MURPHY: AN EARLY PALAEO-INDIAN GAINEY PHASE SITE IN SOUTHWESTERN ONTARIO

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The Murphy site (AeHk-1)is *a small Gainey* phase *Early Palaeo-Indian camp* near *Alvinston* in southwestern Ontario. *Excavated in 1990,* the site provides *important* new evidence *of activity area separation and* functional *differences in* Gainey *phase* settlement *systems. Located* more than *200 km* southwest of *a* Collingwood (Fossil *Hill* Formation) chert source, *Murphy strongly* supports *Gainey* phase mobility patterns *proposed for other* sites in southern *Ontario. The Murphy* site lithics *significantly* strengthen *Deller and Ellis'* (1988) case *for* a suite *of Gainey* phase *Early Palaeo-Indian* diagnostics.

INTRODUCTION

The Murphy site (AeHk-1) is located in southwestern Ontario near the town of Alvinston and is almost equidistant from the modern shorelines of Lake Huron to the north and Lake Erie to the south. As shown in Figure 1, Murphy is one of a small number of interior Gainey phase Early Palaeo-Indian sites known in southwestern Ontario. Abandoned strandlines of several successively lower proglacial Great Lakes are present in this area. Deep-water sand, silt, and clay deposits of Lake Whittlesey are the dominant landform features near Murphy. Shallow-water lacustrine deposits, principally beaches and bars of succeeding Lake Warren, are also common a short distance from the site and overlie the deeper and older Lake Whittlesey deposits (Cooper et al. 1978).

At about 210 m elevation, the Murphy site overlooks a ravine to its south which varies in depth from about one metre at its head to about 8 to 10 m along its course (Figure 2). The site itself consists of surface scatters of Collingwood (Fossil Hill Formation) chert debitage on high ground about one kilometre south of the modern Sydenham River. Local topography is dissected by deeply entrenched streams and erosional features crossing otherwise level areas. The dominant soil, Brookston clay loam, is noted for its poor drainage and presents special problems for the recovery of archaeological data.

THE GAINEY PHASE IN ONTARIO

Research into the earliest of Early Palaeo-Indian occupations in Ontario is still in its infancy. Nevertheless, the ten sites of this time period excavated thus far (see Figure 1) permit a few tentative conclusions. The Gainey phase is characterized by a number of technological attributes, including use of the Gainey type fluted point, minor use of Upper Mercer, Ohio cherts, presence of pieces esquillées, and absence of several Parkhill phase identifiers such as miniature fluted points, backed bifaces, alternately bevelled bifaces, and hafted perforators (Ellis and Deller 1988:112; Simons et al. 1984:266-269).

Ongoing analysis of Gainey phase sites in Ontario adds to this trait list the use of crystal quartzes, distinctive channel flake width, trianguloid end scraper attributes including flatter bits, paired lateral mid-point notches, 20 to 25 degree edge expansion, and a high incidence of right lateral bit spurs (Jackson 1994:410-411). Additional Gainey phase identifiers may include use of rectanguloid end scrapers and specialized forms of pieces esquillées. Sample sizes are not yet large enough, how-ever, to be conclusive.

Seriation of fluted projectile points from all three known Early Palaeo-Indian phases in Ontario clearly indicates a temporal series (Deller and Ellis 1992a:126; Ellis and Deller 1997:1-5). Gainey points of the Gainey phase are earliest, followed by Barnes points of the Parkhill phase, and Crowfield points of the Crowfield phase. In terms of actual age, there are no radiocarbon dates available for Early Palaeo-Indian sites in Ontario. However, an age range of about 1,000 years is strongly indicated for the typologically-seriated Early Palaeo-Indian phases Gainey-Parkhill-Crowfield (Deller and Ellis 1988:255).

