal retouch. Scraping edge configurations are straight (15) and convex (6) and concave (I). Two had a second margin retouched, 6 showed secondary margin use-wear, 4 were bifacially retouched along one margin, 1 had a crushed margin and 1 had a rip-retouched margin and 2 were denticular.

Spoke shaves (15)

These are marginally retouched flake tools with one or more concave working edges (Fig. 3, No. 26). The concavities range from 7 to 15 mm in length with a mean of 10 mm and a depth from 2 to 9 mm with a mean of 4 mm. Only one had a secondary concavity. Three had a retouched margin, the mean length was 53 mm, the mean height of the margin was 3.8 mm and the mean angle was 51 ° ± 5°. Two had graver spurs, 1 was bifacially edge retouched, 1 had reverse margin use-wear and 1 had a crushed margin.

Ridged-backed flakes (8)

These were elongated flakes with a thick ridge along one margin and minimum use, shear retouch or pressure retouch along the thin margin (Fig. 3, No. 27). They are subtriangular in cross-section. Two had a distinct pressure flaked margin and 1 had minor ventral retouching.

Gravers (5)

This tool has small spurs or gravers worked on the margin of a broad thin flake of irregular outline (Fig. 3, No. 25). The spurs are finely retouched peaks. One with multiple spurs had one spur which exhibited extensive use-wear. It may have been a cornet-like variety with an original longer central peak. Two have lateral margins which exhibit use-wear, one of which was also pressure flaked and could be classed as a beak (Irwin and Wormington 1970). Another has an elongated spur with a flattened tip that has been called a chisel graver (Irwin and Wormington 1970; Fig. 2, No. 32).

Perforating tools (5)

Two types of unifacial perforating tools were recovered, perforators (4) and an awl. One recovery was made of Gunflint. Metrics are shown in Table 4 and these pieces described below.

Perforators (4)

These marginally retouched-flaked tools were made on contracting flakes with striking platforms at the base. Edge retouch is minimal but evidence of wear on the tips is heavy. One was produced from chert (Gunflint), the rest were taconite. All have straight bases and are roughly plano-triangular in cross-section (Fig. 3, No. 23).

Awl (1)

This was a broken tip fragment with parallel steep retouched sides and fine retouching at the tip.

TABLE 4
MARGINAL RETOUCH TOOLS: METRICAL ATTRIBUTES

		Length (mm)		Width (mm)		Thickness (mm)		Weight (gm)	
Variety	f	Range	Mean	Range	Mean	Range	Mean	Range	Mean
Flake Knives	22	40-120	62	24-83	41	5.3-23.0	13.3	15-17	39
Spoke Shaves	15	32-72	49	18-49	35	1.0-27.0	11.0	3-83	27
Ridged-backed flakes	8	47-90	67	15-35	23	7.5-19.3	11.3	8-41	16
Gravers	5	24-53	38	23-28	25	7.3-13.7	9.9	5-23	11
Perforators	4	25-72	54	15-50	25	6.4-11.5	8.4	2-34	14

SPALL TOOLS (9)

These are larger flakes struck from blocks with little or no modification after removal (Fig. 3, Nos. 10,11). They are tabular to semi-lunar in form. Margins exhibit crushing, nicking and occasional retouching on one or more margins. Two were produced from siltstone, the others from taconite. Three of these spall scrapers have minor massive retouch scars and crushed edges suggesting their use as spall choppers. Three came from the surface, the balance were from excavations. Metrics are as follows: length, range 81-115 mm, mean 97 mm; width, range 57-92 mm, mean 77 mm; thickness, 14-44 mm, mean 28 mm and weight 62-400 gm, mean 244 gm.

