Canadian Journal of Archaeology, Vol. 15, 1991

Nettling: an Overview of an Early Archaic "Kirk Corner-notched Cluster" Site in Southwestern Ontario

Chris J. Ellis,
Department of Anthropology
University of Waterloo

Stanley Wortner
Bothwell, Ontario

William A. Fox
Ontario Ministry of Culture and Communications

INTRODUCTION

In this paper we report on a large Early Archaic *(ca.* 10,000 to 8000 B.P.) lithic assemblage from the Nettling site (AdHj-1) in southwestern Ontario. Our concerns in the paper are threefold. First, we wish to provide a summary description of the whole Nettling site assemblage. Although a number of actual Early Archaic sites have been reported from the Great Lakes- Northeast area in recent years (e.g. Brose 1989; Deller, Ellis and Kenyon 1986; Funk and Wellman 1984; Payne 1982), the Early Archaic of the area still consists almost entirely of a series of point finds (largely from markedly multi-component, "mixed" sites) which are comparable to well-dated point forms from the southeastern United States (Mason 1981:129; Snow 1980:159). Therefore, while largely a surface collection from a ploughed field, the Nettling assemblage provides one of the first major opportunities to go beyond simply points and delimit the nature and extent of whole Early Archaic tool assemblages and lithic source preferences in the area- knowledge which is essential to building higher order constructs concerning the nature of Early Archaic cultural systems and to documenting the changes associated with the Palaeo-Indian to Archaic transition.

Second, we attempt to provide age estimates for the Nettling assemblage by comparing it to welldated assemblages elsewhere, particularly in the southeastern United States. In doing so, and following the lead of investigators such as Dincauze and Mullholland (1977) and Funk (1978:23), we assume that Early Archaic materials in the Great Lakes/Northeast similar to those of areas farther south are of a comparable age. This assumption has been questioned by some individuals (e.g. McNett 1985:106-107; Snow 1980:163-166) but we suggest that these objections are without foundation.

Finally, the nature of Early Archaic adaptations in the more northerly parts of the East has long been of interest to scholars. Much of this interest has been at a very general level and has revolved around a long-standing debate on the extent of the Early

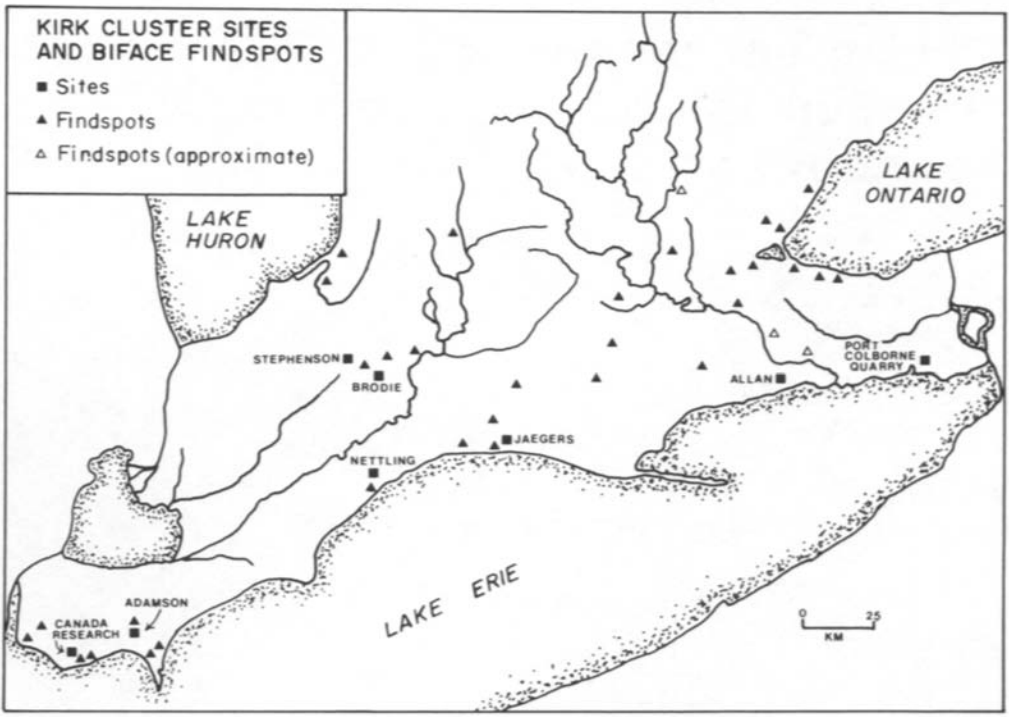

Figure 1
Location of the Nettling site and other Early Archaic -Kirk Corner-Notched horizon" sites in southwestern Ontario.

Archaic occupations in the region. Some have argued for a virtual abandonment of the area in early Archaic times due to environmental constraints (Fitting 1968; Ritchie 1971a) whereas others (e.g. J. Wright 1978; Roberts 1988) have argued against such a position. The Nettling site cannot serve by itself to resolve this particular debate. However, it does provide some information bearing on this question and upon which we can begin to develop a much more subtle understanding of the nature of Early Archaic environmental adaptations in the lower Great Lakes area.

SITE LOCATION AND INVESTIGATIONS

The Nettling site is located southwest of London, Ontario, some 5km from the north shore of Lake Erie (Figure 1). Situated in a cultivated field, the site was first located by S. Wortner in 1965. The main site area is bordered on the east by a shallow gully (Figure 2) representing a now dry creek bed. This creek flowed north by the site and then, about 100 metres to the north, cut west. eventually to join up with Lake Erie. At the time the site was first located, the creek was bordered by steep banks and only the north end of the site was cultivated. Subsequently, the south end was cleared and ploughed and the site area was levelled somewhat by bulldozing to prepare the area for tobacco growing.

The main site area consists of two dense, relatively discrete, concentrations of Early Archaic debris. These concentrations, referred to as North and South, cover ca. 800 and 600m^2 respectively. However, they were probably somewhat smaller prior to modem land alterations. A few artifact mends have been made between these two

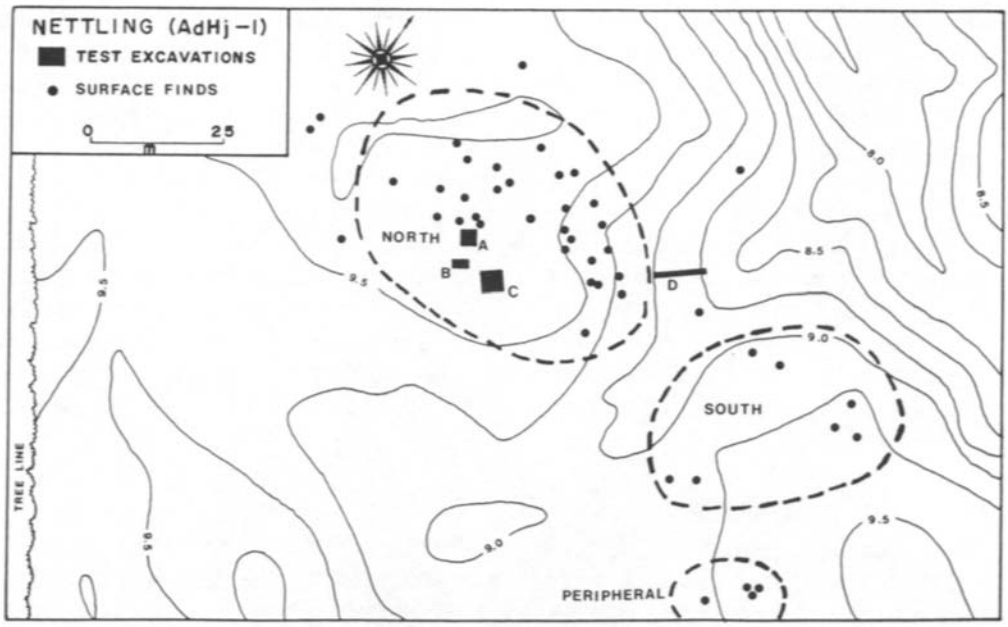

Figure 2
Nettling site topographic map.

concentrations, but in all cases, the breaks are recent suggesting these linkages are a product of modem site alterations. Each of the major concentrations is located on a low knoll, being separated from one another by a shallow west to east channel which joins up with the old creek bed and is largely devoid of Early Archaic debris.

A scatter of Early Archaic material occurs in surrounding areas, including even the area east of the old creek bed. For the most part, this material does not seem to form any definable concentrations. A notable exception is a small area at the southern margin of the site (termed the "Peripheral" Concentration on Figure 2) from which a biface preform, several conjoinable fragments of a large, trianguloid, heat fractured chert biface tool (Figure 5a), and a ground stone tube (see below) have been recovered.

From the 1950s to the late 1970s. the site was intensively surface investigated with all cultural materials including flaking debris being collected. This material was largely retained by site concentration but during the late 1970s piece-plotting of materials was carried out. the distribution of which are shown on Figure 2. In addition some test-units were excavated on the margins of Nettling North in 1967 (Units A, B) and again in 1979 (CD). These units yielded some Early Archaic tools and debris from the plough zone, and in one instance (Unit B) the subsoil, and also provided evidence that a small, burned, historic structure once stood at the southern edge of Nettling North.

While mainly surface-collected from a ploughed field, the vast majority of the recovered material is quite homogeneous in terms of toot forms and stone raw materials and is assignable to an occupation by Early Archaic peoples producing corner-notched serrated points characteristic of what Tuck (1974) calls the "Kirk Horizon." Evidence of

other occupations is sparse and excluding historic European material includes first, from Nettling North: a Late Palaeo-Indian point somewhat intermediate between the Holcombe and Hi-Lo types; five Early Archaic bifurcate points of various types; an Early Woodland Meadowood point reworked into a perforator; four Middle Woodland body sherds; and four probable Middle Woodland points including one corner-notched form resembling the Jack's Reef type (Ritchie 1971b:26-27) and three "weakly side-notched" forms. From Nettling South have been recovered three Late Woodland body sherds, probably from a single vessel, and a small side-notched Late Woodland point. In addition, a second Holcombe/Hi-lo like point was recovered from the gully or old river bed east of the North concentration and several sherds from a single Early Woodland Vinette 1 vessel were recovered from test unit "D" just outside the main North concentration (Figure 2). Evidence of other prehistoric occupations is lacking in the area of the Peripheral concentration at the southern site margin. It is also worth emphasizing that excepting a single bifurcate point, none of the definite later lithics from the site are on certain Ohio cherts which are common in the dominant Early Archaic assemblage (see below).

LITHIC ASSEMBLAGE

Excluding the small amount of material attributable to non-Kirk occupation of the site, the stone artifact assemblage recovered from Nettling to date is quite large, including 1,629 tools/preforms and 2,474 pieces of chert flaking debris (Tables 1 and 2). These totals are subject to change as continued attempts are made to cross-mend a large number of fragmentary items. Industries on both fine-grained (hereafter "cherts") and coarse-grained rocks are represented and these are each discussed in turn below.

tool type	*area*			*total*	*percent*
	north	*south*	*other*		
points	92	48	18	158	9.7
large trianguloid bifaces	4	18	3	25	1.5
drills	22	3	2	27	1.7
pièces esquillées	1	5	-	6	0.4
bifacial perforators	3	-	-	3	0.2
biface preforms	326	122	24	472	29.0
other bifaces and fragments	218	133	22	373	22.9
'tear-drop' end scrapers	77	40	-	117	7.2
end scraper preforms	3	-	-	3	0.2
other end scrapers	4	2	-	6	0.4
specialized concave side scrapers	4	11	1	16	1.0
other side scrapers	12	11	1	24	1.5
retouched flakes	94	49	10	153	9.4
denticulates	28	15	3	46	2.8
gravers/borers/pointed scrapers	12	2	1	15	0.9
other unifaces and fragments	51	20	2	73	4.5
chipped and ground celts	26	4	2	32	2.0
celt preforms	5	-	1	6	0.4
tubular atlatl weights	4	1	1	6	0.4
atlatl weight preforms	6	-	1	7	0.4
abraders and fragments	17	-	1	18	1.1
other rough stone	40	4	1	45	2.8
totals	1,047	488	94	1,629	100.4

Table 1
Tool type distributions by sire areas.

debris type	*area*			*total*	*percent*
	north	*south*	*other*		
cores and blocky fragments	258	65	-	323	13.1
primary decortication flakes	36	14	-	50	2.0
secondary decortication flakes	157	55	-	212	8.6
core trimming flakes	214	74	-	288	11.6
biface thinning flakes	207	54	-	261	10.6
uniface retouch flakes	3	1	-	4	0.2
flake fragments	978	357	1	1,336	54.0
totals	1,853	620	1	2,474	100.1

Table 2
Chert flaking debris distributions by site areas.

