CHAINGATE (AhGw-11) : A LATE ARCHAIC PERKIOMEN SITE IN BURLINGTON, ONTARIO

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The Chaingate site is a Late Archaic component in the Burlington area. Although only a small portion of the site was excavated, the information derived offers significant new insights into the later periods of the Archaic. An intrasite spatial analysis indicates discontinuities in the distribution of artifacts, and comparison with other assemblages suggests the projectile points to be transitional between Perkiomen and Innes types.

The Chaingate site is one of several Archaic components excavated by the Ministry of Transportation along a proposed Queen Elizabeth Highway realignment in Burlington, Ontario. It was discovered in 1976 and several surface collections were made prior to 1981 (Ambrose 1982). Because the site was believed to represent a possible late Paleo-Indian component, a full salvage excavation before construction was recommended. In 1982, 102 one-metre squares were excavated, under the direction of Mary Ambrose, before the site was destroyed by bull-dozer stripping.

This report discusses the archaeological investigation of the site, describes collected artifacts, and considers some aspects of Late Archaic cultural development and possible intrasite activity areas.

SITE LOCATION

The Chaingate site is located about 300 m east of the Queen Elizabeth Highway/Plains Road overpass and about 100 m north of Maple Avenue, within the City of Burlington (see Figure 1). Prior to destruction, it occupied the top and sides of a sandy knoll just southwest of a small tributary stream of Indian Creek, two kilometres from its mouth. The site is located within the Iroquois Plain (Chapman and Putnam 1984:190-196) and the soil is Brady sandy loam (Hoffman et al. 1964).

Following the retreat of the glacial front from the eastern end of Lake Ontario, water levels in the western basin of the lake rose due to differential tilting (isostatic rebound of the eastern end), and by 3,000 B.P. the lake shore had reached its western limits (Frazer 1973). During the period it was occupied, the Chaingate site may have been slightly farther away from the shoreline than at present, but probably not significantly so.

Vegetation surveys conducted in 1806 and 1819 by Samuel Wilmot noted that the predominant tree cover was oak/pine and maple with lesser quantities of nut-bearing trees such as hickory and chestnut (Finlay 1978). Oak/pine forests most likely reflect landscape changes as a result of late prehistoric land use; the forests of the Late Archaic period were probably maple/beech climax communities with lesser amounts of nut-bearing trees (Fecteau 1991). At the time of discovery and excavation, the site was being utilized as a market garden.

HISTORY OF INVESTIGATION

The site was originally discovered by Roberts (1976) who collected several Archaic projectile points and a possible late Paleo-Indian point. A second survey conducted by a consulting firm under poor conditions of surface visibility recovered only two chert flakes (Anonymous 1981). Ambrose surface collected the site in 1981 (Ambrose 1982) and possibly in 1980. Excavations were undertaken in 1982 under the field supervision of Ingrid Kritsch. An initial surface collection was followed by the excavation of 102 one-metre squares. A final surface collection was attempted after the site had been destroyed

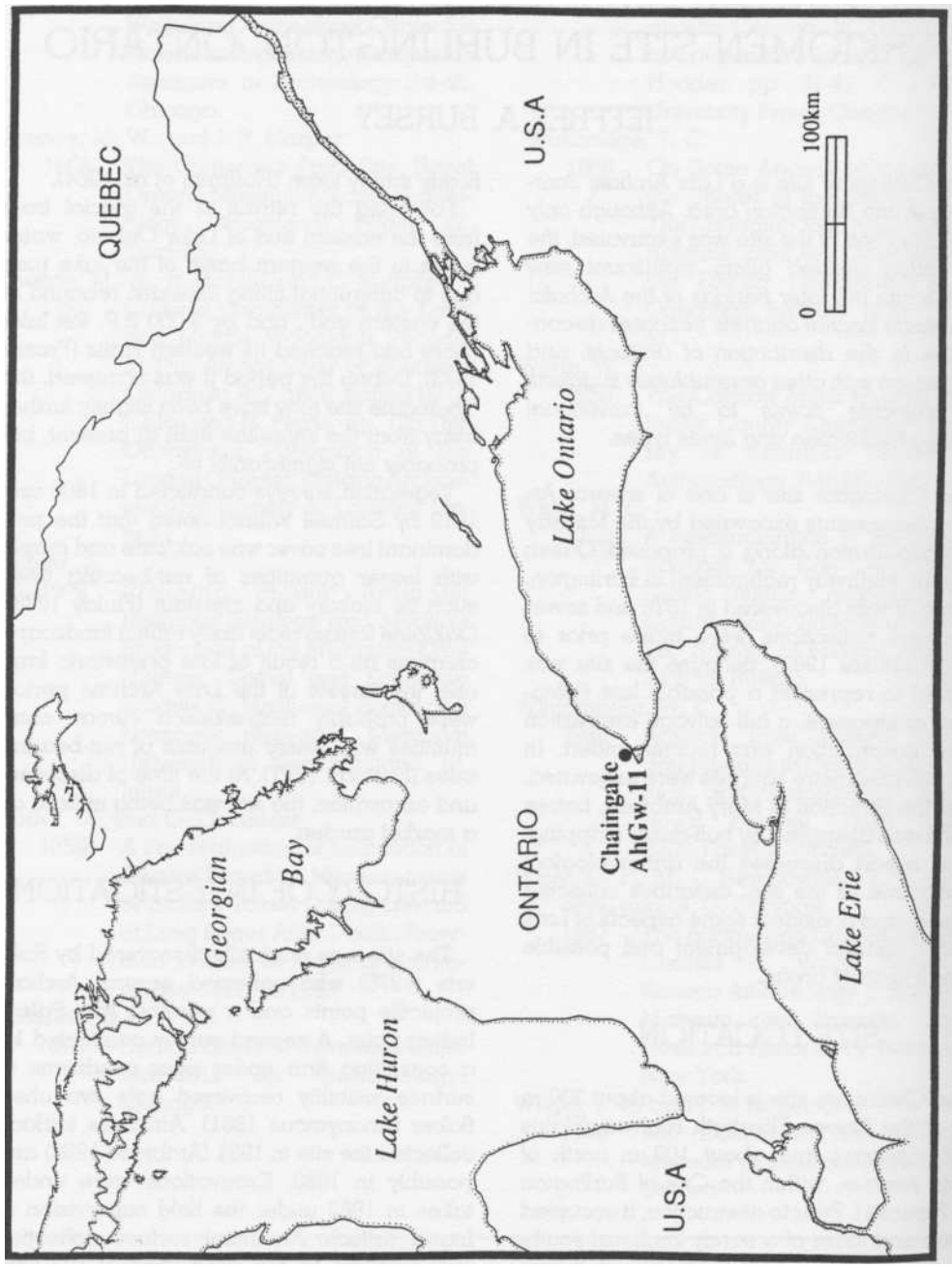

Figure 1. Location of Chaingate Site.

by bull-dozer stripping. This analysis will focus on the results of the 1982 excavations and, to a limited degree, the surface collections which are currently being stored by the Ministry of Transportation in Downsview, Ontario.