Fig. 5. Cores and hammerstones

1.	Unprepared Core Small Vein Plate	NMM	116	TT11
2.	Linear Hammerstone Sandstone	NMM	190	TTV-Sq.2
3.	Linear Abrader Silstone	NMM	160	TTV-Sq. 1
4.	Prepared Core Anvil Stone Taconite	NMM	238	S
5.	Circular Granitic Hammerstone	NM M	164	TTV-Sq.1
6.	Linear Hammerstone Sandstone	NMM	126	T T I I -Sq.3
7.	Unprepared Core Large Vein Plate	LU	81-100	S
8.	Prepared Core Biface	LU	81-34	S

***COBBLE** TOOLS (17)*

These are heavy tools with specialized functions and form. They all show extensive use-wear with hammering and polished surface. They have been classified as hammerstones (13) anvil stones (2) abrader (1) and paintstones (1). Their metrical and discrete attributes are given in Table 5.

Hammerstone (13)

The 13 cobble hammerstones were of five varieties: linear (3), ovoid (3), circular (3) (Fig. 5, No. 5), rectangular (2) and irregular (2). Nine were from excavations. One linear and 2 rectangular were elongated Gunflint slate cobbles with wear patterns on their lateral margins (Fig. 5, No. 2,6). These are characteristic of the type of hammerstone used for blade-making (Crabtree 1972:9). It is also significant that the latter two had striations across their faces suggestive of use for grinding.

Anvil Stones (2)

These are large taconite cobbles with marked depressions and crushing resulting from hammering. One is a prepared core biface (Fig. 5, No. 4).

TABLE 5
COBBLE TOOLS: DISCRETE AND METRICAL ATTRIBUTES

Type	f	L (mm)	W	Th	Wt. (gm)	Hammering Facets Periphery	Ends	Sides	Material GF Shale Cobbles	Igneous Cobbles	Tac-onite	Location
Hammerstones												
Linear	3	82	**32**	36	521		X			X		S
		157	79	42	675		X	X	X			TTII
		-	50	30	119		X				X	TTV
Ovoid	3	78	**64**	63	477	X				X		TTV-1
		71	61	61	**394**	X				X		TTV-1
		76	68	60	520	X				X		TTV
Circular	3	81	**66**	**59**	194	X				X		S
		68	53	42	304	X		X		X		TTV-1
		61	52	47	206		X			X		
Rectangular	2	**96**	74	49	479		X	X	X			TTV-1
		132	70	35	498		X	X	X			TTV
Irregular	2	93	63	40	357			X	X			S
		101	87	41	402			X	X			TTII
Anvil	2	141	85	85	896	X					X	S
		82	49	35	205	X					X	TTII
Abrader	1	117	**49**	20	169			X	X			TTV
Pain Stone	1	32	29	8	**9**			X	(red ochre)			TTV

Abrader (1)

This single linear sandstone cobble shows shallow ground grooves and polishing on 2 flat faces of its rectangular form (Fig. 5, No. 3).

Paint Stone (1)

This was a small red ochre stone fragment which shows use-wear on one face.

CORES

Cores are *of* two varieties, prepared roughed out taconite biface ovates (24) and unprepared taconite quarry vein plates with cortex or natural fracture surfaces (170). Unwanted fracturing resulted in a considerable number *of* broken or rejected cores, and these unprepared cores are considered separately as rejects (92). Metrical attributes are shown in Table 6.

TABLE 6
CORES: DISCRETE AND METRICAL ATTRIBUTES

	f	(mm) (gm)	Max.	Min	Mean
Prepared Cores	12	Length	174	70	93
		Width	96	50	60
		Thickness	52	19	31
		Weight	763	104	233
Unprepared cores					
Vein Plate large	13	Length	143	90	113
		Width	112	74	91
		Thickness	90	24	50
		Weight	1182	405	650
		# of Flake Scars	0	14	5
		# of Planes Flaked	0	3	1.7
		# of Natural Planes	1	**3**	2.3
		# of Cortex Planes	0	**2**	1.3
Small	65	Length	143	57	**66**
		Width	98	50	52
		Thickness	70	28	38
		Weight	391	121	235
		if of Flake Scars	2	8	4.7
		# of Planes Flaked	1	3	1.9
		# of Natural Planes	1	3	2.6
		# of Cortex Planes	1	2	1.3
Rejects	91	Length	113	41	68
		Width	79	26	47
		Thickness	45	12	28
		Weight	214	39	108
		# of Flake Scars	1	9	4
		# of Planes Flaked	1	**4**	2
		# of Natural Planes	1	5	2.3
		# of Cortex Planes	0	2	0.7