CHERT INDUSTRY

Raw Materials

A wide range of cherts from various sources are represented. Source assignments are based on detailed visual comparisons with reference collections at the Ontario Ministry of Culture and Communications in London and the Department of Anthropology at the University of Waterloo. Items about which there was *any* uncertainty of identification were classified as unknown.

Although the identifications will need to be confirmed by more objective methods, there is little doubt that a major aspect of the assemblage is the high frequency of quite distinctive cherts only rarely seen in Ontario; namelythose derived from sources in Ohio (Tables 3 and 4). Indeed, the assemblage has a higher percentage of those Ohio cherts than any Ontario site reported to date. The best represented Ohio source includes Pipe Creek chert which outcrops in the Sandusky Bay area of northern Ohio some 175-200km southwest of the site but Upper Mercer chert from sources in central Ohio some 300km away is also well-represented (Figure 3). Examination of unflaked surfaces on tools and debris indicate all of the Upper Mercer and the majority of the Pipe Creek cherts were obtained from bedrock outcrops rather than secondary deposits. Other Ohio materials such as Columbus and Flint Ridge are represented by only a few isolated examples. The rarity of Flint Ridge is surprising since it outcrops in areas close to the Upper Mercer.

Among Ontario cherts, Onondaga and Selkirk are the best represented. While both these materials outcrop some 150km east of Nettling, examination of unflaked surfaces indicate these cherts are derived from pebbles and cobbles obtained in secondary deposits. Even today, cobbles of these materials are common in beach deposits along the Lake Erie shore south of the site and it is probable such materials were obtained locally. Other Ontario sources, such as Haldimand, Kettle Point and Collingwood, and Michigan sources such as Bayport chert are rare to non-existent. In fact, they are so rare that they could represent the odd piece from local secondary deposits (e.g. Kettle Point) or could even be associated with the ephemeral evidence of non-Early Archaic occupations (e.g. Haldimand which was extensively used by Holcombe/Hi-Lo groups in southern Ontario; Deller 1989).

The high frequency of the Pipe Creek chert suggests it was acquired during annual cycles of movement rather than through other mechanisms such as exchange. The same might also be argued for the Upper Mercer materials but the long distances involved (ca. 300km) seem extreme. It is also worth nothing that much more of the Upper Mercer material is visibly heat-fractured in relation to other materials and as a result, is highly fragmentary. This is evident, for example, in the relatively high frequen-

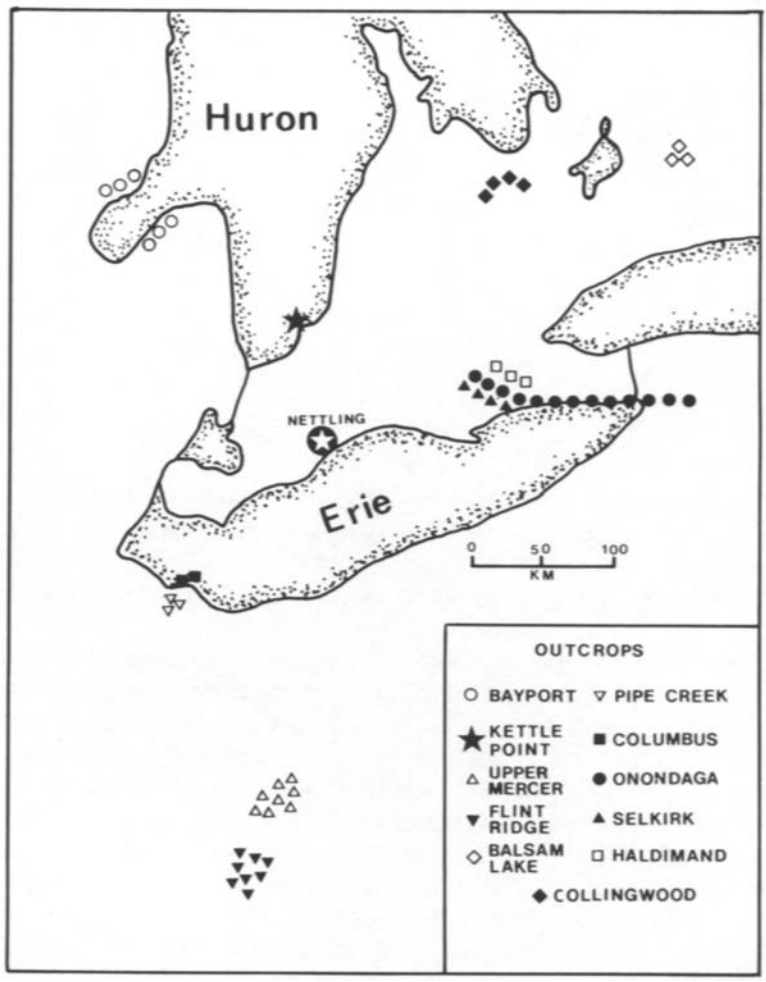

Figure 3
Bedrock outcrops of some chert sources mentioned in the text.

ties of that material among the fragmentary bifaces and unifaces (Table 3). This visible heat-shattering of Upper Mercer in comparison to other materials has been noted at other sites, notablythe Gainey Palaeo-Indian site in Michigan (Simons *et al.* 1984; Henry T. Wright: personal communication) and it may be that it has a propensity to shatter at lower temperatures than other cherts. In any event, such fragmentation has inflated the Upper Mercer totals at Nettling. Moreover, the Upper Mercer is poorly represented among the flaking debris (5.3%) and this might suggest it was imported mainly in "finished" forms and through exchange systems. Regardless, it is notable that Ohio cherts are common among all finished, exhausted, and discarded tool types or classes at the site (Table 3). This contrasts with unfinished tools in the assemblage such as biface preforms as well as with the flaking debris from the primary stages of manufacture (Table 4) where local materials are much more common. These data strongly suggest a case of tool kit replacement with exhausted tools acquired elsewhere in the annual round, notably in Ohio, being discarded and replaced with tools made of local Ontario

tool type	raw material							
	Pipe Creek	Upper Mercer	Onondaga	Selkirk	Flint Ridge	Kettle Point	other/unknown	total
points	28(17.1)	24(15.2)	35(22.2)	20(12.7)	2(1.3)	1(0.6)	48(30.4)	158
large trianguloid bifaces	1(4.0)	17(68.0)	4(16.0)	-	-	-	3(12.0)	25
drills	7(25.9)	9(33.3)	6(22.2)	3(11.1)	-	-	2(7.4)	27
pièces esquillées	-	-	4(66.6)	2(33.3)	-	-	-	6
bifacial perforators	-	2(66.6)	-	-	-	-	1(33.3)	3
biface preforms	32(6.8)	22(4.7)	176(37.3)	155(32.8)	1(0.2)	3(0.6)	83(17.6)	472
other bifaces and fragments	16(4.3)	74(19.8)	123(33.0)	89(23.9)	1(0.3)	1(0.3)	69(18.5)	373
tear-drop end scrapers	46(39.3)	16(13.7)	24(20.5)	1(0.9)	1(0.9)	-	29(24.8)	117
end scraper preforms	-	-	2(66.6)	1(33.3)	-	-	-	3
other end scrapers	2(33.3)	1(16.6)	2(33.3)	-	-	-	1(16.6)	6
specialized concave side scrapers	3(18.8)	7(43.8)	1(6.3)	2(12.5)	-	-	3(18.8)	16
other side scrapers	10(4176)	6(25.0)	1(4.2)	3(12.5)	-	-	4(16.7)	24
retouched flakes	70(45.8)	27(17.7)	34(22.2)	7(4.6)	-	-	15(9.8)	153
denticulates	22(47.8)	8(17.4)	6(13.0)	3(6.5)	1(2.2)	1(2.2)	5(10.9)	46
gravers/borers/pointed scrapers	6(40.0)	2(13.3)	4(26.6)	-	-	-	3(20.0)	15
other unifaces and fragments	8(10.5)	16(21.1)	14(18.4)	9(11.8)	1(1.3)	-	28(36.8)	76
totals	251(16.5)	231(15.2)	436(28.7)	295(19.4)	7(0.5)	6(0.4)	294(19.3)	1,520(100)

Tool type distributions by raw materials.

materials. It will be interesting to see if future sites are reported in Ohio with reverse frequencies to that of Nettling (e.g. worn-out tools on Ontario cherts, manufacturing discards and debris on Ohio cherts) which could represent another segment of the annual round.

debris type	raw material						
	Pipe Creek	Upper Mercer	Onondaga	Selkirk	other	unknown	total
cores and blocky fragments	45(13.9)	5(1.6)	103(31.9)	93(28.8)	3(0.9)	74(22.9)	323(100.0)
primary decortation flakes	4(8.0)	1(2.0)	23(46.0)	13(26.0)	-	9(12.3)	50(100.0)
secondary decortation flakes	18(8.5)	8(3.8)	123(58.0)	37(17.5)	-	26(12.3)	212(100.1)
core trimming flakes	57(19.8)	14(4.9)	145(50.4)	28(9.7)	-	44(15.3)	288(100.1)
biface thinning flakes	47(18.0)	24(9.2)	152(58.2)	25(9.6)	2(0.8)	11(4.2)	261(100.0)
uniface retouch flakes	-	-	2(50.0)	1(25.0)	-	1(25.0)	4(100.0)
flake fragments	170(12.7)	80(6.0)	606(45.4)	155(11.6)	4(0.3)	321(24.0)	1,336(100.0)
totals	341(13.8)	132(5.3)	1154(46.7)	352(14.2)	9(0.4)	486(19.6)	2,474(100.0)

Table 4
Chert flaking debris distributions by raw material.

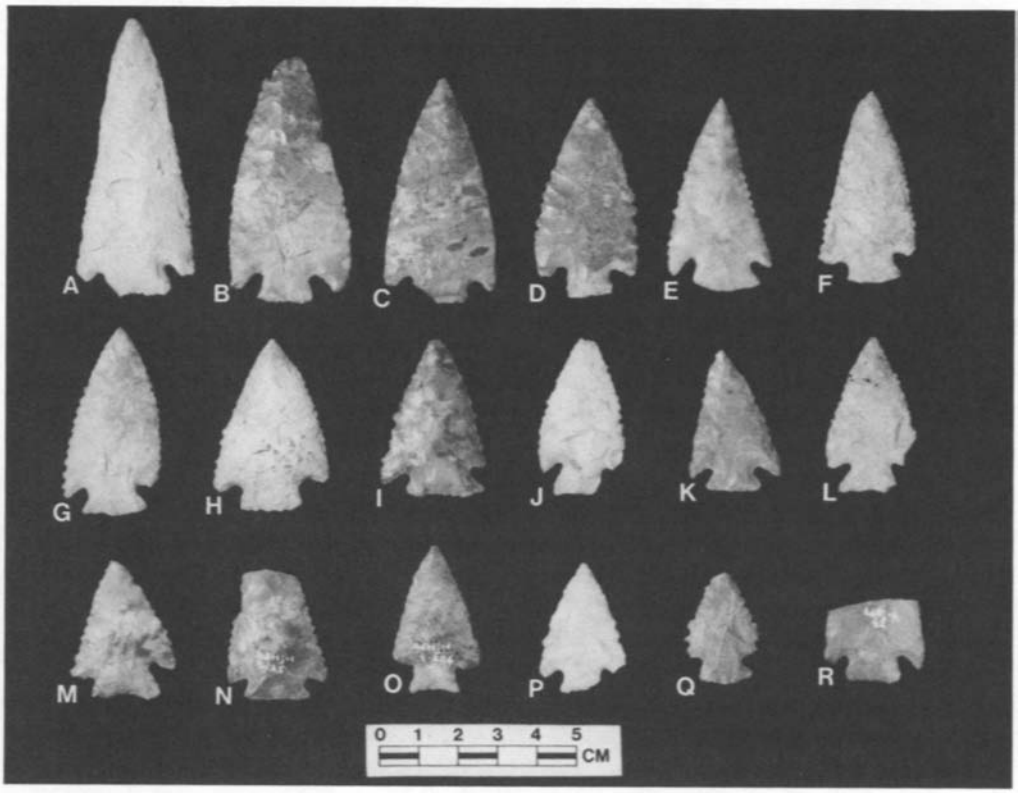

Figure 4
Corner-notched serrated points. Reproduced by permission of *the editorial board, London Chapter, Ontario Archaeological Society.*

Bifaces

Points

A large sample of 158, well-made points have been recovered (Figure 4; Table 5). With but three exceptions, these items can be easily classed as comer-notched (e.g. the widest point occurs at the top of the notches). The three exceptions include one item which is about the same width both at base and above the notch such that it could be classified as "side-notched"; one example (Figure 4q) which appears "side-notched" on one edge and "comer-notched" on the other; and one item (Figure 40) which could be seen as "expanding stemmed." However, careful examination of these items suggest they are simply reworked comer-notched forms. The "side-notched" item and the item "side-notched" on one side have had their lateral edges reduced through resharpening such that the barbs overhanging the notch have been reduced in width. Similarly, on the "stemmed" form the barbs have been completely removed by reworking, only **a** slight unretouched remnant of a break at one barb betraying its original notched nature.