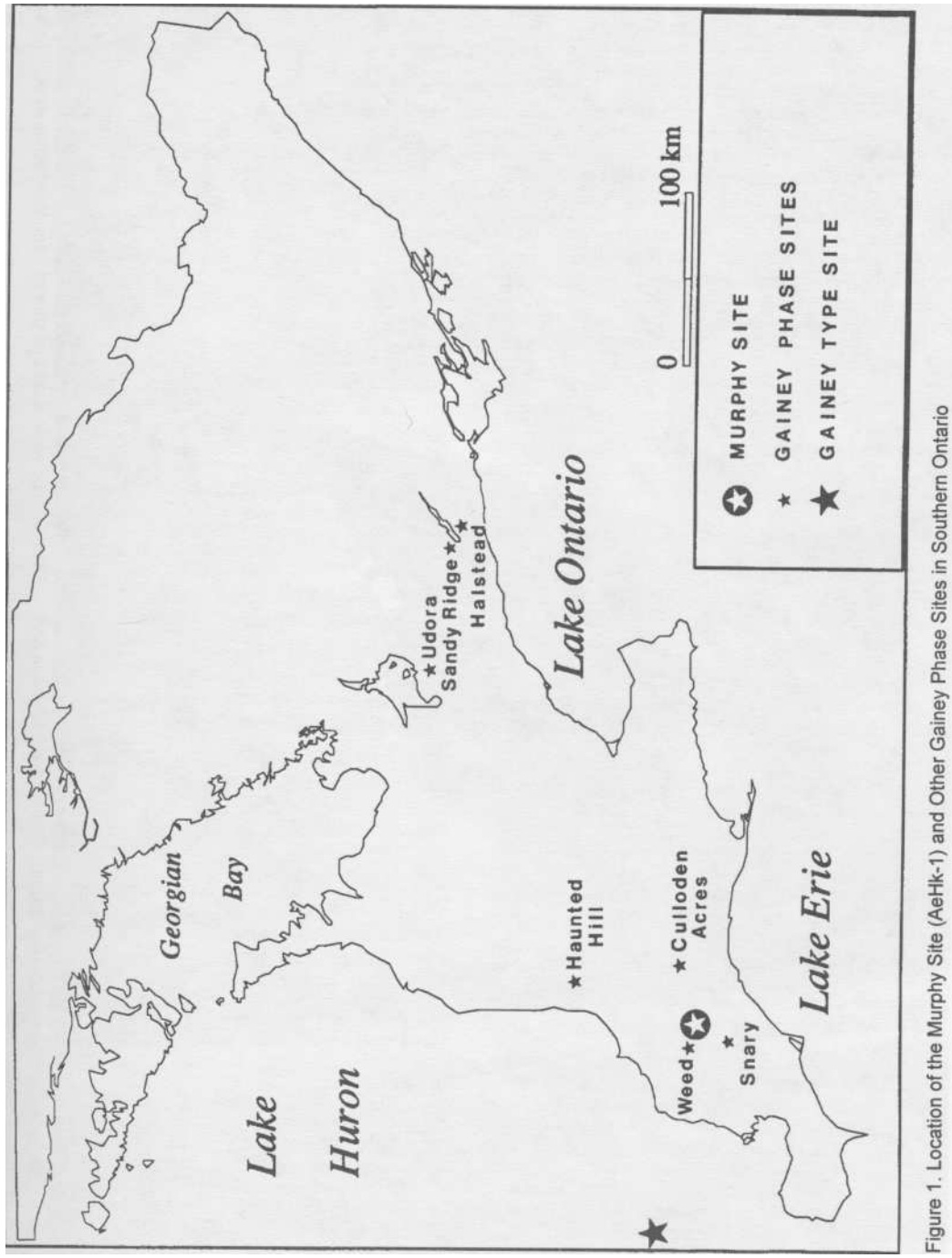

Figure 1. Location of the Murphy Site (AeHk-1) and Other Gainey Phase Sites in Southern Ontario

Geochronological data support the beginning of this chronology after 11,400 years B.P. and an ending close to 10,400 years B.P. Both Gainey and Barnes type fluted points found in the Rice Lake area of south-central Ontario must date after permanent lobal ice retreated from this area at circa 11,400 years B.P. (Jackson 1978). The absence of fluted points below the strandline of Main Lake Algonquin (or Ardtrea) with a termination date of 10,400 years