While over a dozen tools were made from local flints, only two Gunflint cores were recovered and these were classed as exhausted core scrapers. No quartzite tools were recovered but 1 unprepared quartzite core was recovered and 1 quartzite projectile point is known to have been recovered from the site by a collector. No siltstone or mudstone cores were recovered.

Prepared Cores (24)

These taconite cores are roughly ovate in form with edge crushing and large crude surface flake scars which distinguish them from large preforms. Some of these bifacial cores have extensive battering and may have been used as hammerstone (Fig. 5, No. 8). Twelve are complete and 12 are edge fragments. The latter's weights ranged from 16 to 161 gm with a mean of 89 gm.

Unprepared Cores (78)

These are large blockey taconite cores generally tabular in form. A few are trihedral in outline. They are quarried vein plates with cortex or natural fracture plane exteriors. Most exhibit a few large flake scars and some have minor crushing. Natural fracture planes were utilized to remove longitudinal flakes. They have been divided into large over 400 gm (13) (Fig. 5, No. 7) and small below 400 gm (65) (Fig. 5, No. 1).

Unprepared Core Rejects (92)

These are blockey taconite cores broken along a fracture plane during initial flaking. All exhibit large flake scars and many have one or more crushed margins or prepared platforms. Most are irregular blockey pieces but some are tabular or trihedral in form. One exception was a quartzite core. It had a length of 58 mm, a width of 55 mm, a thickness of 44 mm and a weight of 196 gm. It had 1 flake scar on one plane, 2 natural planes and 2 cortex planes. Metric attributes of the others are shown in Table 6.

DEBITAGE (1667)

The variety of debitage is shown in Table 1. Of the total, an insignificant number (23 or 1.3%) were materials other than taconite. Attributes of taconite recoveries from Test Trench II, the only excavation from which complete recoveries were retained in this initial exploratory examination of the site, are shown in Table 7.

TABLE 7
TEST TRENCH II DEBITAGE: DISCRETE AND METRICAL ATTRIBUTES

		Length (mm)		Width (mm)		Thickness (mm)		Weight (gm)	
Types	f	Range	Mean	Range	Mean	Range	Mean	Range	Mean
Primary Flakes									
Expanding	33	34-[illegible]	38	21-[illegible]	44	4-15	9	4-59	17
Parallel	13	29-71	44	16-29	22	5-13	7.9	3-28	9
Secondary Flakes									
Trimming	49	16-52	30	12-41	24	3-11	6	6-36	11
Utilized	42	20-81	48	14-50	30	3-28	10	1-84	13
Linear	1	14-	30	5-19	11	2-10	5.6	0.5-2.5	1.9

Primary Flakes

Shatter	f	$\bar{X}$ wt
Large	167	55.6
Medium	266	18.5
Small	173	6.6
Total	606	25.3

Secondary Flakes

Cortex	f	$\bar{X}$ wt	Shatter	f	$\bar{X}$ wt
Medium	56	4.6	Medium	122	4.9
Small	120	2.7	Small	198	2.7
Micro	19	1.6	Micro	61	0.4
	195	3.2		381	3.6

Total Primary 652, Mean Wt. 24.6 gm.

Total Secondary 790, Mean Wt. 4.5 gm.

CONCLUSIONS

Geochronological evidence indicates that Early Man could have come into parts of northwestern Ontario north of the western end of Lake Superior prior to 10,000 BC, the estimated age of retreat of the Wisconsin glacial boundary. However, the emerging picture of paleo-geography of the region places the Cummins site occupation considerably later, some time after circa 7500 BC during the post glacial Lake Minong period in Kaministikwia Valley.