1980 Test Surface Collection

Five artifacts in the site collection are labelled "1980 Test Surface Collection". Unfortunately, their exact provenience is unknown as no field notes or maps have been located. Presumably, these artifacts were recovered through casual collection. The artifacts include a badly eroded white ball-clay, historic pipe stem, an Ancaster chert, core trimming flake with utilization flaking on dorsal-distal and dorsal-left margins, a dark grey Onondaga chert flake that appears to have been struck from a biface, and two projectile points. One of the latter points is tentatively identified as a Perkiomen point (Ritchie 1971: 42-43; Witthoft 1971) manufactured from Ancaster chert (Figure 2b). The other appears to be a burnt, Late Archaic small point with an expanding stem, and is manufactured from Onondaga chert (Figure 2f). These two artifacts will be discussed in greater detail below.

1981 Test Surface Collection

In order to relocate and determine the nature and significance of the site, about 250 square metres were ploughed and a surface collection taken in 1981. Unfortunately, no further records from this site visit have been located. Twenty-five chert artifacts were initially catalogued from this collection, although several were subsequently identified as non-cultural. The final tally for this collection is five cores or core fragments, two decortication flakes, five core trimming flakes, two biface trimming flakes, five flake fragments, one core trimming flake with utilization along one short lateral margin, and one fragmented projectile point (Figure 2d). With

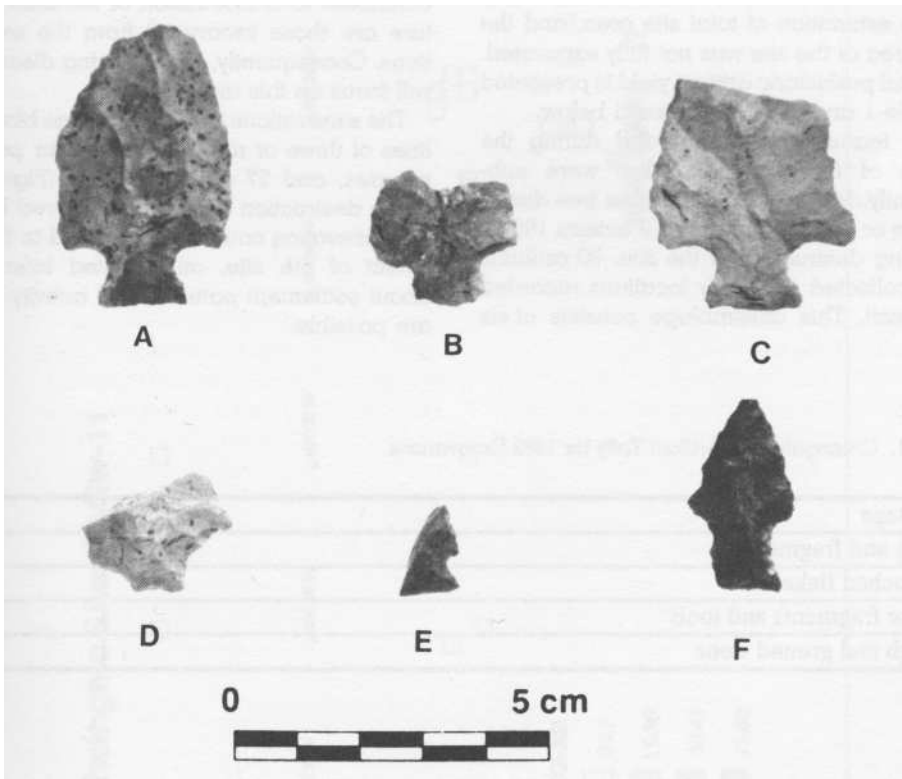

Figure 2. Chaingate Site Projectile Points.

the exception of one flake fragment, all artifacts were manufactured from Ancaster chert. The projectile point fragment was initially identified as a Hi-Lo point base (Ambrose 1982) but subsequent examination suggests this artifact to be a Perkiomen point with the tip and stem missing.

1982 *Excavations*

In advance of highway construction, a small crew was sent to the site in June of 1982 to conduct salvage excavations. Although an initial surface collection of the site was conducted, neither transit records nor artifacts have been found. Excavation of one-metre squares began on the summit of the sandy knoll and proceeded to the north and west at irregular intervals.

Before the site was destroyed by bull-dozer stripping, 102 m^2 were excavated (Figure 3). Excavation units distributed to the north, east and west produced diminishing artifact frequencies, suggesting limits for the site in these directions can be inferred. Lack of test excavations to the south, however, do not allow for the estimation of total site area, and the core area of the site was not fully excavated. The total prehistoric artifact yield is presented in Table 1 and will be discussed below.

Five features were recorded during the course of the excavation but were subsequently determined to be either tree disturbances or historic intrusions (Fecteau 1991).

During destruction of the site, 30 artifacts were collected and their locations recorded by transit. This assemblage consists of six Ancaster and one Onondaga chert flake fragments, six Ancaster chert decortication flakes, ten Ancaster chert core trimming flakes, four Ancaster and two Onondaga chert biface trimming flakes, and an Onondaga chert core trimming flake with light utilization flaking on the dorsal right margin.

After destruction of the site, a casual surface collection yielded 136 artifacts, including 2 Ancaster chert shatter fragments, 19 Ancaster and 3 Onondaga chert flake fragments, 14 Ancaster and 1 Onondaga chert decortication flakes, 50 Ancaster and 9 Onondaga chert core trimming flakes, and 20 Ancaster and 11 Onondaga chert biface trimming flakes. Also recovered were 1 Ancaster chert random core, 2 Ancaster and 2 Onondaga chert primary flakes with utilized edges, and 2 broken bifaces, one of Ancaster chert and one of Onondaga chert.

ARTIFACT ANALYSIS

Because the surface collections were unprovenienced, the only artifacts that can contribute to a discussion of intrasite structure are those recovered from the excavations. Consequently, the following discussion will focus on this material.

The excavations consisted of nine blocks or lines of three or more squares, four pairs of squares, and 27 single squares (Figure 3). Since destruction of the site occurred before the excavation could be expanded to the full extent of the site, only limited inferences about settlement patterns and activity areas are possible.

Table 1. Chaingate Site Artifact Tally for 1982 Excavations.