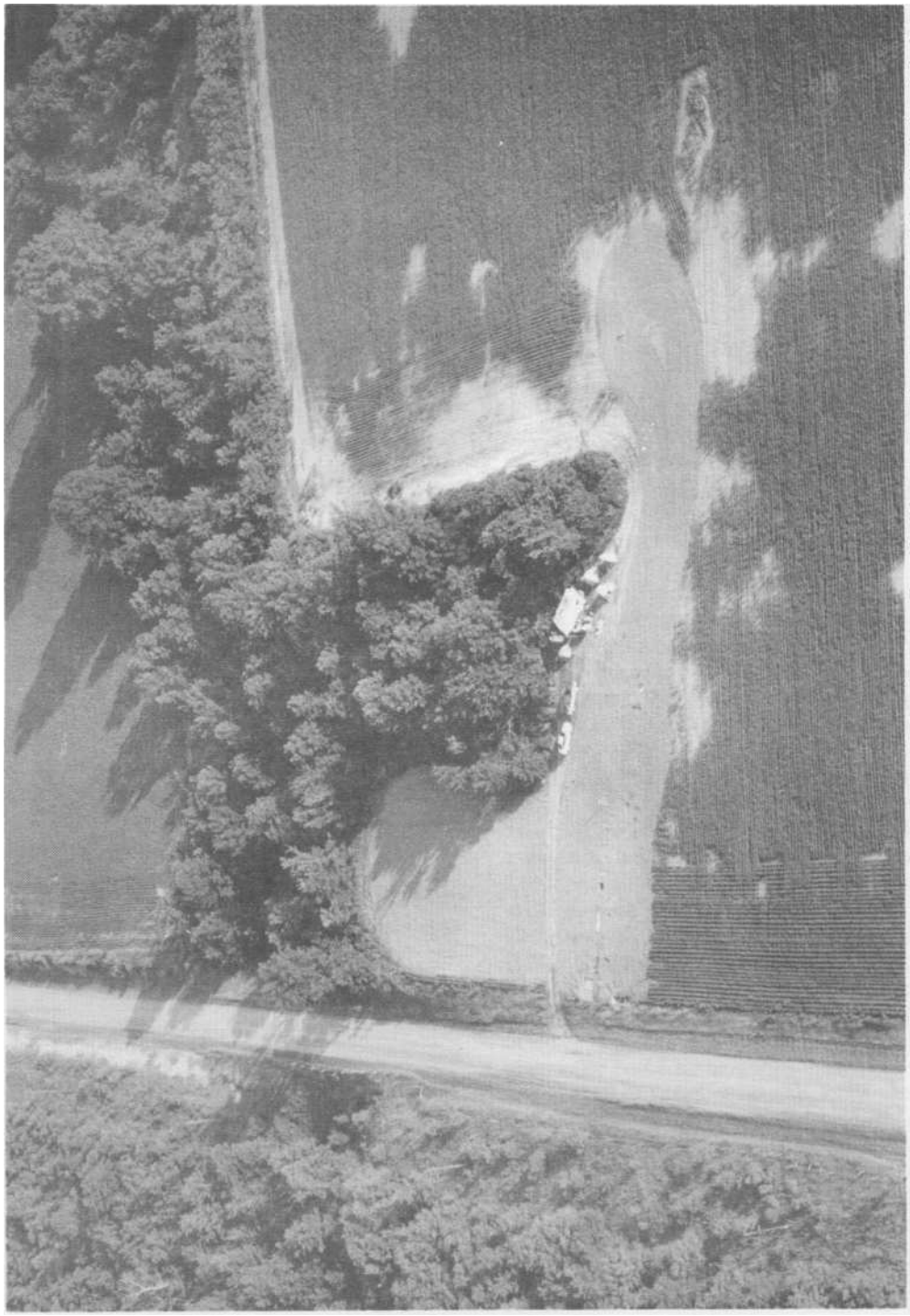

Figure 2. Oblique Aerial View to South of Murphy Site (wooded ravine in centre, East Knoll between road and parked cars, West Knoll directly below or north of parked cars).

B.P. (Deller and Ellis 1992a:2-3) suggests an equivalent end-date for Early Palaeo-Indian fluted point-using phases.

Available radiocarbon dates on Bull Brook phase sites in New England (regarded as a regional equivalent of Gainey), suggest an average age of about 11,000 years B.P. (Haynes et al. 1984:185; see also Grimes et al. 1984). This estimate is close enough to suggested geochronological ages for the Gainey

phase in Ontario to provide an anchor point for the seriated series Gainey - Parkhill - Crowfield. Since Holcombe points, which are age-equivalent or slightly later than Crowfield points, are found below the Lake Algonquin (Ardtrea) strandline, a terminal date of circa 10,000 years B.P. is reasonable for the fluted point complex in Ontario.

METHODOLOGY AND PROBLEMS

Chris Ellis and Brian Deller surface collected the Murphy site in the spring of 1990, thereby augmenting the original collection made by Deller and Ronald Welke in the 1960s. The site had remained poorly defined despite repeated surface collections over the intervening years. This characteristic is typical of small Gainey phase sites in Ontario where total tool inventories tend to be limited, flaking debris is ephemeral, and dispersal of material by ploughing is pronounced. In the case of the Sandy Ridge and Halstead Gainey phase sites in the Rice Lake region of south-central Ontario, literally years of survey was needed to locate excavatable activity areas (Jackson 1990:95, 1994:68).