This was a period of periglacial environment which saw a rapid replacement of the tundra by an open spruce forest and Plano settlements along the succession of glacial margins in areas that provided animal and bird hunting and fishing opportunities. The most recent generally accepted dates for these beaches registered in the area of the Cummins site between 225 m and 240 m a.s.l. are approximately 7500 BC to 5000 BC (Phillips 1982). The Cummins beach registered at 231 m a.s.l. is therefore on an early post-Minong beach. Lake Minong dates which have previously been used to support an earlier placement (Steinbring 1976; Fox 1975) are not applicable. Predicating the placement in time of a site by correlating beach elevations and dates across the region is subject to so many discontinuities its use is untenable (Phillips 1982). Thus the radiocarbon date of 7430 ± 180 BC (Dyck et al 1966) from a beach at 226 m a.s.l. 8.8 km to the south (Zoltai 1965) used in support of an earlier date for the site (Dawson 1972; Fox 1975) is also rejected.

The maximum date range (6140 - 6920 BC) obtained from the cremation carbon date (6530 ± 390 BC) is consistent with the 7000 BC date estimated for the post-Minong beach upon which the Cummins site is located. Occupation over at least 2000 years (7000-5000) is suggested by the recoveries with the size of site being the result of massing of peoples during a single occupation rather than a successive occupation by small bands over a long period of time.

Other Plano sites in the immediate vicinity (Wilder 225 m, Boulevard 220 to 231 m, Simmonds 235 m, Bolowski 230 to 236 m and Catherine 230 to 240 m) (Fig. 6) range in elevation (elevations are approximate, for the area is disturbed) from 225 m to 240 m a.s.l., suggesting a prolonged occupation of the area by Plano peoples both pre-dating and post-dating the Cummins site coincident with the rapidly declining waters of post-glacial Lake Minong between 7500 BC and 5000 BC (Dawson 1983).

The site situated adjacent to an extensive source of raw material was oriented toward lithic tool production while other surrounding sites, small camps and game watches, would have been predominantly oriented towards subsistence and occupied by nuclear or small extended family groups. The site appears to have served as a primary source of raw material for the Plano peoples in the region; jasper taconite often occurs at sites to the west where it is not readily available (Steinbring 1974, 1976, 1980). However, the broad range of activities suggested by the recoveries indicates that the site was much more than a specialized activity site. It was a habitation site situated adjacent to a readily available source of subsistence-the marshy lake - and a readily available source of raw materials for tools - the red jasper taconite outcrop.

The lithic industry itself gives the general impression of limited formalization of types including the lanceolate projectile points and bifaces for they vary considerably in most features although they are generally finished by collateral transverse or parallel oblique flaking to create a thick lenticular to diamond cross-section. In the initial stages thermal alteration appears to have been used and subsequently taconite blanks (core, flake, shatter piece) were selected for particular uses, mainly on the basis of their edge angles or edge