Debitage	1230
Cores and fragments	11
Retouched flakes	33
Biface fragments and tools	12
Rough and ground stone	1

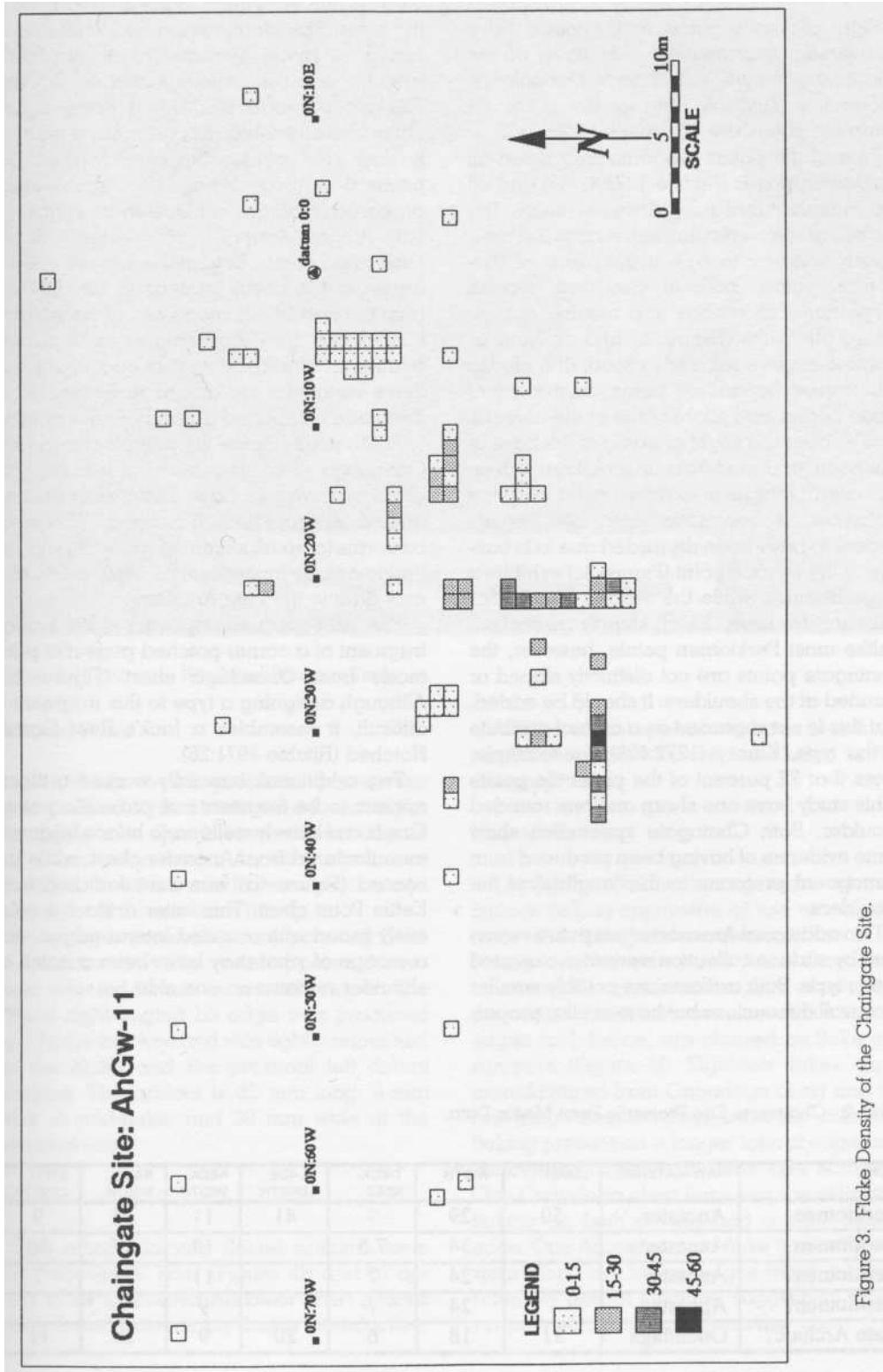

Figure 3. Flake Density of the Chaingate Site.

Projectile Points

Eight projectile points or fragments were recovered. Unfortunately, only three of the relatively complete points have provenience information. Attribute data for five of the six complete points are presented in Table 2.

Four of the points are tentatively typed as Perkiomen points (Ritchie 1971:42-43) and all are manufactured from Ancaster chert. The two points recovered through excavation most closely conform to type descriptions of Perkiomen points, both in size and general proportions, as well as in a number of non-metric attributes (Figure 2a and c). Notable features include relatively broad, thin blades with narrow expanding stems, asymmetry of blade edges, and slight barbs at the corners. Also evident is a slight grinding of the base of one point, and moderate unifacial retouch on one lateral margin of the other point, perhaps indicative of secondary use. Both points appear to have been discarded due to breakage of the tip: one point (Figure 2c) exhibits a hinge fracture, while the second (Figure 2a) appears to have been slightly reworked. Unlike most Perkiomen points, however, the Chaingate points are not distinctly sloped or rounded at the shoulders. It should be added, that this is not regarded as a crucial attribute of the type. Kinsey (1972:426), for example, notes that 72 percent of the projectile points in his study have one sharp and one rounded shoulder. Both Chaingate specimens show some evidence of having been produced from pentagonal preforms in the "angling" of the shoulders.

Two additional Ancaster chert points recovered by surface collection were also assigned to this type. Both artifacts are notably smaller in overall dimensions but have similar proportions. The point fragment (Figure 2d) recovered by Ambrose is missing the tip and base of the stem. The identification as Perkiomen is based on blade asymmetry, relative blade breadth, and the remnants of a small stem. The second surface-collected point (Figure 2b) is also broad-bladed. The stem is relatively short and lobate compared to the fuller points described above, although the small proportions relative to blade width suggest a Late Archaic temporal assignment with the Perkiomen points. Both of the surface-collected projectile points appear to be different from the specimens recovered in the excavations since they are smaller and thicker relative to blade width. It is suggested that these variations are due to resharpening of the blade edges and damage to the points.

A fifth point (Figure 2f), manufactured from Onondaga chert, is more problematic. The blade appears to have been resharpened and is slightly heat damaged. The stem conforms to "small stemmed" varieties such as Perkiomen, or Innes (Lennox 1982, 1986), and may date to the Late Archaic.

The sixth specimen appears to be a small fragment of a corner-notched projectile point made from Onondaga chert (Figure 2e). Although assigning a type to this fragment is difficult, it resembles a Jack's Reef Corner Notched (Ritchie 1971:26).

Two additional, bffacially worked artifacts appear to be fragments of projectile points. One is a relatively well-made biface fragment manufactured from Ancaster chert, while the second (Figure 4a) was manufactured from Kettle Point chert. This latter artifact is relatively broad with rounded lateral edges, and a vestige of what may have been a notch or shoulder remains on one side.

Table 2. Chaingate Site Projectile Point Metric Data.