To add to this problem of poor activity area definition, Murphy also has the disadvantage of being situated in an area of intractable clay loam. Modem deep ploughing has introduced a high percentage of clay subsoil into the plough zone, resulting in an excavation that is much like the activity normally carried out by pneumatic drill operators. During the summer, the Murphy site soils bake into clay blocks which must be broken apart with force and hand crushed to separate artifacts from the "soil" which will not sift through 1/8 inch or even 1/4 inch mesh screens.

Previous experience excavating two small Gainey phase sites in south-central Ontario had clearly indicated that site definition could be derived from the distribution of small pieces of debitage. Consequently, 1/8 inch mesh screens were used for the entire Murphy site excavation.

A three-metre site grid was established parallel to the township road on the east side of the site and test units were placed across the presumed activity area on the East Knoll (Figure 3). Known as "Area A", this was the only location which had produced Collingwood chert tools and debitage diagnostic of the Early Palaeo-Indian period.

Shortly after excavation began, it became obvious that shovel excavation was not possible, since the ground had solidified in the July heat. Farm-owner Richard Murphy then offered to run an experimental "para-till" unit over the site which, theoretically, was designed to lift, drop, and shatter large blocks of soil. This, however, simply made matters worse by separating the ground into large, irregularly shaped blocks of hard clay (Figure 4). Attempts to process excavation soils by water-screening in the nearby Sydenham River proved to be even less satisfactory. Conventional ploughing allowed the excavations to continue and, eventually, it was found that the use of a gasoline-powered roto-tiller was crucial to work the "soil" immediately prior to excavation.

By the close of the first month of excavation, our crew of six managed to excavate an average of 2.5 square metres per day.

ACTIVITY AREA DEFINITION

Repeated surface collections of the Murphy site between the 1960s and 1990 had yielded a handful of diagnostic artifacts manufactured from Collingwood chert. These artifacts were scattered across the crest and slopes of a low knoll termed the East Knoll or Area A (Figure 3). This area, which is about 30 metres northeast of the ravine edge (and less than 2.0 metres higher) yielded a number of Collingwood chert flakes during the 1990 excavation. Plough-dragged materials were also found to the south in a relatively level area where a nineteenth-century house once stood.

The principal objective of the 1990 research was to locate the activity area on the East Knoll, perhaps prematurely called "Area A". Surface artifacts had clearly indicated substantial unifacial tool activity, yet unifacial retouch flakes were only weakly represented. Fifty-six square metres were excavated (see Figure 3), which required 130 days of labour. Yet, Area A produced only 15 flat distal or medial flake fragments, three pot-lid flakes (produced by heat), two scraper retouch flakes, 12 biface retouch flakes, and one point tip fragment, all manufactured from Collingwood chert. Concentrations were too low to support the presence of an intact activity area. A preponderance of biface flakes and flat flake fragments (normally produced by breakage