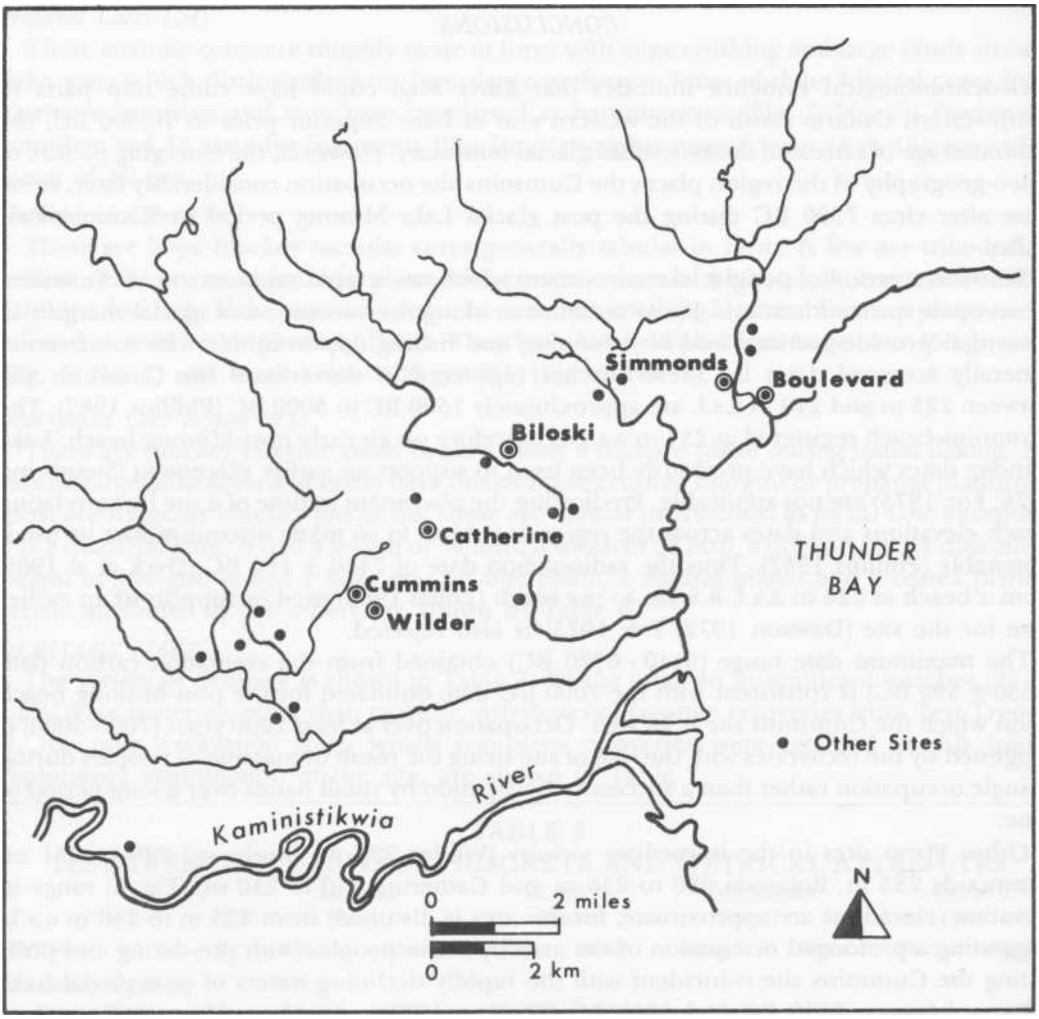


Fig. 6. Plano sites on the glacial lake shores of Thunder Bay.

shapes with only loose attention to blank size and general shape. Retouching also occasionally appears to have been done for the purpose of blunting the edge of the blank for holding rather than to alter the shape of the angle of the utilized edge. Purposeful edge preparation was practiced in the intermediate stage in the production of bifacial tools, utilizing soft stone impactors (slate hammerstones).

Specific selection of raw materials is also evident in the minimal utilization of non-taconite lithics (Gunflint, Hudson Bay flint, siltstone) for special tools. The absence of Knifelake siltstone debitage supports the view that this material was imported from the quarry sites located immediately to the west (Fox 1980a). The extensive techniques used and the range of tools present indicates a broadening of activities and argues for the beginnings of an adaptation to forest conditions, a prelude to the later Shield Archaic tradition (Wright 1972b).

The tool kit, consisting of lanceolate projectile points, bifacial blades, single and double-edge side scrapers, raclettes, spurred and generalized end scrapers, simple notches, spokeshaves, drills, beaks, spurs and simple and multiple gravers is typical of Plains Plano assemblages ca. 9500 BC to 6000 BC (Irwin and Wormington 1970). Since the tool kit appears to be clearly out of the west the suggestion is that Plano hunters spread northeast as colonists, into deglaciated territory where they were pursuing large game, particularly caribou, and that gradually they changed to generalized hunters similar to the situation in the Keewatin district of the Northwest Territories (Wright 1972c, 1976). The number of tools suggestive of woodworking - bifacial core tools, choppers and trihedral-like adzes - indicates an adaptation to forest conditions while a broad range of activities - butchering, woodworking, boneworking and hide preparation - is suggested by the other recoveries (Keeley 1980). A prolonged occupation is indicated by these new tools and the presence of early to late Plano projectile points. The Cummins site and other sites and recoveries in the Thunder Bay region have been loosely defined as the Lakehead Complex (Fox 1975, 1980a).