TYPE	RAW MATERIAL	LENGTH	WIDTH	THICKNESS	BLADE LENGTH	NECK WIDTH	BASE WIDTH	STEM LENGTH
Perkiomen	Ancaster	50	29	7	41	11	14	9
Perkiomen	Ancaster		34	7.5		12	17	10
Perkiomen?	Ancaster		24	7		11	12	7
Perkiomen?	Ancaster		24	7		9		
Late Archaic?	Onondaga	31	18	6	20	9	14	11

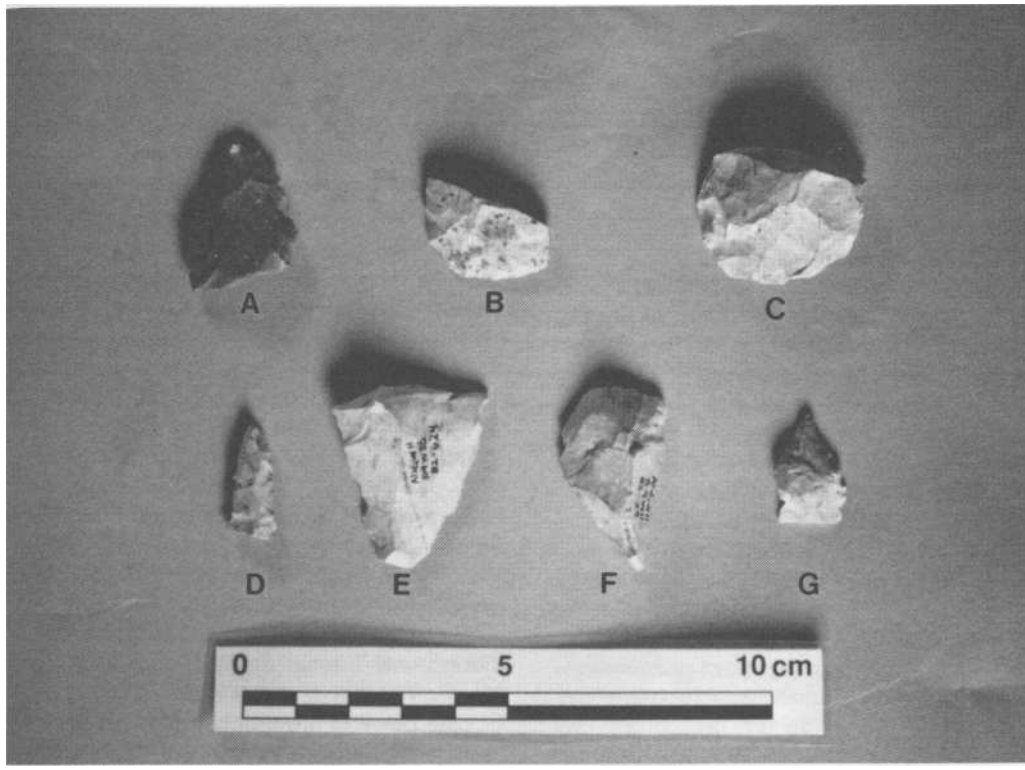

Figure 4. Chaingate Site Miscellaneous Tools.

Finished Tools

In addition to the projectile points, two other finished formal tools were found at the Chaingate site. One broken drill bit (Figure 4d), manufactured from Ancaster chert, was identified. It is 8 x 5 mm in cross section and is broken off 22 mm from the tip.

One large, expanding core trimming flake of Ancaster chert (Figure 4e) appears to have been selected for use as an end scraper. The almost right-angled bit edge was produced by a hinge fracture and was lightly retouched on the distal and the proximal left dorsal margins. The artifact is 35 mm long, 7 mm thick at mid-flake, and 30 mm wide at the proximal end.

Bifaces

Five other bifacially flaked artifacts were also recovered. Four (Figure 4b and c) appear to be unfinished Ancaster chert bifaces which broke, presumably during manufacture.

A flake which appears to have broken off an Ancaster chert biface is included in this category.

Utilized Flakes

Thirty-three flakes, having areas of continuous flaking suggestive of use wear, were recovered during the excavations. Ten of the flakes, one manufactured from Onondaga chert and the rest from Ancaster chert, have the areas of utilization on one of the shorter edges and, hence, are classed as flake end scrapers (Figure 4f). Eighteen flakes, three manufactured from Onondaga chert and the rest from Ancaster chert, have the utilization flaking present on a longer lateral edge and, hence, are classed as flake side scrapers. One Onondaga chert flake has the utilization flaking on both a long and a short lateral edge. One Ancaster chert flake has utilization wear along two lateral edges which join in a relatively abrupt juncture, suggesting a convergent scraper. One Ancaster chert flake

Table 3. Chaingate Site Debitage Data.

FLAKE TYPE	ANCASTER (#/gm)	BOIS BLANC (#/gm)	FLINT RIDGE (#/gm)	HALM-MAND (#/gm)	KETTLE POINT (#/gm)	ONON-DAGA (#/gm)	UN-KNOWN (#/gm)	TOTALS (#/gm)
Shatter	37/32.38					2/1.46		39/33.84
Flake frag.	179/49.65			1/0.17		7/1.52		187/51.34
Decortication	102/193.40					3/2.95		105/196.35
Core trimming	366/237.90	2/0.87		3/0.55	1/3.93	15/10.46	2/0.80	389/254.51
Bif. Reduction	438/107.70		5/0.58	7/1.57		49/13.42	2/0.37	500/123.64
Retouch	10/0.29							10/0.29
Totals	1132/621.32	2/0.87	5/0.58	11/2.29	1/3.93	76/29.81	4/1.17	1230/659.97

(Figure 4g) is similar to the convergent scraper, although the "tip" is sufficiently fine to be classed as a drill or borer. Finally, two Ancaster chert flakes have short (seven to eight millimetre) areas of use-wear producing concavities in the lateral edges; these are classed as spokeshaves or notches.

Debitage

A total of 1230 unmodified chert flakes or fragments were recovered. Flakes were sorted by chert type (Eley and von Bitter 1989; Fox 1989) using a comparative collection, and by debitage type. Six flake types were employed for the latter sorting: shatter, flake fragments, decortication flakes, core reduction (primary), biface reduction (secondary), and biface retouch (secondary). Distribution of the flakes according to these categories is presented in Table 3.

Most of the chert from this site was locally obtained Ancaster chert. An examination of the core trimming and decortication flakes suggests that both primary (tabular) and secondary (weathered and rounded) sources were being exploited. Although the Haldimand (chalky white) and Bois Blanc (glossy blue-grey) chert types outcrop together in the Bois Blanc formation, they were separated in the analysis because of possible cultural preferences during certain time periods. The unidentified chert consists of three pieces of a tan-brown chalcedony similar in appearance to Flint Ridge material, as well as a fragment of what may be moss agate.

Cores

Eleven cores and core fragments were recovered from the excavations. All are Ancaster chert, and both tabular and weathered nodule forms are present.

Rough and Ground Stone *Tool*

One piece of fire-cracked rock appears to have been abraded or ground on one face, suggesting use after breaking from thermal shock.

An interesting feature of this assemblage is the predominance of white or light coloured chert. Even lighter varieties of the characteristically dark Onondaga chert seem to have been preferred. One possible explanation for this phenomena might be that the site's inhabitants had limited access to the relatively distant, though generally preferred, Onondaga chert sources. One potential explanation for this phenomena is the inundation of some of the Onondaga chert outcrops due to the flooding of Lake Wainfleet and high water levels of Lake Erie (Pengelly 1990; Tinkler and Pengelly 1992; Tinkler et al. 1992). This explanation has been invoked to account for the distribution of chert at the Lamoka Archaic Canada Century site (Lennox 1990).

This explanation does not appear to be applicable in this case, however, as Lake Erie attained its present water level after 3,900 years B.P. (Pengelly 1990:10), while the period to which the Perkiomen points are believed to belong dates to approximately 3,600 to 3,400 years B.P. (Funk 1976:265; Kinsey 1972:222).