All of the points are wide and thin with maximum width occurring at (53.8%) or just above (46.2%) the barb overhanging the notches. Bases and fore-section edges are usually straight to slightly convex and the notches are narrow and elongated. Fine edge serrations and basal thinning are often present (87.3% and 51.1%) but alternate bevelling (23.4%) and basal grinding (20.5%) are relatively rare. Stems are short (mean of 6.95mm) and basal widths are almost exclusively under 20mm.

variable	*no.*	*range*	*mean*	*s.d.*
length	39	28.1–72.4	40.67	8.279
width	44	19.0–37.4	25.91	3.771
thickness	102	4.1–9.0	5.53	0.936
basal width	46	11.8–20.3	13.62	2.181
stem length	80	5.0–12.1	6.96	1.167
fore-section length	56	20.4–64.8	33.91	8.308
notch width (left)	39	3.3–6.4	4.49	0.722
notch width (right)	35	3.1–7.0	4.31	0.936
notch depth (left)	40	2.9–7.4	5.22	1.305
notch depth (right)	36	3.1–7.9	5.32	1.299
neck width	87	7.1–16.1	11.94	1.656
basal thinning length	39	8.3–16.7	12.08	2.376

Table 5
Nettling sire point variables.

Other Biface Tools

At least four other biface tool forms occur in the Nettling collection. One form consists of large, extremely well-made bifaces (Figure 5). Overall these items have a roughly trianguloid outline shape and thin biconvex transverse sections with slightly rounded to pointed tips and convex bases. While surfaces are covered with broad, expanding thinning flake scars, finer retouch is present along margins. Usually, one edge is acute-angled and exhibits a continuous fine bifacial retouch which consistently results in a relatively sharp, straight, regular edge in plan and profile. The opposite side edge is less acute, exhibits only intermittent fine retouch, is quite sinuous in plan and profile, and is relatively dull, some specimens even exhibiting grinding. It seems likely that the former sharp edge is the working edge of the tool while the latter dull margin was designed to hold or haft the tool. Tools virtually identical to these items in terms of outline shape, for the most part size, and in some cases, having a finely retouched edge opposite a coarsely flaked dull margin, have been recovered from a number of Early Archaic sites in the southeastern United States. Examples include the “Type VI blades” from the St. Alban’s site, West Virginia (Broyles 1971 :Figure 31 j-k) and the “Knife Type B” from several sites in Tennessee (Chapman 1978:62, 1985:Figure 5.3a; Kimball and Chapman 1977:72). These bifaces represent one of the few tool forms at the site where Upper Mercer chert is dominant (Table 3). It is also notable that they are much more common in the South assemblage than in the North, despite the smaller size of the South assemblage (Table 1).

Another bifacial tool form with rod-like fore-sections, are here termed “drills” although this may not have been their true function (Figure 6). Tips are narrow and blunt to relatively pointed and are sometimes polished from use. Fore-sections have a marked bi-convex to diamond-shaped transverse section. Four types of bases occur on these tools. The most common form has an expanding base (Figure Ga-c,i). Some of these exhibit surface remnants indicating they were made on flakes (Figure 6i) but several were clearly made by recycling points as they exhibit slight notch remnants (Figure 6c). Fully notched forms clearly made by recycling points (Figure 6d,e) are also present as are examples with roughly oval bases (Figure 6j). Finally, there are a few tools with roughly squarish to rectangular bases (Figure 6h). The stem sides on these items are straight and the basal edge is slightly convex. All these forms of drills have been recovered from Early Archaic sites in the Southeast, often in association with corner-

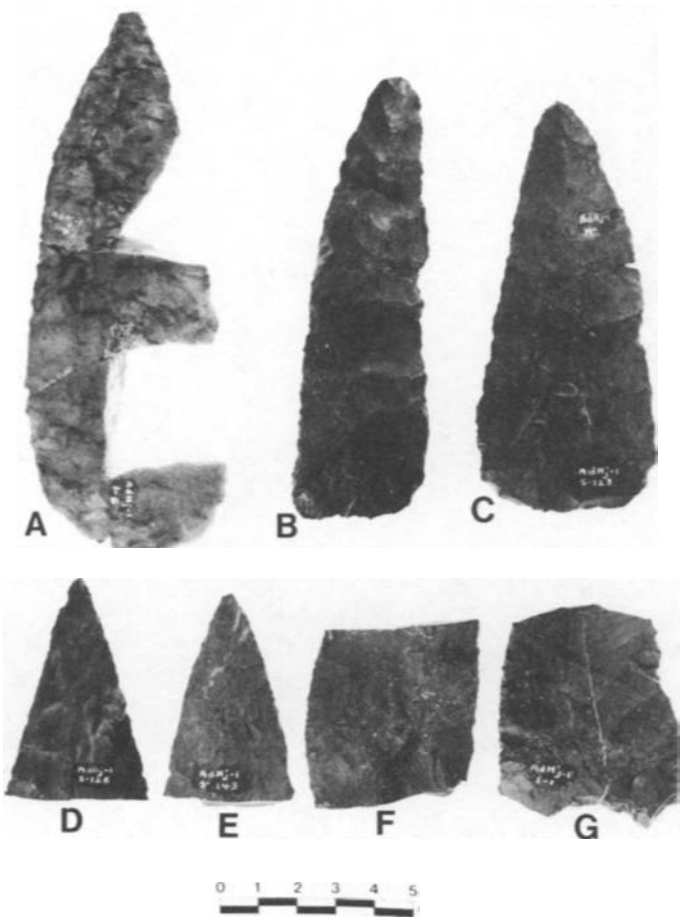

Figure 5

Large trianguloid biface tools: A-C, relatively complete; D-E, tips; F-G, mid-sections.

notched serrated points. For example, notched and expanding base drills reworked from points, as well as the oval base forms, are reported from the Hardaway site in North Carolina (Coe 1964:Figure 62c). Simple expanding base and "squared" base forms are also present (Kimball and Chapman 1977:Figure 24a, 24b; see also Broyles 1971 :Figure 279. h, j, etc.).

The final two biface tool forms include a few examples of pieces esquillées, which could be either bipolar cores or wedges, and a few largely fragmentary examples of what are referred to here as bifacial perforators. These perforators are well-made, elongated, narrow forms with marked Plano-convex transverse sections, a lack of any expansion of the base, and thin pointed tips or working ends. Pieces esquillees are quite common on Early Archaic sites in the Southeast (e.g. Chapman 1975) but the bifacial perforators are as yet unreported in such contexts. However, elongated perforators very similar to the Nettling examples, albeit unifacial, are reported from the 'Early Early Archaic Living floor" at the Shawnee Minisink site in Pennsylvania (McNett 1985:Figure 6.8m).

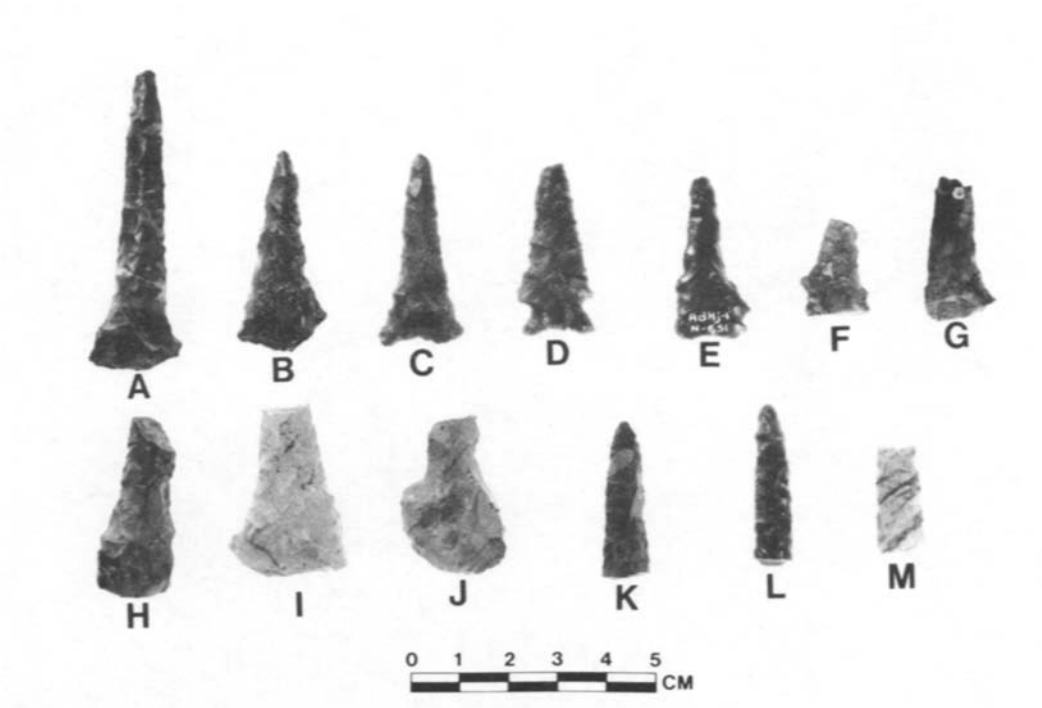

Figure 6
Drills and drill fragments.

Biface Preforms

The remainder of the biface inventory consists mainly of a large number of preforms, or fragments thereof, discarded in manufacture. As previously noted, these are dominated by local cherts as opposed to the exotics dominant among the finished tools. These preforms include larger, roughly made items in an early stage of manufacture characterized by oval to irregular outlines and broad surface flaking, down to smaller, finely retouched, final stage preforms with regular, trianguloid outlines. Among the latter are some items upon which notching was started but which were discarded before this manufacturing operation could be completed. Again, comparable items, particularly to the final stage preforms. are ubiquitous on Early Archaic sites in the Southeast (e.g. Kimball and Chapman 1977: Figure 24d).

Unifaces

End Scrapers

The most common end scraper form, represented by at least 117 examples, are small items characterized by a roughly “teardrop” or less often, trianguloid, outline (Figures 7 and 8). Bits are usually convex in outline with edge angles averaging around 60”. Lateral edges in all cases taper gently to the proximal end. Some items have slight “spurs” at one or both distal comers but these appear to be fortuitous rather than a purposefully created working edge. These end scrapers have a highly standardized shape, undoubtedly to facilitate hafting in standardized handles. For example, of the 68 items upon which the expansion of the lateral edges from the platform could be measured. almost 80% have a divergence angle between 20” and 30”. Also strongly

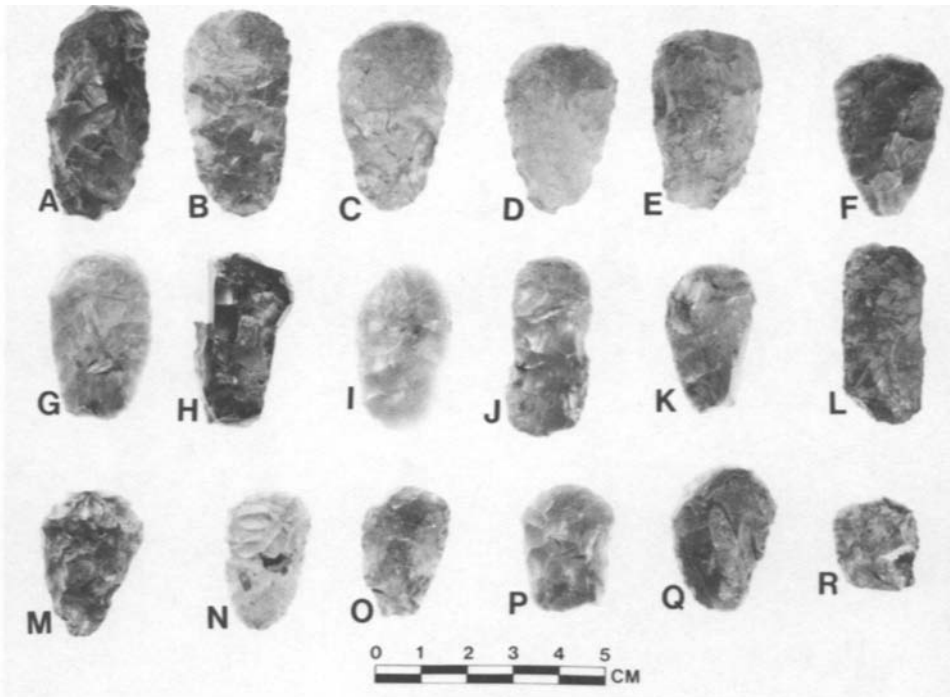

Figure 7
Variety 1 end scrapers.