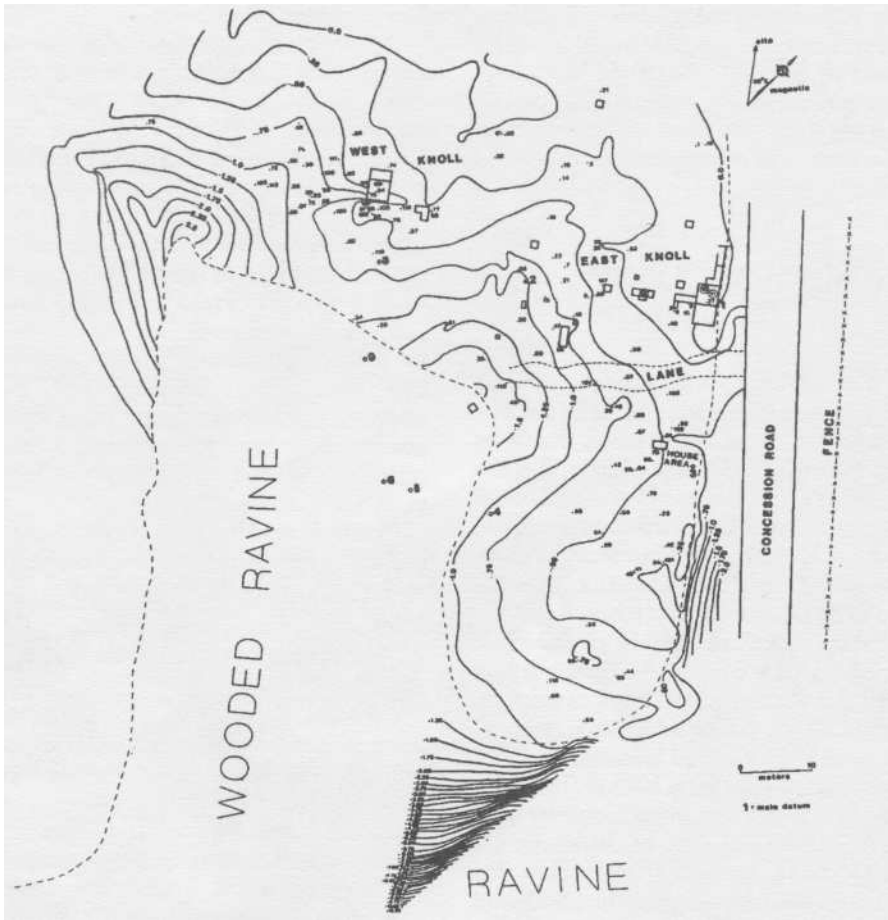

Figure 3. Contour Map of Murphy Site (showing East and West Knolls, numbered surface artifact locations, and 1990 excavations).

during and after biface manufacture) strongly suggested intrusive materials from a biface production or retouching area. The unifacial tool activity area indicated by surface recoveries was not located in 1990. The Area A excavations appear to have identified debris from both unifacial and bifacial tool activity areas which has been plough-dragged to this location. Modem north-south and east-west plough patterns actually meet in this area due to the constricted land surface between the ravine on the west and the concession road on the east. Known unifacial tool activity areas on small Gainey phase sites produce large numbers of small retouch flakes (Jackson 1994:235), quite unlike Murphy Area A, although a very similar array of unifacial tools including end scrapers, side scrapers, gravers, denticulates, and various kinds of modified flakes and fragments are present. Only formal gravers are absent at Murphy, unless they are present as exhausted unifacial tools (see AeHk-1-481 and 20 in Figure 13).

A small Archaic period activity area with a preponderance of Kettle Point chert was located in 1990. This area lies immediately adjacent to the north-south concession road in Area A (Figure 3). An Early/Middle Archaic corner-notched point was recovered here by J. Garfit during a 1989 surface collection (Figure 9b). Artifacts found during our 1990 test excavation, which may relate to the Archaic occupation, include Onondaga and Kettle Point chert biface flakes, as well as flat flakes of similar materials.

These 71 items may relate to Archaic bifacial tool sharpening or refurbishment.

The principal diagnostic Early Palaeo-Indian

Figure 4. View to East of Murphy East Knoll (after ground broken by paratill unit).

artifacts were recovered by surface collection of the East Knoll. A one-metre test unit placed at the northeast corner of the wooded ravine (Figure 3) produced a Collingwood chert flat flake and a pot-lid flake, as well as recent historic debris. Since this unit lay at the south end of an eroding gully originating to the northeast near the crest of the East Knoll, the cultural material may have been transported by post-depositional erosion. In fact, during heavy rain storms it was observed that small stones and flakes from the site were carried downslope as the water washed in sheets over the impermeable clay. Original surface collections may have indicated a false location for the centre of Area A. Test excavations did not reveal any area of debitage density consistent with recovered artifacts. Specifically, end scrapers on small Gainey phase sites in Ontario are typically resharpened several times during use, resulting in appreciable scatters of scraper retouch flakes (Jackson 1994:269). Consequently, it is suggested that a uniface/scraper use and rejuvenation area remains undiscovered at the site.

Diagnostic tools from the East Knoll do confirm the presence of a uniface area since tool types and diversity are comparable with uniface areas on excavated Gainey phase sites such as Culloden Acres (Ellis et al. 1991) and Sandy Ridge (Jackson 1990).

A two-metre test unit directly south of and downslope from the East Knoll crest (Figure 3) identified the location of a nineteenth-century house with abundant historic material and yielded a Collingwood flat flake and a uniface fragment.

GEOMAGNETIC SURVEY

Area A on the East Knoll and the southeast house foundation area were surveyed on June 26 and 27, 1991 by David Nobes and Mike Brewster of the University of Waterloo. A proton magnetometer survey of a 20 by 30 metre grid in Area A produced a number of high and low anomaly readings. Only a few of these could be confirmed in the field since it was not possible to excavate large enough areas. Significantly, high readings along the east edge of the excavation area proved to be associated with a series of burned tree stumps. These trees once lined the adjoining concession road.