Moreover, other sources of Onondaga chert do not appear to have been affected by the higher water levels. It seems likely that the Onondaga chert sources would have been exposed and that the unusual selection of chert types may have been a product of cultural factors.

Two possible hypotheses might explain the selection of cherts found on the site. First, a sharp increase in the number of Late Archaic sites occurs in the area immediately around the western end of Lake Ontario. Hence, in the earlier portion of this period when the Chaingate site is believed to have been occupied, mechanisms may not have been in place to obtain a relatively reliable supply of chert from the Onondaga chert sources. This could have occurred either because there was a blockage in the supply routes (caused, for example, by inter-group hostility) or be-cause the means and mechanisms of long distance exchange were not in place to supply the increased quantities of chert required by the larger population in the Hamilton area.

Another cultural factor may also be responsible. Preferential selection of chert types appears to have been a relatively common practice of some prehistoric groups. Onondaga chert was the most commonly employed chert of prehistoric peoples in Ontario, probably due to its abundance, occurrence in relatively massive deposits and its relative "toughness" or durability. During the Paleo-Indian period, however, there seems to have been a preferential selection of light coloured cherts, possibly prescribed by ritual beliefs (Bill Fox, personal communication 1990). Hi-Lo projectile points of the late Paleo-Indian period are preferentially manufactured from white Haldimand chert, despite the presence of an extensive Onondaga chert source a few kilometres from the major Haldimand chert sources just west of Cayuga, Ontario (Parker 1986).

In light of the predominance of light coloured cherts and the presence of "exotic" cherts at the Chaingate site, it is tempting to suggest that these Late Archaic people were selecting chert according to similar criteria. Preferential selection of exotic raw materials is a common feature of other Perkiomen assemblages (Witthoft 1971).

INTRASITE ANALYSIS

It was noted above that three projectile point types were present in the combined assemblage, suggesting the site was multi-component. While four of the projectile points are typed as Perkiomen points, two are not. Of the latter, one is tentatively typed as an Innes-type point, which may belong with the Perkiomen points. On the other hand, the remaining point type, tentatively typed as Jack's Reef Corner Notched, dates significantly later than the Late Archaic. Since all artifacts were derived from relatively mixed ploughzone deposits, isolating components and associated activity areas requires special care. The potential for the discovery of significant cultural patterning on ploughed archaeological sites is well documented (Lennox 1986; Sterud et al. 1978; Trubowitz 1978; Warrick 1986).

Unfortunately, only three projectile points, representing two separate time periods, have provenience information. The two best preserved Perkiomen points were recovered in nearby squares in the northeast portion of the site, while the Jack's Reef Corner Notched point was recovered from the central portion of the site (Figure 5). Since the distribution of these artifacts does not appear to correspond with the distribution of total flake counts (Figure 3) or the distribution of other tools (Figure 5), they cannot assist in separating spatial components.

Plotting the distribution of chert types is an alternate method for distinguishing components on a multi-component site, especially if it can be determined that different cherts are associated with specific cultural or temp-oral groups (Muller 1989). The distribution of each chert type was plotted in order to deter-mine if any type appeared to occur in a localized portion of the site. Unfortunately, no clear patterns emerged.

In the absence of spatial patterns allowing for the separation of components, it was decided to simply remove all artifacts manufactured from Onondaga chert from further consideration. This decision was prompted by the fact that the Jack's Reef Corner Notched point, which belongs to a distinctly different time period than the other diagnostic artifacts, was manufactured from Onondaga

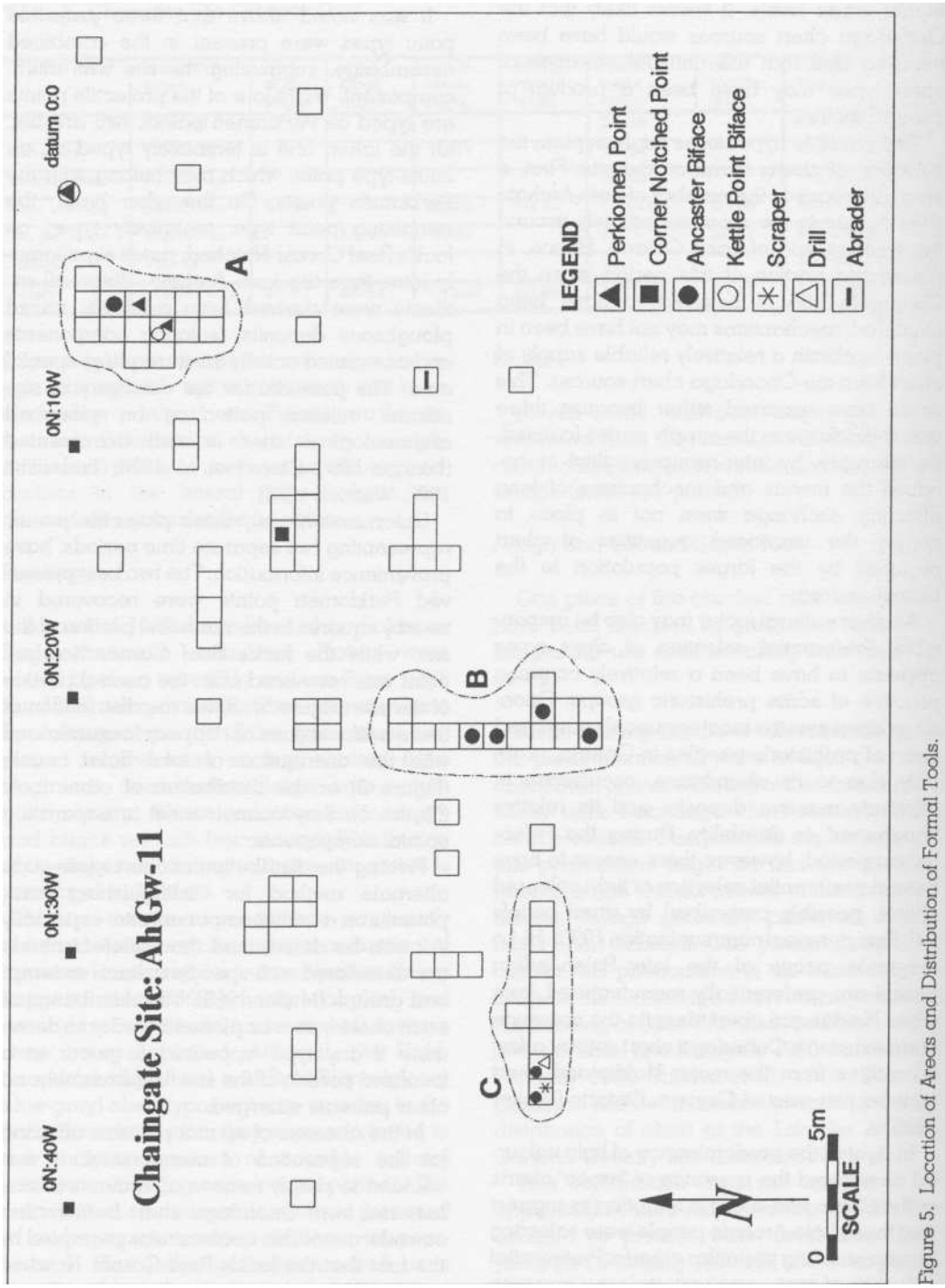

Figure 5. Location of Areas and Distribution of Formal Tools.