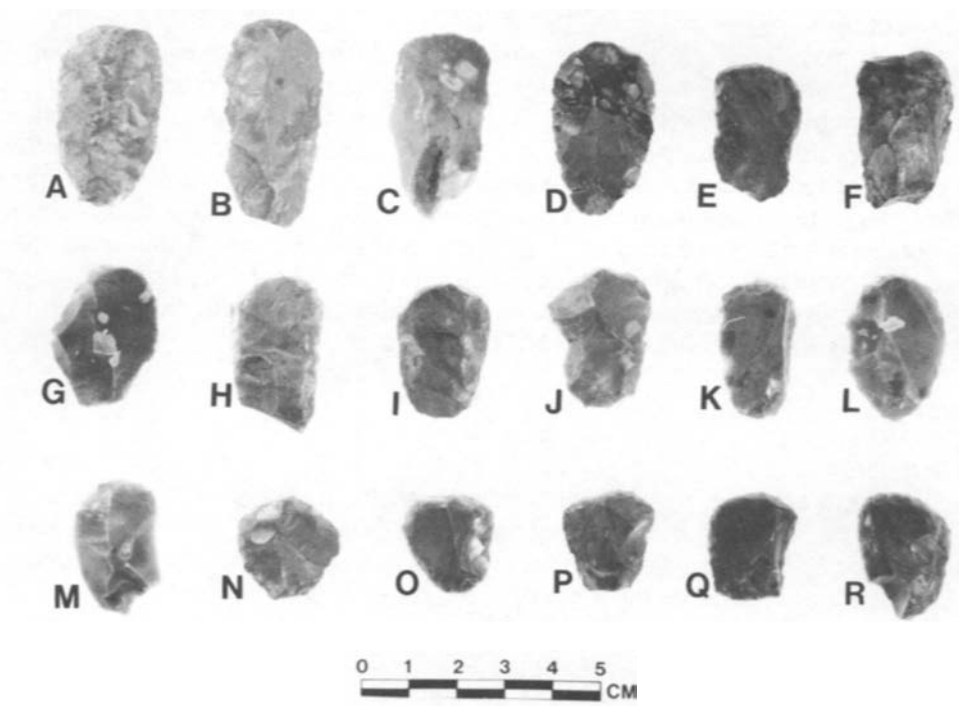

Figure 8
Variety 2 end scrapers.

variable	*degrees of freedom*	*T-value*	*probability*	
length	54	1.32	.191	
width	68	0.94	.352	
thickness		68	2.23	.029
proximal thickness*		63	1.92	.060
proximal width*	62	-0.97	.334	
bit width	75	0.50	.615	
bit depth	75	0.38	.701	
bit thickness	79	1.78	.079	

* measured at a distance of 10mm from the proximal tool end

Table 6
Statistical comparison of variety 1 and 2 end scrapers.

suggestive of hafting is the frequent presence of deliberate attempts to thin the proximal end of the tool by dorsal and ventral flaking from the proximal end and often (see below) complete flaking of the dorsal surface by removals from the lateral edges. As well, in some cases the whole ventral surface for about half the tool length has been completely obliterated by flaking from the lateral edge.

Two major varieties of these end scrapers can be distinguished based on the nature of the lateral dorsal retouch. Variety #1 includes 49 items (42.2%) which are flaked by a fine, often parallel, lateral retouch over all or most of the dorsal surface (e.g. Figure 7). At least three items are present which also have “tear drop-shaped” outlined but are larger and more coarsely flaked. We would suggest these are “preforms” for the Variety #1 end scrapers and they are listed as such on Table 1. As with the biface preforms, these end scraper preforms are dominated by local cherts.

Variety #2 end scrapers, represented by 67 items (57.8%) lack the extensive dorsal lateral flaking. Instead, they have only marginal or no dorsal retouch (e.g. Figure

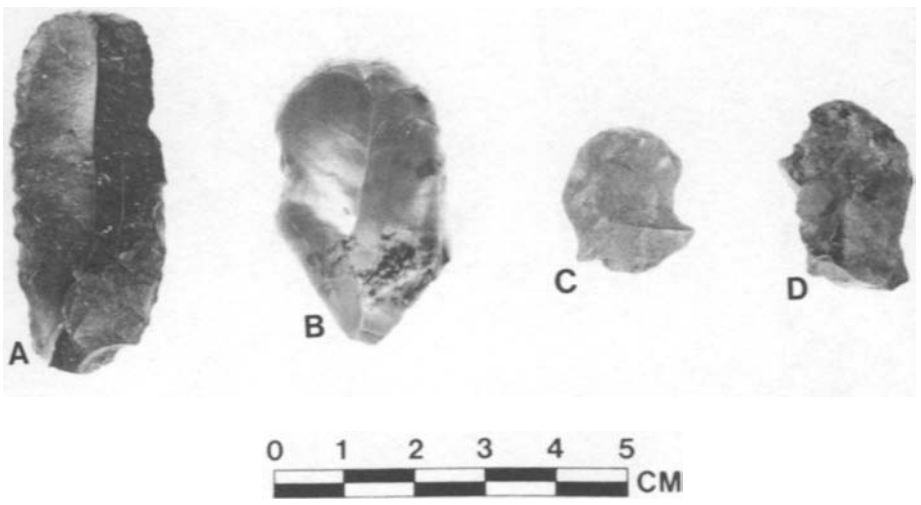

Figure 9
Other end scrapers.

8). It is doubtful that the distinction between the two varieties of end scrapers (e.g. presence or absence of dorsal flaking) reflects use differences within these end scraper forms. Instead, it probably reflects the size and shape of the original blank selected to be made into the tool form, larger and thicker items requiring more extensive lateral dorsal retouch to thin and shape them for hafting. Detailed statistical comparisons (Table 6) show no discernible differences between the varieties at the .01 significance level. Both the varieties of end scrapers are reported from Early Archaic sites elsewhere. The Variety #1 forms in particular, with their complete dorsal flaking, are diagnostic of the Early Archaic in the Southeast (e.g. Coe 1964:73; Kimball and Chapman 1977:61).

Besides the above standardized forms, and excluding one Variety #1 form reworked into a bi-bitted form by placing another working edge at the proximal end, the remaining end scrapers include a few items which are much more variable in outline shape and which exhibit no modifications designed to thin or shape the tool for hafting (Figure 9). Hence, it is probable these were hand-held tools.

Side Scrapers

Side scrapers are here somewhat arbitrarily distinguished from simple retouched/used flakes by the presence of continuous retouch along one or both lateral flake edges which extends more than 25mm back from the edge (Le. longer than retouch that we would expect to be produced simply by use).

A highly distinctive side scraper form is referred to here as a 'specialized concave side scraper" (Figure 10) and is represented by 16 examples, many of which are fragmentary. These items were dearly hafted, having a distinct stem with extensive dorsal or lateral retouch at one end. They also often exhibit dorsal thinning from the proximal end and/or ventral lateral thinning as a hafting modification. In two instances, the ventral stem surface has been completely flaked such that the stems are essentially bifacial. The fore-sectionsalways exhibit a steeply and continuously retouched concave

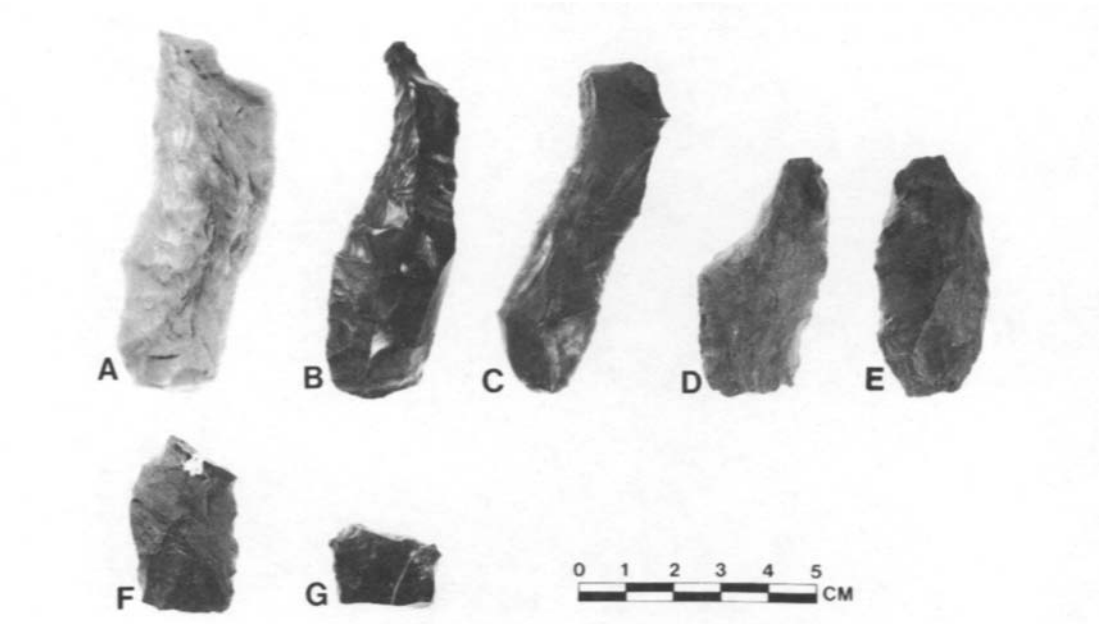

Figure 10
Specialized hafted concave side scrapers.

type	*n*	*edge form**		
		concave	*convex*	*straight*
single straight	3	-	-	3
single concave	6	6	-	-
single convex	7	-	7	-
double concave/straight	1	1	-	1
double convex/straight	1	-	1	1
double alternate	1	-	2	-
double concave/convex	2	2	2	-
double concave	3	6	-	-
totals	24	15	12	5

* refers to number of edges of each shape per tool type

Table 7
Nettling site side scrapers.

margin on one side and a generally more acute, continuous to discontinuously retouched convex edge on the opposite margin. With one exception (Figure 10e), the concave edge always occurs on the left side when viewed in dorsal plan with the stem towards the bottom. Functionally, these items seem to have served as hafted draw-shaves or spokeshaves. As with the large trianguloid bifaces, these items are notable in that they are predominantly on Upper Mercer chert and that they are more common in the small South assemblage (Tables 1 and 3). These specialized scrapers are known to the authors from two other sites with corner-notched serrated points in southern Ontario.

No definite examples of this type of tool have been reported from Early Archaic sites with notched points elsewhere in the East although some possible examples have been illustrated (e.g. Chapman 1978: Figure 19g). However, definitive examples of these items are reported in temporally early site contexts. In particular, they consistently occur on Dalton sites in the lower Mississippi River valley area where they are variously referred to as “backed blades”, “backed hafted unifaces” or “backed scraper/knives” (e.g. Morse 1971 :Figure 4c, 1973:27 and Figure 4d-f, 1976:Figure 2i, 1982: Figure 7.3v; Redfield and Moselage 1970:Figure 6h). They also appear similar to some of those items referred to as “oblong scrapers” from Suwannee contexts in Florida (Daniel and Wisenbaker 1987:Figure 25i-j). In addition, hafted tools with concave “left” edges but having side-notched stems, are a commonly reported tool form in Early Archaic contexts in the Southeast (e.g. Griffin 197450; Michie 1973; Purdy 1981:26-29; Webb, Shiner and Roberts 1971 :Figure 10d).

The remaining side scrapers were apparently unhafted and several varieties of these can be distinguished based on the position of retouch (one or both edges) and edge outline shape (Table 7; Figure 11). It is notable that concave edges are predominant among these tools, accounting for *ca.* 47% of the working edges. One double concave-convex form and one double concave form are notable in that they are composite tools, also exhibiting a thick spur or borer.

Other Unifaces

The remainder of the unifacial tools are forms with minimal edge retouch. Simple retouched flakes predominate. Among these are at least four bilaterally retouched

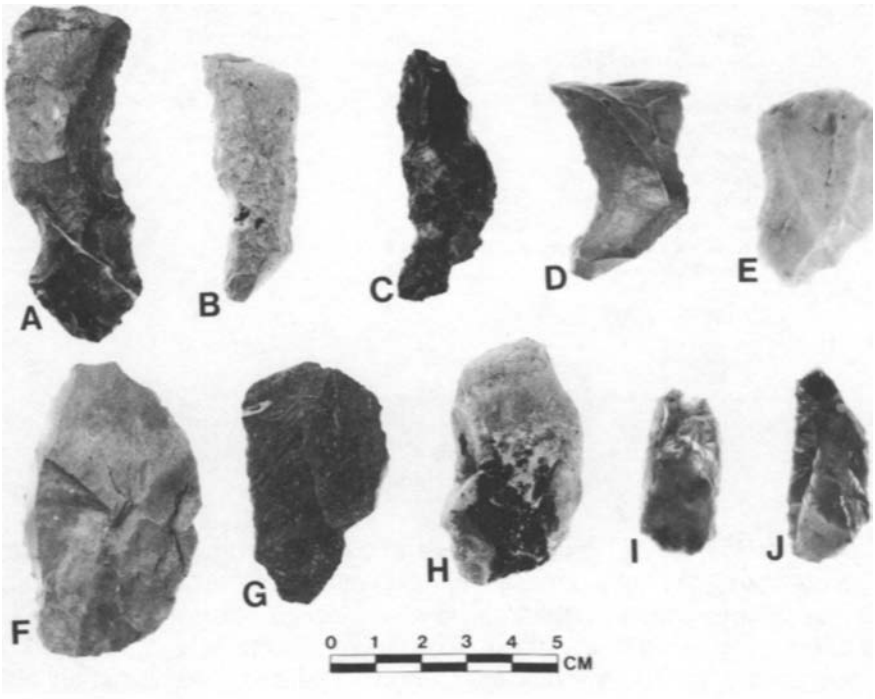

Figure 11
Other side scrapers.