The settlements are seen as having close affinities with the Reservoir Lake Phase (Steinbring 1974) near Duluth 300 km to the southwest on the north shore of Lake Superior and the Flambeau/Micoqua Phases on the south shore (Salzer 1974). The latter is estimated to date to 7000 to 5000 BC (Salzer 1974:44-45). The cremation burial on a sandy beach shore suggests a relationship to the Renier Site of similar age and origins on Lake Michigan (Mason & Irwin 1960; Mason 1980).

Steinbring (1974, 1976, 1980:33) has postulated the origins of the Plano tradition in the region and subsequent western movement. He sees the development of the Thunder Bay settlements out of the Reservoir Lake Phase. The position is predicated on the assumption that the phase is considerably earlier, occurring soon after 12,000 BC (Steinbring 1980:24-25). The date is based on the opinion that the area was attractive to human settlement because it was unglaciated and had a moderate climate. In support of the early date is the location of the recoveries at 198 m a.s.l. (650 ft) on what may have been a Mankato moraine. No detailed geological evidence is presented and no specific dates are cited. As previously stated, there is no consistency between beach elevation and age in the Superior Basin, thus the location provides no evidence for such an early date. Further, no intact site was discovered, the scant recoveries were from the surface in an area disturbed by dam construction (Steinbring 1980:25). The nature of the lithic technology is also cited; this refers to the spatuate detachment pattern evident on projectile points, a method of manufacturing considered early, antedating fluting. While recoveries reflect this tradition, the presence of the pattern, in itself, does not provide evidence for an early date. The proposition that Plano peoples had their origin in the region and migrated west has no supporting evidence.

While rejecting an early placement of the Reservoir Lake Phase, nevertheless the method of fabricating tools and the diversity of biface and projectile points together with the other recoveries described as massive choppers, picks and crude flake tools (Steinbring 1980:24) suggest a close relationship with the Cummins site recoveries. The occurrences of similar sites and recoveries to the west and north in the interior on relic lake beach strands, points to a roughly contemporaneous occupation of the Minong and Agassiz Basins by the same peoples. These include the sites near Thunder Bay (Dawson 1972, 1973; McLeod 1981; Newton et al 1974); the Tower Road site (Dawson 1962, 1964) and the South Fowl Site (Platcek 1965) to the west of Thunder Bay and others to the northwest (Fox 1980a; Newton and Englebert 1975), the Reservoir Lake sites near Duluth (Steinbring 1974), recoveries near Rainy River (Mayer-Oakes 1970; Storck 1971; Reid 1980) and sites on or near Lake of the Woods and the Lake Winnipeg drainage area (Buchner 1979, 1981; Pettipas 1970, 1975; Steinbring 1980).

All are seen as having been influenced or having a firm connection to the Minong shore