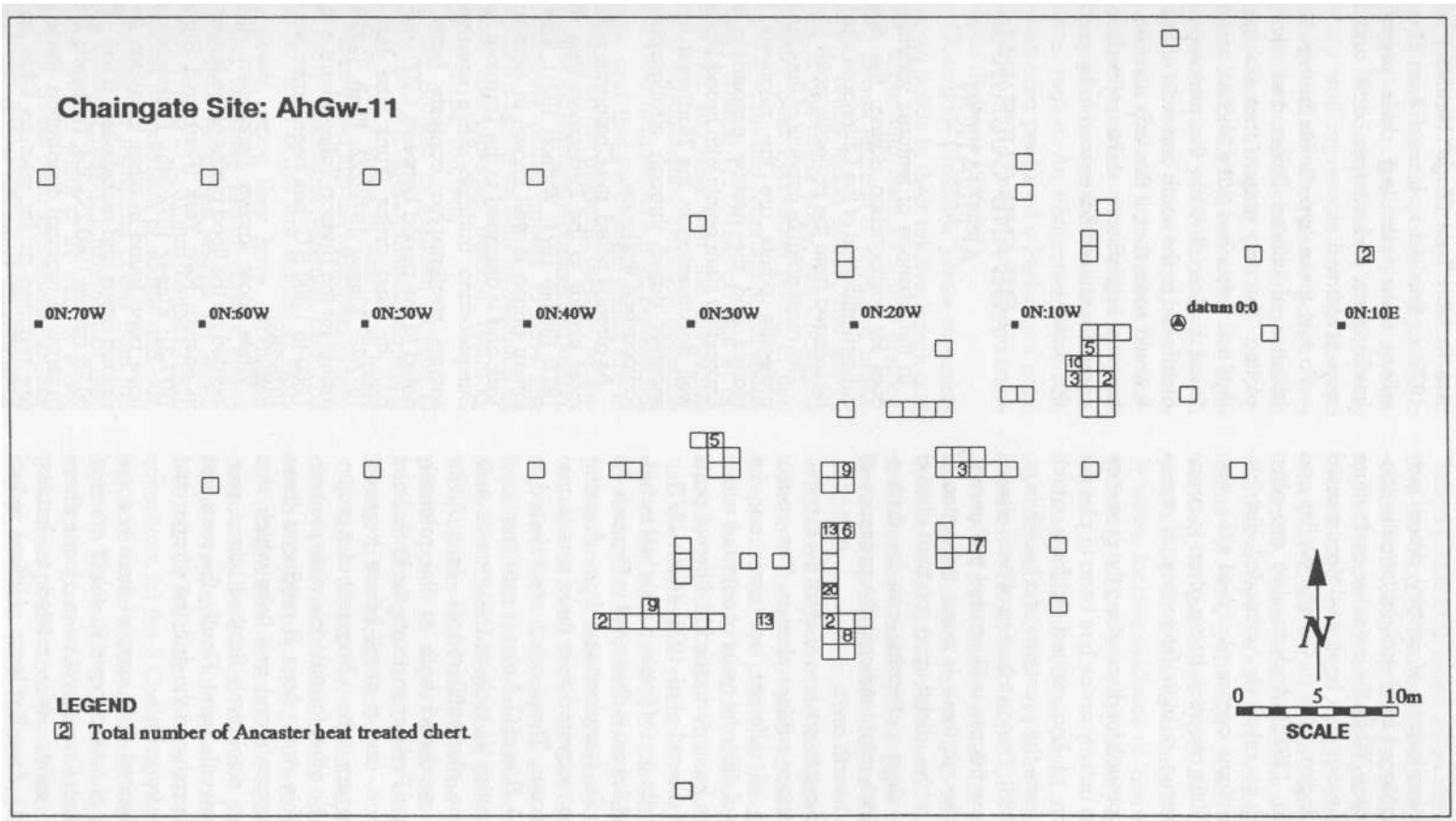

Figure 6. Distribution of Heat Altered Chert.

chert.

The determination of activity areas may also be achieved by a study of intrasite spatial patterning. While the presence and nature of activity areas has been well documented on Paleo-Indian sites in Ontario (Deller and Ellis 1992a, 1992b), Archaic sites are often excavated as relatively "unimodal" distributions of artifacts across ploughed sites, with relatively little attention being given to areas not producing a high frequency of waste flakes.

One approach for discovering the presence of discrete activity areas has been to plot the distribution of heat-altered artifacts which might indicate the presence of a hearth (e.g., Lennox 1986). The distribution of heat-altered chert across the site is illustrated in Figure 6. Again, although there is some indication of "peaks" in the distribution of heat-altered chert, no clear patterning can be distinguished which might indicate the presence of a definite hearth area.

Another approach is to analyze the distribution of various artifact classes. The spatial patterning of different tool types can be indicative of different types of activities which might have been performed in different parts of the site (Sterud et al. 1978; Yellen 1977).

The distribution of finished tools (not including utilized flakes) is illustrated in Figure 5. All formal tools manufactured from Ancaster chert were recovered from three sets of one-metre squares. These areas are referred to as Areas A, B, and C. A closer examination of the distribution of tools in these areas indicates some clear differences. Area A, for example, produced both of the relatively undamaged Perkiomen points, the Kettle Point chert biface, and a small biface fragment which appears to be a fragment of a projectile point. No other formal tools were recovered from this Area. Area B produced three biface fragments and one flake which was struck from a relatively finished biface, possibly a projectile point. Finally, the west end of Area C produced the drill, the scraper and two biface fragments.

These limited data suggest there is some clustering of artifact types in select areas of the site. Area A may have been a locus where projectile points were refitted to hunting implements, Area B a locus of biface reduction to form "Late Stage" bifaces (Callahan 1979) or finished tools, and Area C a locus where other tasks (e.g., hide preparation) involving an end scraper, drill, and biface were preformed.

To test these hypotheses further, the distribution of utilized flakes and cores was plotted. The only pattern that emerged was that one retouched flake and no cores were found in Area A while the remainder were distributed to the south and west of this area. It would seem that, if this was an area where hunting implements were refitted, neither cores nor utilized flakes were a by-product of this activity.

AGE AND CULTURAL AFFILIATION

In the absence of features yielding char-coal for radiocarbon dating, the age and cultural affiliation of the Chaingate site had to be inferred from the projectile point typology.

The most notable aspects of the Chaingate projectile points are the relatively broad blades and the narrow expanding stems. Expanding stem points with broad blades are well documented in the Northeast and are securely dated through stratigraphic and radiocarbon evidence.

As already noted, the Chaingate points are most similar to the Perkiomen type (Kinsey 1972; Ritchie 1971; Witthoft 1971). The Perkiomen phase is well known in eastern New York and is assigned to the Terminal Archaic Susquehanna tradition. Sites excavated in secure stratigraphic contexts have been dated to the period between 1,700 and 1,500 B.C. in most areas (Funk and Rippeteau 1977:22; Kinsey 1972:222; Kraft 1972:10-11), except for the Hudson Valley where a span of 1,600 to 1,400 B.C. has been proposed (Funk 1976:265).