'Madelets" which are a characteristic tool form on some Early Archaic sites in the Southeast (Kimball and Chapman 1977%). Also common are denticulates or tools with "toothed" working edges. These items range from forms with gross serrations (Figure 12ad) to finely serrated specimens (Figure 12e-i). Other unifaces include a few simple notches and a variety of forms with relatively small, generally thin, pointed working edges. Some of the latter, with very small working edges, could be classified as micro-piercers or "gravers." At least three of these were made by recycling, the micro-piercer being placed at or near the proximal end *(2* examples) or in the centre of the bit (one example) of oval end scrapers. These are also some tools with larger, thin, pointed edges and a fairly marked divergence of the lateral edges forming the working 'point". These items have been classified variously in the Early Archaic literature as borers, perforators or 'pointed scrapers" (e.g. Coe 1964:Figure 67a; Kimball and Chapman 1977:852).

Flaking Debris

The 2474 pieces of chert flaking debris in the collections represent the whole sequence of toot manufacture from cores down to tool retouch and resharpening flakes (Table 2). It is notable that the whole sequence is represented even among the major Ohio cherts (e.g. Pipe Creek and Upper Mercer) although, as was the case with unfinished tools such as preforms, the bulk of the debris and particulary that from the earliest stages of manufacture (cores and blocky fragments; decoration flakes; Table 4), is on local Selkirk and Onondaga materials. There is no evidence in the collections for the use of standardized core forms and hence, reduction sequences for primary

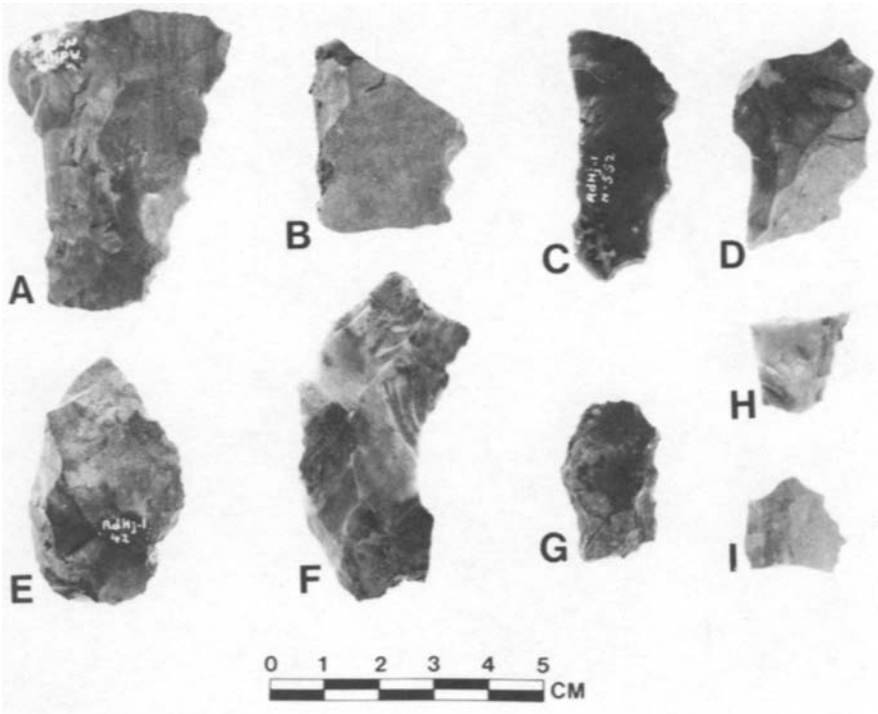

Figure 12
Denticulates.

flake blank production. To be sure, **a** few "blade-like" flakes, considered to be a major characteristic of Early Archaic in the Southeast (e.g. Kimball and Chapman 1977:70-71) do occur, not only among the debris, but also, among the tools (e.g. Figure 9a). However, these appear to be fortuitous as they are rare and all of the cores recovered are "random," indicating the use of non-standardized techniques. The cores suggest reliance on "haphazard" reduction was the norm with the knappers selecting mainly fortuitously produced flakes for tool blanks. This lack of a heavy reliance on shaping on the core is also suggested by certain common tad forms, notably the Variety #1 end scrapers, where the blanks were extensively shaped after detachment by secondary retouch to make them into tools.

GROUND AND ROUGH STONE INDUSTRY

Chipped and Ground Stone Celts

One of the most distinctive toot types in the Nettling assemblage is the chipped **and** ground stone celt (Figure 13). represented by 32 finished examples on either banded state or the metasediment subgreywacke (see Kenyon 1980). In all cases the bit is ground and for the most part, so are the lateral edges and the poll ends. Other surfaces, although sometimes dulled by light grinding, particularly on slate specimens, retain flaking from earlier stages of manufacture or, in the case of some items on slate, pecked surfaces. The only real exceptions are two very small items on slate where because of the form of the small pebble selected **as a** tool blank. only minimal grinding of the lateral and poll ends and of course, the bits, was necessary to convert the blank

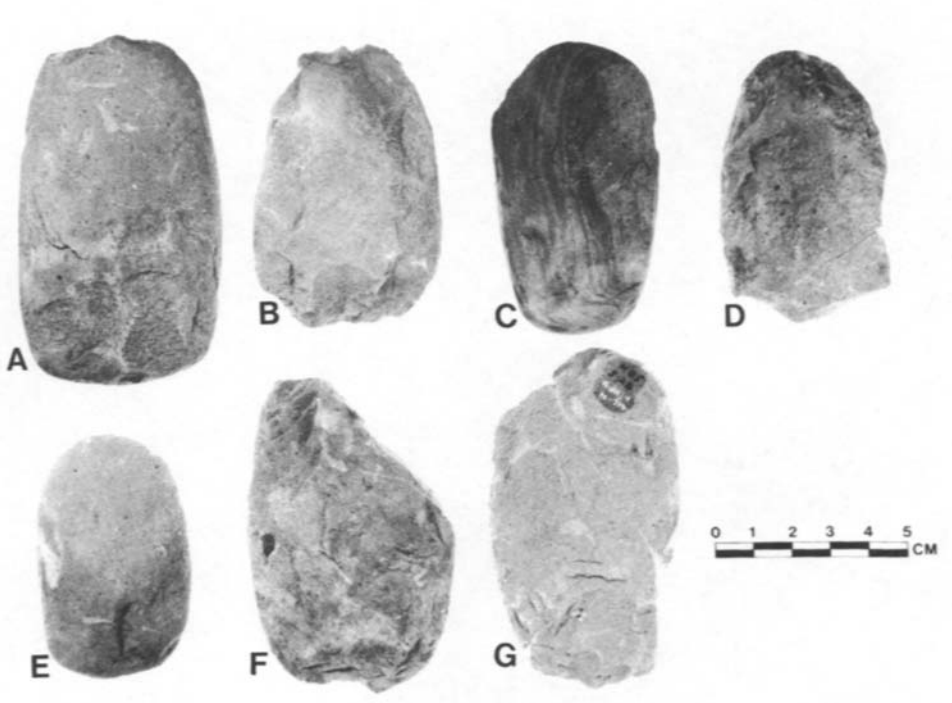

Figure 13
Chipped celts with ground bits.

into a finished tool. Besides the finished tools of this type, there are several examples of celt preforms which, except for the lack of grinding, more or less approximate the finished product.

Chipped and ground stone celts are undoubtedly the earliest tools with ground working edges in the East (see Chapman 1978:70), having been reported from a number of Early Archaic assemblages. Sites where they are reported include: Sheep Rock Shelter, Pennsylvania (Michels and Smith 1967), Ward's Point, New York (Ritchie and Funk 1971:52), St. Albans, West Virginia (where they are called "grubbing tools or hoes;" Broyies 1971:39), and Rose Island (Chapman 1975:161) and Bacon Farm (Chapman 1978:68-70) Tennessee. However, these items are usually represented by only one or two examples at other sites. In fact, the number of such items from Nettling probably exceeds the total number of these Early Archaic tools reported to date from the East.

Ground and Polished Stone Tubes

A surprising element in the Nettling collection is the presence of six ground and polished slate stone tubes, exquisitely drilled through the long axis (Figure 14). In addition, there are at least seven unfinished specimens including both forms which had simply been pecked into a rough outline shape and forms which had been fully or partially drilled before discard. The finished specimens have drill holes averaging about 12cm in diameter. All completed items also exhibit a flattened surface along part or all of one side. As such, the cross-sections are markedly plano-convex

To date, such items have never been reported from Early Archaic contexts. Virtually identical "tubular to barrel-shaped atlatl weights," as well as preforms for the

same, have been reported from Middle Archaic (post-8000 B.P.) sites in the Southeast (e.g. Chapman 1977:90 and Figure 26f, 26h, 1979:Figure 17b, 18b). They are also reported from the Eva site in Tennessee (Lewis and Lewis 1961:66-68) where they are often assigned to a Middle Archaic occupation although the complex stratigraphy at that site combined with the presence of the odd example of what appear to be Early Archaic point forms, does raise the possibility these could be of Early Archaic provenience. Regardless, we would suggest these tubes are associated with the Early Archaic occupation at Nettling and as such, they would be the earliest reported fully ground and polished stone tools, not to mention atlatl weights per se, in the East. The sheer number of these items at Nettling and the major predominance of the Early Archaic occupation would suggest such an interpretation. Further, there is absolutely no suggestion of Middle Archaic occupations at the site. Moreover, examples of these tubes have been recovered not only from the Early Archaic North and South concentrations but also from the Peripheral concentration (Table 1). again suggesting an Early Archaic placement. It seems possible that these undoubtedly rare items in the tool kits are only discernible at Nettling as part of Early Archaic assemblages because of the very large size of the recovered sample which suggests a substantial, perhaps long-term, occupation. The large number of other definite Early Archaic tool forms at Nettling which are exceedingly rare elsewhere. such as the celts, makes this a plausible suggestion.

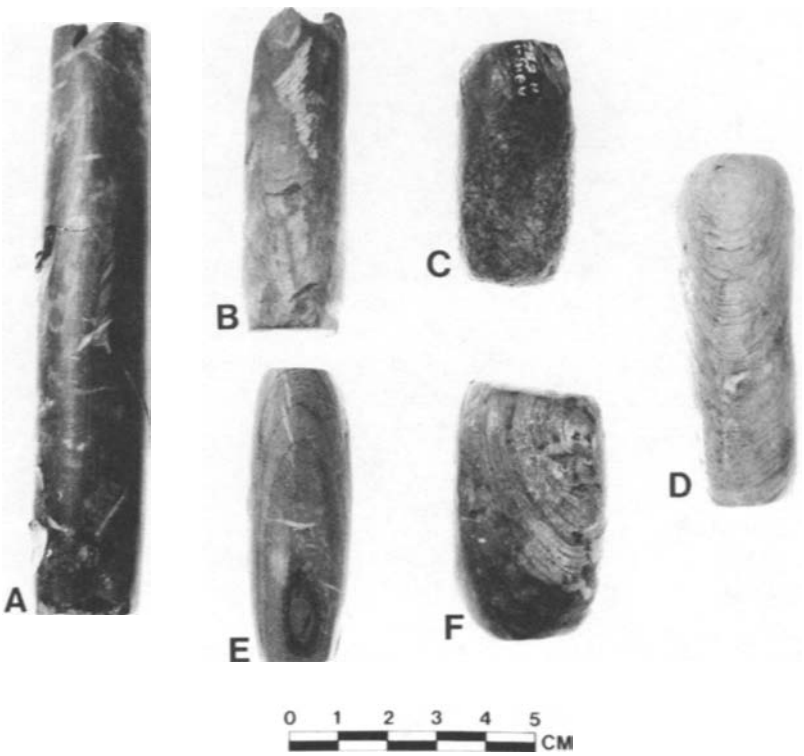

Figure 14
Ground and polished stone tubes.