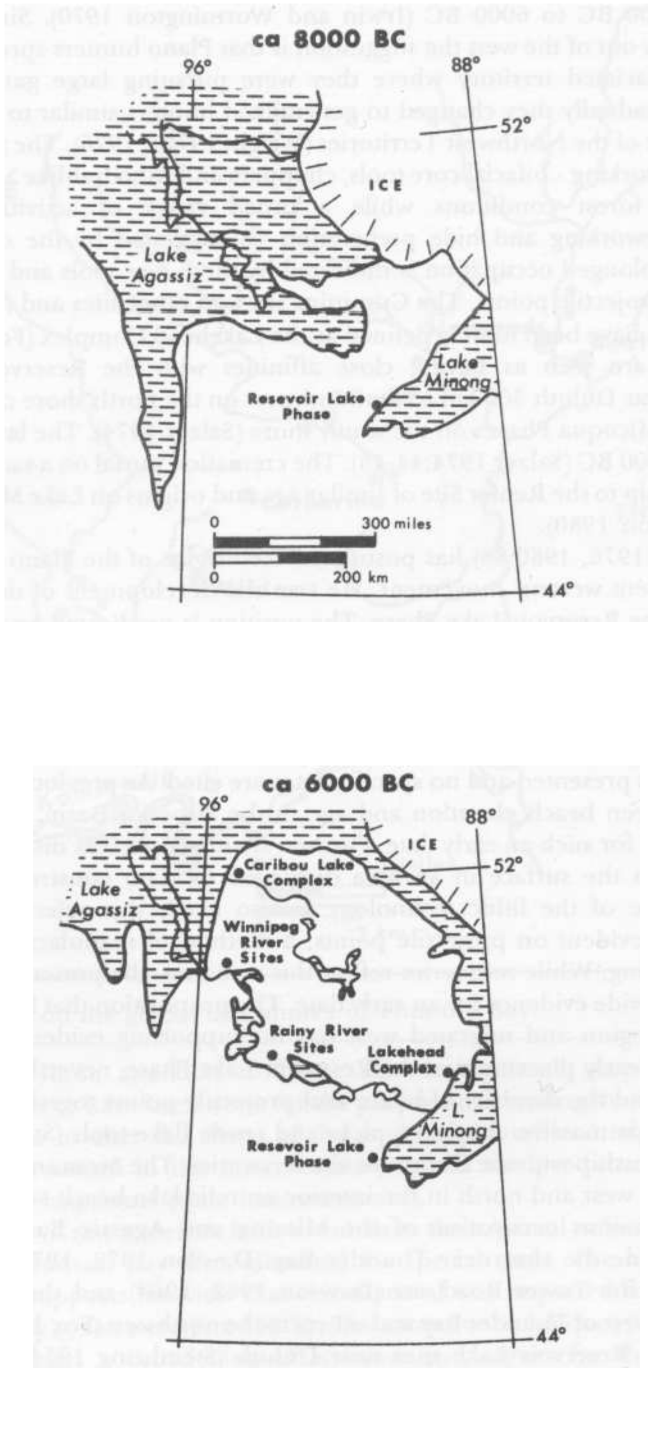


Fig. 7. Plano locations in the Minong/Agassiz cul-de-sac (maps after Prest 1970).

settlements (Steinbring 1980:33; Reid 1980:35). Accepting the placement of the Reservoir Lake Phase slightly earlier than the Cummins site and the gradual later dates for recoveries running north and west, the pattern is consistent with observations of the movement of Plano people west of this drainage basin (Ebell 1980). The movement into the region terminates with the Caribou Lake Complex, an even poorer defined complex (Buchner 1979:74) 700 km to the northwest in the eastern Lake Winnipeg drainage area. The latter complex characterized by lanceolate projectile points, bifaces and trihedral adzes is considered to date circa 5000 to 4000 BC (Steinbring & Buchner 1980:33) and to be a close relative to the Lakehead Complex (Buchner 1979; Wheeler 1978).

The cul-de-sac bounded by the waters of the Minong and Agassiz basins (Fig. 7) appears to have been occupied for a considerable period of time about 8000 to 4000 BC by Plano peoples. While lateral displacement from the Minong basin is apparent, essentially the movement was north into the cul-de-sac. Tool kit changes in response to ameliorating climatic conditions were probably accelerated by population pressures and breakdown of the earlier wide spread unit on reaching the ecological limits of territorial expansion (Fitting 1977).

Regional recoveries are not characterized by one type of projectile point as is the case in the central Plains (Irwin-Williams et al 1973: 46-52) but rather they are characterized by a diversity of projectile points temporally and spatially overlapping. The tool kit together with the diversity of Plano points and new Shield Archaic-like points represent a generalized hunting, fishing and gathering economic adaptation, not the specialized big game hunting characteristic of Paleo-Indians of the high plains.

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