While most known Perkiomen sites are located on the flood plains of the larger rivers in eastern New York (Funk and Rippeteau 1977:31; Kinsey 1972:346), Perkiomen points have been found in other locations such as upland areas and rockshelters (Funk 1989:47, 50,73; Ritchie 1980:253-254; Trubowitz 1983:83). In terms of regional distribution, these points are reported as far west as Ohio and into southeastern Michigan (Fogelman 1988:148;

Justice 1987:169-170; Kinsey 1972:347-348). Furthermore, projectile points assignable to the Susquehanna Tradition, including Susquehanna Broad and Orient Fishtail (Kinsey 1972), are well represented in the Niagara Peninsula, and 27 Perkiomen points have been identified and described from museum collections there (Pengelly 1991).

Roberts (1985:102,104) notes that the highest relative frequency of Perkiomen points in his survey of three areas along the north shore of Lake Ontario occurred in the Durham region, but that one Perkiomen point was recovered as far west as the Lennox-Addington region. An excavated site in the Burlington area produced a Perkiomen point in association with a hearth feature and some deer bone (Roberts 1985:227).

The Chaingate projectile points resemble Perkiomen points in their relative length and breadth, expanding stem form and metrics, relatively abrupt junction of stem and blade, asymmetry of the blade edges, and secondary use of one blade edge. The Chaingate points differ from Perkiomen points in that they have less distinct rounding of the shoulders. John Witthoft (1971:164; cf. Ellis et al. 1990:100,102) suggests that the distinctive feature of Susquehanna Tradition projectile points is their manufacture from pentagonal preforms, and that Perkiomen points are in fact notched on the diagonal corners, retaining traces of the distinctive pentagonal shape. The Chaingate points appear to have this feature but it is not as strongly represented as in classic assemblages (Ritchie 1980:155; Witthoft 1971:164, 166,168).

The Late Archaic in southern Ontario is characterized by a developmental sequence of projectile point styles in which the Innes type is transformed into the Meadowood type of the Early Woodland (Spence and Fox 1986:5-15). Innes points are similar to Perkiomen points, since they have expanding stems and relatively broad convex edges (Lennox 1982). Maximum widths for Innes points range from 17 to 31 mm (Lennox 1982), although an examination of widths and out-line drawings for individual points from the type site (Kenyon 1989:4,7), reveals that only one point, with a width of 31 mm, is wider than 23 mm. It has been suggested that this "broad" point, and possibly other relatively broad points from Innes, more closely resemble the "Ace of Spades" form from Michigan (Ellis et al. 1990:109). Kenyon's (1989:17) Principle Components analysis of projectile points from a number of Late Archaic sites in south-ern Ontario also found that this specimen was aberrant. These considerations suggest that the Innes type should not include the attributes of this particular point. With this revision to the Innes type, the Chaingate points differ from Innes points in being notably wider, lacking evidence of lateral or basal grinding, and relative asymmetry of the plan view.

Innes points have been dated at 1,400 B.C. +/- 195 and 670 B.C. +/- 80 at the type site (Lennox 1986:37) and 1,490 B.C. +/- 75 at the Thistle Hill site (Woodley 1990:16). If the later date from is rejected, a time span of 1,500 to 1,400 B.C. is indicated. Notably, this is the century following the suggested span of Perkiomen points in eastern New York (Kinsey 1972:222).

Although Kenyon noted the "dirtiness" of the data set, there appeared to be a distinct temporal trend for points to become larger after the Innes "horizon" (Kenyon 1989:17; Spence and Fox 1986). This would suggest that the Chaingate points date to the later end of the horizon. It should be noted, however, that the increase in the size of points through time is accompanied by an increase in basal width, so that the expanding stem form becomes a corner-notched form and, finally, the side-notched form of Early Woodland Meadowood points (Kenyon 1989; Spence and Fox 1986). The Chaingate points appear to depart from this expected trend in having a distinctively narrow stem relative to the broad blade.

In order to test the relationship between blade width and width of the stem base, seven samples of projectile points were plotted using these dimensions (Figure 7). The seven samples are: (a) 15 Innes points from Niagara region museum collections (Pengelly 1991), (b) 27 Perkiomen points from the same collections, (c) the 3 Chaingate points retaining both these measurements, (d) 6 points from the Thistle Hill site tentatively identified as Innes points (Woodley 1990:84), (e) 39 Perkiomen points from the Piffard mortuary site in western New York, measured from