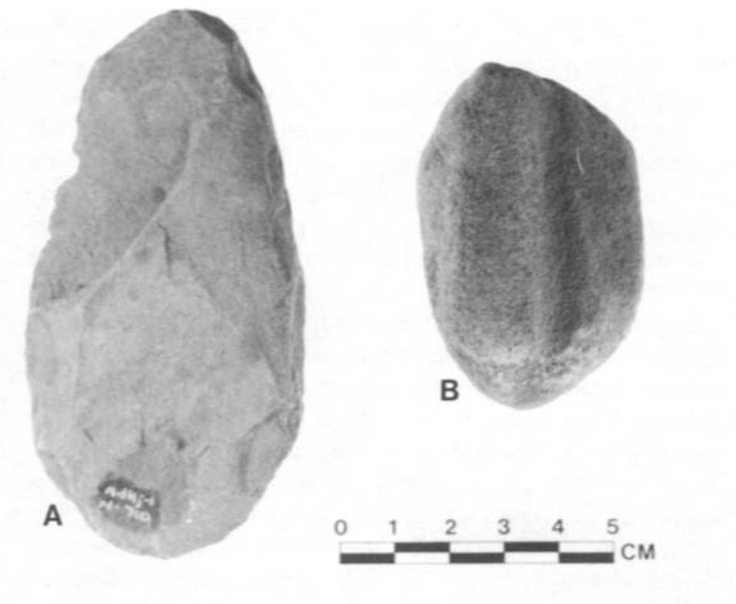

Figure 15
Ovate chopper/scraper (A) and oval grooved abrader (B).

Abraders

The Nettling site collection includes 18 abraders made on a fine-grained sandstone. For the most part. these items lack any standardized shape and refits of some fragments suggest shape was largely determined by continued use, breakage or wear, and reuse. Actual signs of use are confined to broad, shallow, poorly defined concave surfaces or rarely, very narrow deep "striations" which could conceivably be a product of grinding the sharp bits of the celts. Notable exceptions to the above generalizations are two examples of small "dumbbell-shaped" items with constricted centres. Also, there is a single example of a roughly oval form which has single, narrow, welldefined, concave linear depression down the centre of the long axis on each face (Figure 15b). A mid-section of what is apparently another abrader of this form is also in the collection. Definitive examples of these oval grooved abraders are not reported from notched point Early Archaic occupation sites elsewhere although Kimball and Chapman (1977:Fig. 27b) illustrate a "pitted cobble" with a linear groove from Early Archaic contexts at the Icehouse Bottom site in Tennessee. However, as with the specialized concave side scrapers, examples of identical oval sandstone abraders with central grooves on one or both faces are reported from several Dalton sites (e.g. Goodyear 1974:69-72; Morse 1971 :Figure 5d, e, 1976:Figure 5).

Chopper/Scrapers

At least three items in the collection are made on large sandstone/siltstone spalls or cobbles and have marginal bifacial retouch around the periphery and usedulled margins. Although one item has an irregular outline, the other two are ovate in plan (Figure 15a). The ovate items are a characteristic Early Archaic tool form, being reported from a large number of sites elsewhere (e.g. Chapman 1978:68; Kimball and Chapman 1977:92-93; Funk and Wellman 1984:Plates 7 and 21; Ritchie and Funk 1971:52).

Other Items

Excluding a number of spalls and flakes from tool manufacture, the remainder of the rough stone assemblage is made up of hammerstones, anvilstones, some small

polished slate pebbles of unknown function, and two definite and one possible example of pitted cobbles. Despite their consistent presence on Early Archaic sites elsewhere, there are no items which could be construed as manos, mortars or grinding stones.

DISCUSSION

The Early Archaic in the Southeast/Northeast

In the southeastern United States it is generally accepted that the Early Archaic consists of a fairly uniform series of time-sequential developments across much of that area (see Anderson and Hanson 1988; Broyles 1971; Chapman 1976,1980,1985; Coe 1964; Goodyear 1982; Smith 1986; Steponaitis 1986; Tuck 1974). This sequence Is based not only on multiple radiocarbon determinations but also, on a remarkable series of deep, well-stratified, river bank sites formed largely by continued overbank flooding and deposition. These sequential developments are referred to as either "traditions" or "horizons" and changes in point forms or "point type clusters" are a main defining criteria. From earliest to latest, and excluding Dalton which we prefer to view as Late Palaeo-Indian, these "horizons" include: side-notched (Taylor, Kessell, Bolen, Big Sandy and related point types; *ca.* 10,000-9500 B.P.); corner-notched (Palmer, Kirk and related point types; *ca.* 9500-8900 B.P.); and bifurcated (St. Alban's, LeCroy, Kanahwa and related point types; *ca.* 8900-8000 B.P.). It is even possible to recognize finer subdivisions within these developments. For example, the earliest bifurcate forms are corner-notched as well as split-based showing continuity from the preceding "horizon" while later bifurcates are also stemmed and begin a series of stemmed points that continue into the succeeding Middle Archaic (Chapman 1979:53-54). There seems to be clear evidence for gradual, incremental changes in point forms throughout the sequence (see Tuck 1974).

Point forms closely resembling all of the above southeastern Early Archaic forms occur over much of the Great Lakes/Northeast. While some argue that they are of a comparable age and sequence to that of the Southeast (e.g. Dincauze and Mullholland 1977:439; Ellis and Deller 1986; Funk 1978:23; J. Wright 1978) others argue that these point forms overlap considerably in time and in some cases, date well into the Middle Archaic (e.g. post-8000 B.P.; see Snow 1980:163-166). This latter view is based on three main considerations.

First, radiocarbon dates purportedly in association with such point forms in the northern areas are used to support the non-applicability of the southeastern sequence (e.g. Snow 1980:165-166). In particular, it is often emphasized that "Kirk-style" points date much later to the north (e.g. McNett 1985:106-107). Yet, objections can be raised to this view. Almost all of these northern sites have poorly developed stratigraphy, extremely small point samples, and the association between the dated materials and particular point forms is often highly suspect. Also, it is quite clear that items often called "Kirk" or said to be related to the same, date later, even in the Southeast.

The various "Kirk" point types (Corner-Notched, Stemmed, Serrated) were originally defined by Coe (1964:56-83) based on his work at the Hardaway site, North Carolina. Although this site was essential to Coe (1964) in placing the early part of his Archaic sequence in a temporal framework, often overlooked is the fact that Hardaway was not a river terrace site with well-developed stratigraphy like the sites he used to develop a time framework for the later parts of the local Archaic sequence. Rather, Hardaway was situated on a hilltop back from the river and consisted of a thick midden deposit which mainly appears to have accumulated gradually over a considerable period of time rather than being a well-stratified site with rapidly accumulated strata.

Indeed, while difficult to delineate strata were present at the site, the vertical distribution of point forms was presented by Coe (1964:62) largely in terms of arbitrary six inch levels-not in terms of natural stratigraphy. Hence, the sequence of point forms suggested at that site was based logically and simply on the idea that types which were on average deeper in the gross stratigraphy of the refuse mantle were older and subsequent work throughout the Southeast has tended to support Coe's (1964) *sequence* of point forms. Radiocarbon dates were not available for the Hardaway site but because the Kirk Stemmed/Serrated points appeared similar to the Kirk Corner-notched forms, Coe (1964) inferred that they were probably close in time. However, more recent work at better stratified sites suggests that the Kirk Stemmed/Serrated points date relatively recent in the Southeast, being part of the early Middle Archaic proliferation of stemmed points (e.g. Chapman 1979:32-33, 1980:129; see also Mocas 1977). For that matter, there is growing evidence that notched/serrated points do occur in the Middle Archaic of the Southeast. For example, points of the Amos Corner-Notched type (Broyles 197155) were originally attributed to the Early Archaic, but are now strongly suspected to date some time after 7,000 B.P. based on radiocarbon and stratigraphic evidence (Wilkins 1985; Youse 1983, 1985). While these Middle Archaic point forms are more poorly made and more grossly serrated than the "classic" Early Archaic forms, the two can be confused and it is probable that many of the supposedly later "Kirk" points in the Northeast are not true Early Archaic Kirk forms.

Second, based on work at some deep, more northerly located sites such as Shawnee-Minisink (McNett 1985:95-111) and Fifty (Gardner 1974:15-16) there is a suggestion of a more complex series of changes of point forms than that documented in the Southeast. At both sites, it is inferred corner-notched forms are the earliest, but that these were followed by side-notched forms (and also, at Shawnee Minisink some stemmed items) instead of leading immediately into bifurcates. However, at least in the case of Shawnee Minisink, the delineation and sequence of living floors is quite complex (see MacMillan 1977) and we have severe reservations with using such data to reject the application of the Southeastern sequence. A more important objection concerns the nature of the point typologies used, not only at the Northeastern sites but also, in the Southeast.

As emphasized by Chapman (1977:25, 1978:56), many of the types used to categorize Early Archaic points are merely descriptive devices and the variability they exhibit is poorly documented and explained. For example, factors such as resharpening and reworking or discard in manufacture can account for much variability but their effects on morphology have not been thoroughly explored. We suggested above, for instance, that resharpening and reworking can change corner-notched forms into side-notched or even stemmed forms (see also Chapman 1977:39,1979:49) and failure to take such factors into account can create much confusion. We would suggest the side-notched forms reported by McNett (1985:Figure 6.12c-e) and Gardner (1974:Figure 12cd) are simply laterally resharpened or reworked corner-notched points on which the barb over-hanging the notch has been removed. Without exception, these items have extremely narrow, often elongated fore-sections which are almost "drill-like" in several cases. Further, the diagonal orientation of the notches, characteristic of corner-notched points, is clearly evident on several of the illustrated examples (e.g. Gardner 1974: 12 cd; McNett 1985:Figure 6.12d). In addition, at least one of the stemmed points at Shawnee Minisink (McNett 1985:Figure 6.12L) isvirtually identical to the "stemmed," reworked corner-notched point from Nettling (Figure 4q).

Finally, some reject the southeastern sequence because it is argued the point forms are measuring function or use and thus, would not be expected to fit into a nice time-sequential series (Snow 1980:162). We do not doubt that several of the contrasts between the point forms are measuring subtle "functional" differences within this general projectile point/knife category. In fact, given the small size of the points, and the fact they would mainly be encased in a haft, it is difficult to believe they could be measuring other forms of variation such as purposeful social distinctions (e.g. "iconological" style; see Sackett 1982) between groups (see H. Wright 1989:349). However, even granted "functional" differences, this does not mean they are useless for measuring time. It is entirely possible that the contrasts between the various point forms could represent gradual changes in "function" or design improvements through time. Indeed, there is good evidence that this is exactly the case. In the Southeast, and as noted earlier, the changes do seem to be incremental in character with straight- to convex-based corner-notched points giving way to corner-notched bifurcated points, then stemmed bifurcates and finally, Middle Archaic stemmed points with less deeply notched, concave bases. Also, and this is largely a philosophical difference, we believe that human technological behaviour is very dynamic in character. Hence, the static view of some northeastern researchers embodied in the idea that certain quite distinctive and complex point form clusters, such as the Kirk Corner-Notched cluster forms, could persist for literally 2000 or more years without significant change is to us, totally unrealistic. Finally, accepting that the point forms in the Southeast are measuring time depth raises the basic question of why they should measure time in the Southeast but not the Northeast as Snow (1980:162) has argued. In short, those rejecting a time sequence have not provided any explanation for this part of their argument. As it stands, the powerful scientific criterion of parsimony or simplicity suggests that a comparable time sequence in the Southeast and Northeast is the best explanation.

Therefore, we view the objections raised to the applicability of the general southeastern sequence to the Northeast to be without foundation. We suggest these objections incorporate unrealistic assumptions about the dynamic nature of human technological behaviour and the causes of point form variability and that they are largely invalidated by recent improvements in our knowledge of the age of "Kirk-style" points and notched/serrated points in general in the Southeast. As we see it, many if not most of the objections raised to applying the southeastern sequence are simply attempts by northeastern researchers to circumvent the basic problem that the northeastern sites available are inadequate for firmly dating Early Archaic developments in that area. Until such time as well-stratified and multiple dated sites are reported from the Northeast, we believe the general southeastern "horizon" sequence is a more valid, realistic and parsimonious cultural historical model for the northerly regions.

Age of the Nettling Site

Accepting the validity of the general southeastern sequence in the Northeast, it is possible to provide age estimates for the Nettling site assemblage. There seems little doubt that the site is of an Early Archaic age. As noted earlier, serrated, notched points need not be indicative of Early Archaic affiliation based upon the recovery of such forms in Middle Archaic sites in the Southeast. For that matter, such points do occur in undoubted Middle Archaic contexts in the Great Lakes region (e.g. Lovis 1989). However, as stressed above, these Middle Archaic forms tend to be poorly made and grossly serrated and this is not the case for the Nettling forms. Moreover, the emphasis on the use of exotic cherts procured from some distance supports an early temporal

placement as such a strategy is dominant on northeastern Palaeo-Indian sites (e.g. Ellis and Lothrop, editors, 1989) and is clear evidence of some degree of continuity from Palaeo-Indian to Early Archaic. More importantly, the rest of the tool kit from Nettling provides clear evidence of its Early Archaic affiliation.

As should be clear from the preceding descriptions, virtually the whole Nettling site assemblage, not just the point forms, duplicate those from Early Archaic sites with notched points in the Southeast. Some of the simple tool forms such as retouched flakes, denticulates, micro-piercers, pièces esquillées, pitted stones, etc. are common to many lithic industries of various ages and so, are not that distinctive or diagnostic. However, tools such as the large trianguloid bifaces, the particular expanding-, ovoid-, notched- and squared-base drill forms, dorsally flaked teardrop shaped end scrapers, chipped celts with ground bits, and ovate chopper/scrapers are quite distinctive and restricted to Early Archaic assemblages in the Southeast. With the exception of items such as manos and mortars, Nettling includes every tool form reported from Kirk Corner-Notched horizon sites in the Southeast.

To be sure, there are some distinctive items in the Nettling assemblage which have not been reported from Early Archaic sites with notched point forms in the Southeast. These would include the bifacial perforators, the specialized hafted concave side scrapers, the oval grooved abraders, and the ground and polished stone tubes. It is notable, however, that at least the specialized concave scrapers and the oval abraders do definitely occur in other early contexts in the Southeast, specifically in the Dalton horizon. The bifacial perforators and the tubular weights are not yet reported in either late Palaeo-Indian or Early Archaic contexts elsewhere. However, both these tool forms are very rare at Nettling. It is possible therefore that they occur elsewhere but are difficult to recognize because of their rarity.

There seems little doubt, therefore, that the Nettling site is Early Archaic in affiliation. The point forms suggest ties to the Archaic "Kirk Corner-Notched Cluster" (see Chapman 1975, 1977, 1978, etc.) or "horizon" (Tuck 1974) in the southeastern United States. As such, an age of roughly 9500 to 8900 B.P. is suggested. It might be possible to suggest that Nettling dates early within the Kirk Corner-Notched Horizon ***(i.e.*** closer to 9500 B.P.) based on the presence of artifacts such as the hafted concave scrapers and the oval grooved abraders, both of which are characteristic of earlier Dalton materials in the Southeast. In sum, it is possible that these particular items are ones which continued to be used until only the earliest part of the Kirk Corner-Notched Horizon. The deep narrow notches on the points would be consistent with this inference as such appear more characteristic of earlier corner-notched variants in the Southeast (Chapman 1979: 124). Against this interpretation, however, is the relatively small size of the Nettling points, especially the short stems and narrow basal widths (under 20mm) which in the Southeast seem more characteristic of later times (Chapman 1979:123-124, 1980, 1985; but see Broyles 197156; Chapman 1978:54). Clearly, this question cannot be resolved with present evidence.

Environmental Context of the Nettling Site

The above age estimates place the Nettling site firmly within the "Pine Zone" or "Pollen Zone 2" (see McAndrews 1981). Since the 1960s some investigators, notably Ritchie (1969) and Fitting (1968) have argued that Early Archaic sites and finds are extremely rare in the Great Lakes-Northeast. It was suggested that this rarity was a result of a closed coniferous forest cover which provided only a limited resource base and severely constrained populations. There was even the suggestion that the appearance

of closed coniferous forests produced a drop in population from earlier Palaeo-Indian times as the open forests conducive to a Palaeo-Indian emphasis on hunting disappeared and their adaptations and cultural systems collapsed.

More recent workers (e.g. J. Wright 1978) have argued against this position. Indeed, work in some areas of the Great Lakes such as northern Ohio (Payne 1982) and southeastern Ontario (Roberts 1988:282-283) has clearly shown that findspots representing specific Early Archaic "horizons," such as the Corner-Notched one, are certainly more common by themselves than all earlier Palaeo-Indians finds. Based on our own experience in site survey in southwestern Ontario and the number of definitive early Archaic sites recorded (e.g. Figure 1), such materials also seem much more common in that area than those representing Palaeo-Indians. If frequencies of finds are any guide, population increase seems a much more reasonable interpretation. Such a characterization seems more consistent with revised interpretations of vegetation covers of the time.

In northern Ohio, work since the 1970s (e.g. Brose 1989:23-24; Shane 1975100) suggests the vegetation cover after 10,000 B.P. was not a closed one and further, that nut-bearing trees such as oak and hickory were fairly common. Yet, in southwestern Ontario, the situation is less clear. A closed forest dominated by pine was certainly present during the inferred time of the Nettling site occupation between *ca.* 9500 and 8900 B.P. and for some time thereafter (McAndrews 1981; Mott and Farley-Gill 1978). It is evident though that this was not simply a "boreal forest." A number of hardwood species and especially, oak, seem very well-represented in pollen spectra and were probably a significant and increasing presence in the forests of the time. Mott and Farley-Gill (1978:1109) argue that the vegetation of the time had no real modern analogs and could be best characterized as a mixed forest rather than a boreal one (see also Schwert et al. 1985). These newer environmental characterizations suggest that the earlier stereotype of a very sterile, closed, coniferous forest cover were overdrawn and serve to undermine some aspects of the Fitting-Ritchie model.

Regardless, and although it is probably premature to generalize from a single site, the data do suggest that the environment of the Great Lakes area was "resource poor" and that population densities were low relative to areas to the south. The lithic materials used at Nettling indicate considerable annual range mobility and such is characteristic of fairly low density populations and situations in which resources were widely distributed on the landscape. There are no indications of such a high degree of mobility among comparable Early Archaic groups to the south. This contrast seems to represent a continuation of north to south range mobility differences seen in earlier Palaeo-Indian times (see Meltzer 1984). Also, it is perhaps notable that the only artifact forms absent at Nettling which are reported among Kirk sites to the south are plant-processing tools such as manos and mortars. This absence might suggest that the processing of plant foods was less important at the more northerly sites. Finally, even if very "resource poor" environments were characteristic of at least southwestern Ontario environments at the time of the Nettling site occupations, because the occupants were capable of a high annual range mobility it is plausible to suggest that the area was only exploited on a seasonal basis-perhaps during the less "rigorous" months of the year. Such a practice might obviate to some extent any possible environmental constraints on population sizes in that area.

CONCLUSIONS

The Nettling site represents the first major (i.e. large) Early Archaic site to be reported from the lower Great Lakes area. It has permitted for the first time a detailed

documentation of Early Archaic tool kits in that area. Based on external artifact comparisons, the site is clearly related to the Kirk Corner-Notched Horizon of ***ca. 9500*** to 8900 B.P. in the southeastern United States and may date early in that horizon. Indeed, the site is not only comparable to sites of that horizon but is so similar in terms of the total tool kit that it can be easily classified as a Kirk complex site. As such it would be one of the most northerly sites reported for that manifestation.

While we have stressed the nature of the tool kit, age estimates of the site, and some inferences concerning environmental adaptations in this report, it is clear that the implications and potential importance of the site go beyond these considerations. As one example, there is little evidence for the use of more northerly located chert sources at Nettling such as Collingwood (Fossil Hill; Storck and von Bitter 1989) Kettle Point (Janusas 1984) Balsam Lake (von Bitter and Eley 1984) or Bayport (Luedtke 1976). Moreover as J. Wright (1978) has emphasized, Early Archaic finds in southern Ontario tend to concentrate in more southerly locations. At the same time, actual definitive "Plano" Late Palaeo-Indian sites with point forms resembling Agate Basin and Hell Gap of the West and employing all of the more northern chert sources a re restricted to the more northerly parts of southern Ontario such as in the southern Lake Huron Basin area (Ellis and Deller 1986) the lake Simcoe lowlands (Dibb 1985; Storck 1979; Stewart 1984), and the Rice Lake area (Jackson 1984). Such distributions and lithic preferences may suggest these *particular* Late Palaeo-Indian and Early Archaic manifestations are, to some extent, contemporaneous.

As another example, some have argued that the only contrast between Palaeo-Indian and the earliest Archaic is the presence of notched point forms in the latter (e.g. Gardner 1977:258). Based on the Nettling assemblage, however, we would suggest that this is a gross oversimplification. With the caveat that there may be, and undoubtedly is, regional variability in the nature of these contrasts across the East, and although there are similarities and evidence of continuity between Palaeo-Indian and Early Archaic (such as in the size of annual ranges covered as measured by distances to chert sources used), at least in the southern Great Lakes area several contrasts are evident beyond that of point hafting changes. For instance, the Nettling assemblage includes a number of more formal tool types on coarse-grained rocks such as the pitted stones, ovate chopper/scrapers, oval abraders, chipped celts with ground bits, and probably, tubular atlatl weights, which are unreported on Palaeo-Indian sites in the area. Indeed, the introduction of ground stone tools and of heavywood-working tools represent major contrasts. Similarly, there are differences in the fine-grained tool forms such as the reduction in size and the appearance of complete dorsal flaking on the end scrapers. Differences are also suggested in lithic procurement practices and how lithic tool kits were produced and transported across the landscape. Palaeo-Indians made little use of secondary chert deposits in the lower Great Lakes area (e.g. Ellis 1989; Lothrop 1989) but at Nettling, these were extensively employed. Also, while Palaeo-Indian groups relied heavily on the use of standardized core reduction procedures and restricted actual core reduction to lithic source areas (Ellis 1984, in press; Lothrop 1989; H. Wright and Roosa 1966), the Nettling site date suggests there was little reliance on standardized core reduction and the presence of cores on even Ohio cherts indicates this reduction was not restricted to source locations. Since tool kit size, simple tool size, lithic preferences and lithic reduction/transportation strategies are often intimately related to aspects of settlement mobility (see Goodyear 1989; Parry and Kelly 1987; Shott 1989) this may suggest major differences in aspects of that mobility. Finally, we are impressed with the sheer density of material at Nettling. None of the numerous Palaeo-Indian sites

investigated to date in the lower Great Lakes area have anywhere near the density of material seen at Nettling and we believe that this is strongly suggestive of contrasts in land-use patterns.

Whatever the case, it is difficult to evaluate these inferences with data from a single site, and largely a surface-collected one at that. At most, these data can only be suggestive. A detailed and subtle understanding of the Early Archaic in general and in turn, of the relative ages and contrasts between Palaeo-Indian and Early Archaic, will require considerable additional research effort.

ACKNOWLEDGEMENTS

The analyses of the Nettling assemblage have been supported by a SEED grant from Employment and Immigration Canada. We gratefully acknowledge this support and assistance in the analyses by Anne Moulton. We also thank Brian Deller, Jim Pengelly, Bill Parkins and James Payne for discussions and information which led to some ideas expressed in this paper. Finally, and although we accept full responsibility for errors and omissions, this paper has benefitted immensely from comments provided by David Brose, Jefferson Chapman, Randy Daniel, Robert Funk, Albert Goodyear and Henry T. Wright.

REFERENCES CITED

Anderson, D.C. and G.T. Hanson

1988 Early Archaic settlement in the Southeastern United States: a case study from the Savannah River Valley. *American Antiquity* 53(2):262-266.

Brose, D.S.

1989 The Squaw Rock Shelter (33CU34): a stratified Archaic deposit in Cuyahoga County. *Kirtlandia* 44: 17-53.

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. Morgantown

Chapman, J.

1975 *The Rose Island Site and Bifurcate Point Tradition.* Department of Anthropology, University of Tennessee, Report of Investigations 14. Knox-Ville

1976 The Archaic period in the lower Little Tennessee River valley: the radiocarbon dates. *Tennessee Anthropologist* 1(1):1-12.

1977 *The Archaic Period Research in the Lower Little Tennessee River Valley - 1975.* Department of Anthropology, University of Tennessee, Report of Investigations 23. Knoxville.

1978 *The Bacon Farm Site and a Buried Site Reconnaissance.* Department of Anthropology, University of Tennessee, Report of Investigations 27. Knox-Ville.

1979 *The Howard and Galloway Island Sites.* Department of Anthropology, University of Tennessee, Report of Investigations 27. Knoxville.

1980 The Early and Middle Archaic periods: a perspective from eastern Tennessee. In *Proceedings of the Conference on Northeastern Archaeology,* edited by J.A. Moore, pp. 123-132. University of Massachusetts-Amherst, Department of Anthropology, Research Report 19. Amherst.

1985 *Tellico Archaeology, 12,000 Years of Native American History.* Department of Anthropology, University of Tennessee, Report of Investigations 43. Knoxville

Coe, J.L.

1984 *The Formative Cultures of the Carolina Piedmont.* Transactions of the American Philosophical Society (N.S.) 54(5). Philadelphia.

Daniel, I.R. and M. Wisenbaker

1987 *Harney Flats: A Florida Paleo-Indian Sire.* Baywood Publishing Co. Farmingdale, N.Y.

Deller, D.B.

1989 Interpretation of chert type variation in Paleoindian industries, southwestern Ontario. In *Eastern Paleoindian Lithic Resource Use,* edited by C.J. Ellis and J.C. Lothrop, pp. 191-220. Westview Press. Boulder, Colorado.