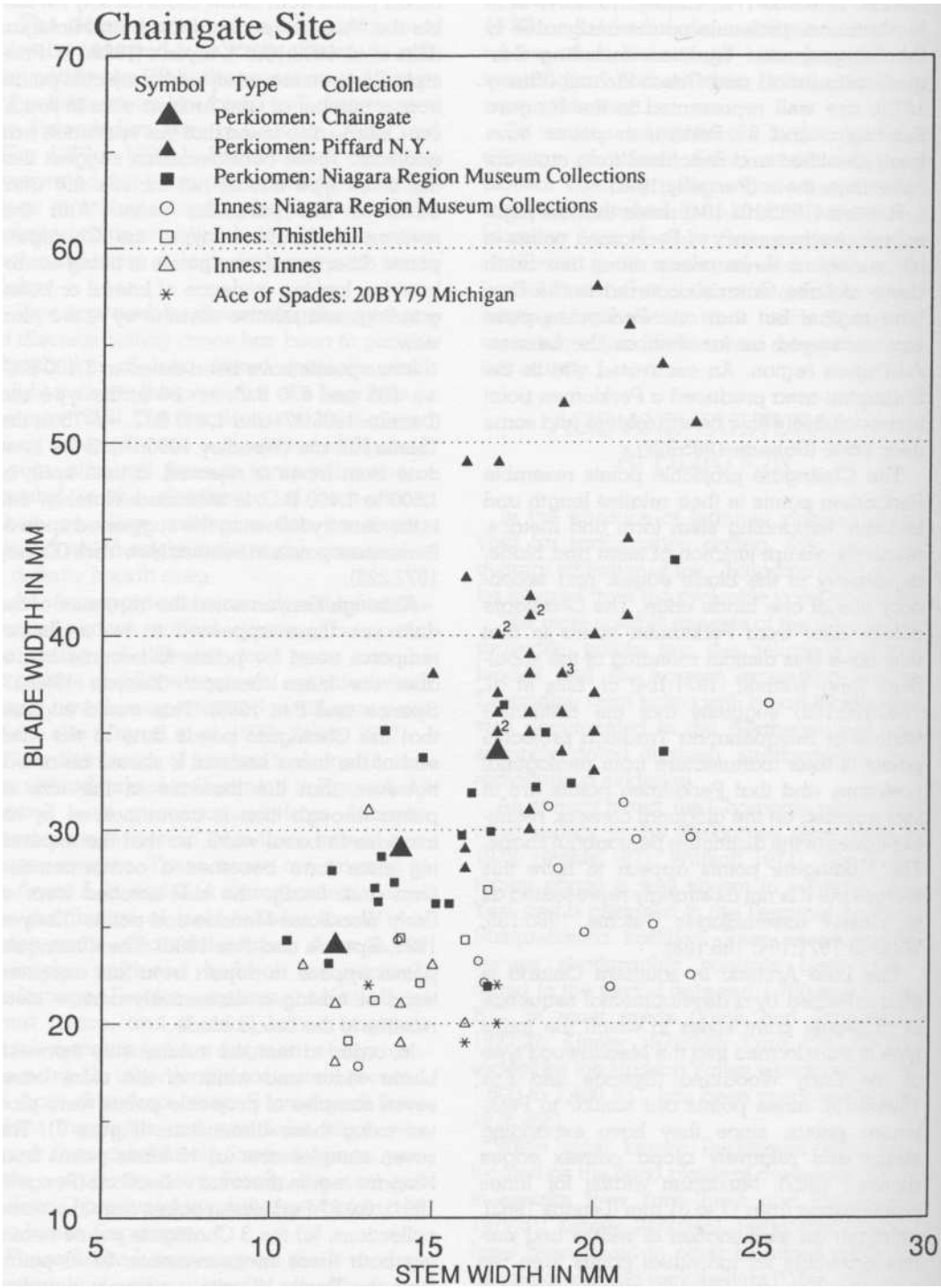

Figure 7. Late Archaic Stem Width versus Blade Width

Plate 50 in Ritchie (1980:155), (f) 8 Innes points from the type site (Kenyon 1989:7), and (g) 4 small expanding stem or "Ace of Spades" points from the 20YB79 site in Michigan (measured from Figure 7 in Lovis and Robertson 1989:245).

As seen in Figure 7, there is a clear distinction between points typed as Perkiomen and points typed as Innes, with the latter having relatively wider stem bases compared to blade width. The even broader bases of the "Ace of Spades" points are clearly distinct from Perkiomen points. The three Chaingate points in which measurements were possible, are clearly placed in the Perkiomen cluster, while most of the Innes and Thistle Hill assemblages are in a separate cluster with other points typed as Innes points. Moreover, two of the points from the Innes assemblage resemble Perkiomen points more than either the Innes or the "Ace of Spades" form.

Based on the above arguments, it is suggested that the Chaingate site represents a component transitional from a western variant of the Perkiomen phase to the Innes phase or horizon of southern Ontario. This transition is marked by a narrowing of the blade of the projectile point, possibly correlated with an abandonment of the use of pentagonal preforms, followed by a subsequent increase in size through to the Early Woodland. In this reconstruction, the Chaingate site would date to approximately 1,500 B.C. or slightly earlier.

DISCUSSION

The foregoing reconstruction suggests that the Chaingate site represents a late manifestation of the western Perkiomen phase in the Niagara Peninsula. Whether the occupants were actually intrusive to the area or were a part of an in situ development will remain unclear without the type of detailed contextual study accomplished in other areas (Collett 1987). For the present, the latter possibility is considered most likely, especially when other Susquehanna Tradition diagnostics known from the region are considered.

There appears to be a relative increase in the frequency of Late Archaic sites with Innes or Crawford Knoll projectile points in the Ancaster area, suggestive of an increase in population at this time. The use of Ancaster chert and changes in projectile point styles suggests a degree of cultural isolation from populations to the south, while the presence of exotic cherts from southern and south-western origins indicates that some form of interaction was maintained. Significantly, exotic cherts, which are frequently considered a hallmark of Perkiomen phase artifacts (Kinsey 1972), were most frequent in the cluster at Innes characterized by the broader points (Kenyon 1989). The Innes site also produced one flake of Pennsylvania jasper which was the preferred source material of Perkiomen points (Lennox 1986; Witthoft 1971).

Another possibly significant feature of the Late Archaic in the Ancaster to Burlington area is the change in frequency of different chert types employed. As described above, the Chaingate site assemblage is characterized by the use of Ancaster chert with a lesser frequency of Onondaga chert, possibly inflated by the presence of a later component. The Thistle Hill site, which has a C14 date of 1,490 B.C. +/- 75, and (based on projectile point typology) dates later than Chain-gate, is dominated by Onondaga chert with Ancaster chert comprising less than 20 per-cent (Woodley 1990:25,26). The Innes site, with a C14 date of 1,400 B.C. +/- 195, produced no Ancaster chert at all. While this trend may be a factor of increased distance from the source, it may also be that these sites represent a temporal continuum and that Ancaster chert lost popularity through time. If this should prove the case, corroborated by additional well-dated examples, then the relative frequency of Ancaster chert versus Onondaga chert may become useful as a chronological indicator. The Abbey Hill 1 site (Mayer and Poulton 1990), for example, has produced a Perkiomen point and Innes points in an assemblage dominated by Onondaga chert with lesser amounts of Ancaster chert. This site might date between Thistle Hill and Innes in the mid-fifteenth century B.C.

CONCLUSIONS

Clearly, many of the conclusions based on the Chaingate site remain speculative. While some indications of intrasite spatial patterning were noted for some artifact categories, the discovery and interpretation of these

patterns was hampered by the limited nature of the excavations at this site and by a general paucity of comparable case studies. While it is possible to employ sampling strategies to determine site structure without excavating the entire site (Custer 1992; Stafford and Sant 1985), the strategies presume some model with which results can be compared. Furthermore, there are some topics of archaeological significance which cannot be approached through sampling strategies (McCartney and Glass 1990). It is necessary, therefore, that ploughed sites be completely excavated if there is no chance of returning to these sites at a later date for additional or confirmatory information. Ideally, since excavations are usually oriented towards scatters of flakes, areas outside these clusters should be heavily sampled in order to determine if the site area continues beyond the extent of the flakes. In general, however, the use of sampling strategies within known site areas should be avoided for CRM excavations, until a greater number of comparable case studies for all time periods and settlement types have been excavated, analyzed, and assessed for their potential to answer various questions about the prehistoric past.

A culture-historical hypothesis of a transition from a Perkiomen to an Innes stage in the Ancaster-Burlington area around 1,500 B.C. has been offered. This reconstruction is based on the morphology of projectile points from the Chaingate site and a few additional sites yielding Perkiomen and Innes points. Chronological support for this hypothesis was provided by two C14 dates; one each from the Innes and Thistle Hill sites. This hypo-thesis differs from earlier ones by suggesting relationships to the south and southeast (rather than to the west), and by suggesting that, at least to some degree, Late Archaic peoples in the Ancaster-Burlington area are a localized development ultimately derived from Susquehanna Tradition origins. Further, it has been suggested that among the adaptations to the local environment was in-creased use of local (Ancaster) chert. This change may have been either because a degree of isolation made access to Onondaga chert more difficult, or because of a cultural preference for lighter coloured materials. Ultimately, however, assemblages reverted back to a preference for Onondaga chert on later sites. Only more data from this time period, especially from well-dated components, and a detailed consideration of the results obtained from such data will resolve any outstanding questions.

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