Deller, D.B., C.J. Ellis and I.T. Kenyon

1988 The archaeology of the southeastern Huron Basin. In Studies in Southwestern Ontario Archaeology, edited by W.A. Fox. *Occasional Publications of the London Chapter, Ontario Archaeological Society. No.* 1:3-12. London.

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.

Dincauze, D. and M.T. Mulholland

1977 Early and Middle Archaic site distributions and habitats in southern New England. *Annals of the New York Academy of Sciences* 288:439-456.

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.

1989 The explanation of Northeastern Paleoindian lithic procurement patterns. In *Eastern Paleoindian Lithic Resource* Use, edited by C.J. Ellis and J.C. Lothrop, pp. 139-184. Westview Press. Boulder.

in press Early Paleoindian lithic industries of Northeastern North America in their temporal, spatial, paleoenvironmental, site and cultural contexts. *L'-Anthropologie.*

Ellis, C.J. and D.B. Deller

1988 Post-glacial Lake Nipissing waterworn assemblages from the southeastern Huron Basin Area. *Ontario Archaeology* 45:39-60.

Ellis, C.J. and J.C. Lothrop (editors)
1989 *Eastern Paleoindian Lithic Resource* Use. Westview Press. Boulder.

Fitting, J.E.
1968 Environmental potential and post-glacial readaptation in eastern North America. *American Antiquity* 33(4):441-445.

Funk, R.E.
1978 Post-Pleistocene adaptations. In *Handbook of North American Indians* Volume *75, Northeast,* edited by B.G. Trigger, pp. 16-27. Smithsonian Institution Press. Washington.

Funk, R.E. and B. Wellman
1984 Evidence of early Holocene occupations in the upper Susquehanna Valley, New York State. *Archaeology of Eastern North America* 12:81-109.

Gardner, W.G.
1974 The Flint Run complex: pattern and process during the Paleo-Indian to Early Archaic. In *The Flint Run Paleo-Indian Complex: A Preliminary Report* 1971-73 *Seasons,* edited by W. Gardner, pp. 5-47. Archaeology Laboratory, Department of Anthropology, Catholic University of America, Occasional Publication No. 1.
1977 Flint Run Paleoindian complex and its implications for eastern North American prehistory. *Anna/s of the New York Academy of Sciences* 288:257-263.

Goodyear, A.C.
1974 The *Brand Site: a Techno-functional Study of a Dalton Site in Northeast Arkansas.* Arkansas Archaeological Survey, Research Series 7. Fayetteville.
1982 The chronological position of the Dalton horizon in the southeastern United States. *American Antiquity* 47(2):382-395.
1989 A hypothesis for the use of cryptocrystalline raw materials among Paleoindian groups of North America. In *Eastern Paleoindian Lithic Resource* Use, edited by C.J. Ellis and J.C. Lothrop, pp. 1-9. Westview Press. Boulder.

Griffin, J.W.
1974 *Investigations in Russell Cave.* U.S. Department of the Interior, National Park Service, Publications in Archaeology 13. Washington.

Jackson, L.J.
1984 Early Paleo-Indian occupation in interior south-central Ontario: the Plain-Ville complex. *Arch Notes* 83:20-23.

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. Ottawa.

Kenyon, LT.
1980 The Satchell complex in Ontario: a perspective from the Ausable Valley. *Ontario Archaeology 34:* 17-43.

Kimball, L. and J. Chapman
1977 Other chipped stone artifacts. In *Archaic Period Research in the Lower Little Tennessee River Valley- 7975,* by J. Chapman, pp. *54-90.* Department of Anthropology, University of Tennessee, Report of Investigations No. 18.

Lewis, J.M.N. and M.K. Lewis
1961 *Eva: An Archaic Site.* University of Tennessee Press. Knoxville.

Lothrop, J.L.
1989 The organization of Paleoindian lithic technology at the Potts site. In *Eastern Paleoindian Lithic Resource Use,* edited by C.J. Ellis and J.C. Lothrop, pp. 99-137. Westview Press. Boulder.

Lovis, W.A. (editor)
1989 *Archaeological Investigations at the Weber I (20SA581) and Weber II (20SA582) Sites, Frankenmuth Township, Saginaw County, Michigan.* Michigan Cultural Resource Investigation Series, Volume 1. State of Michigan. East Lansing.

Luedtke, B.A.
1976 Lithic material distributions and interaction patterns during the Late Woodland period in Michigan. PhD dissertation, Department of Anthropology, University of Michigan. University Microfilms. Ann Arbor.

MacMillan, B.A.
1977 The Shawnee Minisink Site: A Technological Analysis of the Early Archaic. PhD Dissertation, The American University. University Microfilms Inc. Ann Arbor.

Mason, R.J.
1981 *Great Lakes Archaeology.* Academic Press. New York.

McAndrews, J.H.
1981 Late Quaternary climate of Ontario: temperature trends from the fossil pollen record. In *Quaternary Paleoclimate,* edited by W.C. Mahaney, pp. 321-333. Geoabstracts. Norwich, England.

McNett, C.W. Jr.
1985 Artifact morphology and chronology at the Shawnee Minisink site. In *Shawnee Minisink: A Stratified Paleolndian-Archaic Site in the Upper Delaware Valley of Pennsylvania,* edited by C.W. McNett Jr., pp. 83-122. Academic Press. New York.

Meltzer, D.L.
1984 On stone procurement and settlement mobility in eastern fluted point groups. *North American Archaeologist* 6:1-24.

Michels, J.W., and I.F. Smith (editors)
1967 *Archaeological Investigations of Sheep Rock Shelter* (2 vols.). Department of Anthropology. Pennsylvania State University. University Park.

Michie, J.L.
1973 The Edgefield scraper: its inferred antiquity and *use. The Chesopiean* 11:2-10.

Mocas, S.
1977 *Excavations at the Lawrence Sire, 15Tr33, Trigg County, Kentucky.* University of Louisville Archaeological Survey. Louisville.

Morse, D.F.
1971 The Hawkins cache: a significant find in northeast Arkansas. *The Arkansas Archaeologist* 12(1): 9-20.
1973 Dalton culture in northeast Arkansas. *Florida Anthropologist* 26(1): 23-38.
1976 An analysis of the Dalton complex in the central Mississippi Valley. In *Habitats Humains Antérieurs a l'Holocene en Amérique,* edited by J.B. Griffin, pp. 136-166. IX Annual Congress of Prehistoric and Protohistoric Sciences. Nice.
1982 A Paleo-Indian/Early Archaic cemetery possibility in Arkansas. In *Peopling the New World,* edited by J.E. Ericson, R.E. Taylor and Ft. Berger, pp. 147-162. Ballena Press Anthropological Papers No. 23.

Mott, R.J. and D. Farley-Gill
1978 A Late-Quaternary pollen profile from Woodstock, Ontario. *Canadian Journal of Earth Sciences* 15: 1101-1111.

Parry, W.J. and R.L. Kelly
1987 Expedient core technology and sedentism. In *The Organization of Core Technology,* edited by J.K. Johnson and C.A. Morrow, pp. 285-304. Westview Press. Boulder.

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.

Purdy, B.A.
1981 *Florida's Prehistoric Stone Technology.* University Presses of Florida. Gainesville.

Redfield, A., and J. Moselage
1970 The Lace Place, a Dalton Project site in the western lowland in eastern Arkansas. *The Arkansas Archaeologist* 11(2):21-44.

Ritchie, W.A.
1969 *The Archaeology of New York Stare, Revised Edition.* Natural History Press. New York.
1971a The Archaic in New York. *Bulletin of the New York Stare Archaeological Association* 52: 1-12.

1971b *A Typology and Nomenclature for New York Projectile Points. New* York State Museum and Science Service, Bulletin 384.

Ritchie, W.A. and R.E. Funk
1971 Evidence for Early Archaic occupations on Staten Island. *Pennsylvania Archaeologist* 4(3):45-59.

Roberts, A.B.
1988 Paleo-Indian/Archaic transition on the north shore of Lake Ontario: the lithic evidence. In *Late Pleistocene and Early Holocene Paleoecology and Archaeology of the Eastern Great Lakes Region,* edited by R. Laub, N. Miller and D. Steadman, pp. 281-293. Bulletin of the Buffalo Society of Natural Sciences 33.

Sackett, JR.
1982 Approaches to style in lithic archaeology. *Journal of Anthropological Archaeology* 1:59-112.

Schwert, D.P., T.W. Anderson, A. Morgan, A.V. Morgan, & P. Karrow
1985 Changes in Late Quaternary vegetation and insect communities in southwestern Ontario. *Quaternary Research* 23:205-226.

Shane, L.K.
1975 Palynology and radiocarbon chronology of Battaglia Bog, Portage County, Ohio. *Ohio Journal of Science* 596-102.

Shott, M.J.
1989 Technological organization in Great Lakes Paleoindian assemblages. In *Eastern Paleoindian Lithic Resource Use,* edited by C.J. Ellis and J.C. Lothrop, pp. 221-237. Westview Press. Boulder.

Simons, D.L., M. Shott and H.T. Wright
1984 The Gainey site: variability in a Great Lakes Paleo-Indian assemblage. *Archaeology of Eastern North America* 12:266-279.

Smith, B.D.
1986 The archaeology of the Southeastern United States, from Dalton to DeSoto (10,500 B.P.-500 B.P.). In *Advances in World Archaeology, Volume 5,* edited by F. Wendorf and A. Close, pp. 1-92. Academic Press. New York.

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

Steponaitis, V.P.
1986 Prehistoric archaeology in the Southeastern United States, 1970-1985. *Annual Review of Anthropology* 15:363-404.

Stewart, A.L.
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. Ottawa.

Storck, P.L. and P. von Bitter
1989 The geological age and occurrence of Fossil Hill formation chert: implications for early Paleoindian settlement patterns. In *Eastern Paleoindian Lithic Resource* Use, edited by C.J. Ellis and J.C. Lothrop, pp. 165-189. Westview Press. Boulder, Colorado.

Tuck, J.A.
1974 Early Archaic horizons in Eastern North America. *Archaeology of Eastern North America* 2(1):72-80.

von Bitter, P.H. and B. Eley
1984 Balsam lake chert from the upper member of the Middle Ordovician Bobcaygeon formation of southern Ontario. *Canadian Journal of Archaeology 8:* 135-148.

Webb, C., J.L. Shiner and E.W. Roberts
1971 The John Pearce site (16CD56): a San Patrice site in Caddo Parish, Louisiana. *Bulletin of the Texas Archaeological Society* 42:1-49.

Wilkins, G.R.
1985 The Hansford site: an Archaic site in Kanahwa County, West Virginia. West *Virginia Archaeologist* 37(1):21-26.

Wright, H.T.
1989 Late glacial foragers in eastern North America. In *Eastern Paleoindian Lithic Resource* Use, edited by C.J. Ellis and J.C. Lothrop, pp. 345-351. Westview Press. Boulder.

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.

Youse, H.J.
1983 Charleston Town Center (46KA165). *West Virginia Archaelogist* 35(1):54.
1985 Comments and corrections concerning Amos points. *West Virginia Archaeologist* 37(2):46.

ABSTRACT

A large Early Archaic lithic assemblage from the Nettling site in Ontario is described. Although largely a surface collection from a ploughed field, the assemblage is quite homogeneous in terms of the tool forms represented and the stone sources employed and there is little evidence of non-Early Archaic occupations at the site. The tool assemblage has a very high percentage of Ohio cherts and, as a whole, duplicates almost exactly materials of the “Kirk Corner-Notched Horizon” *(ca. 9500* to 8900 B.P.) in the southeastern United States, including corner-notched serrated points, expanding based drills, small dorsally flaked end scrapers, chipped celts with ground bits, ovate chopper/scrapers, etc. Several implications of the Nettling site assemblage are dis-

cussed pertaining to our understanding of the culture history and environmental coping strategies of the Early Archaic occupants of the lower Great Lakes era.

RÈSUMÈ

Le site Nettling, en Ontario, a livre un important assemblage lithique de l'Archaique ancien. II s'agit d'un site de récolte surface dans un champ labouré, mais les outils et les materiaux sont relativement homogènes et il y a peu d'évidence d'une présence à cet endroit de groupes qui n'appartiendraient pas à l'Archaique ancien. L'assemblage d'outilscomprend un fort pourcentage de cherts de l'Ohio et, en général, présente des objets qui reproduisent ce qu'on truove dans le "Kirk Corner-Notched Horizon", au sud-est des Etats-Unis, entre 9 500 et 8 900 AA. On y remarque en particulier des pointes dentelées à encoches en coin, des forêts à base élergie, des petits grattoirs aménagés sur la face dorsale des éclats, des haches au fil poli, des hachoirs ovales, etc.

Les données du site Nettling servent à discuter et à comprendre l'histoire culturelle et les stratégies adaptives des groupes de l'Archaique ancien ayant occupé la région méridionale des Grands Lacs.