As shown in Figure 5, the abundance of geomagnetic anomalies in Area A raises some questions. However, since there were no associated Palaeo-Indian artifact concentrations, it seems reasonably certain that these anomalies do not pertain to an Early Palaeo-Indian

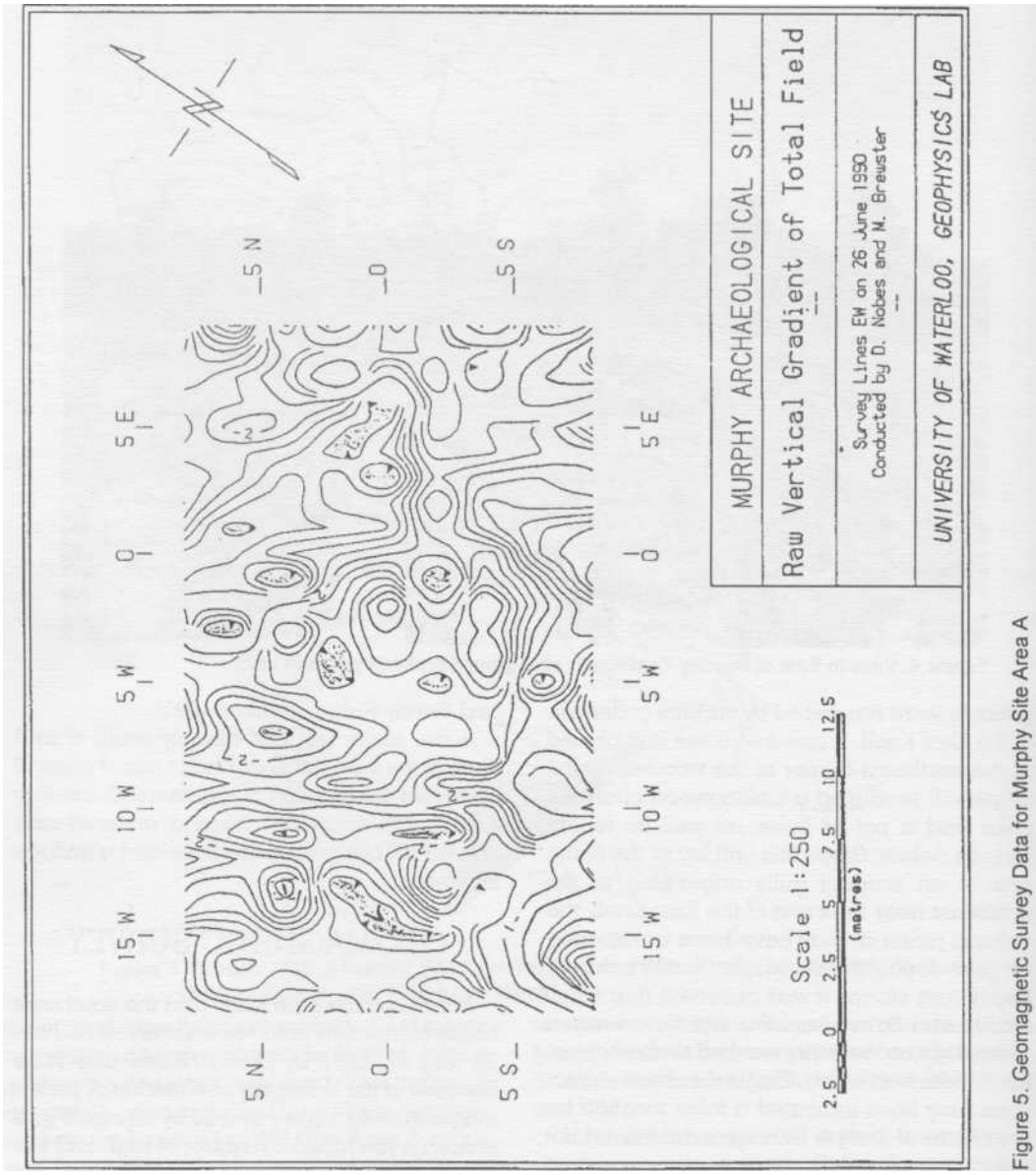

Figure 5. Geomagnetic Survey Data for Murphy Site Area A

site. Figure 6 illustrates geomagnetic cross-over points in the surveyed section of the southeast house site area. There are strong intercepts at the 30 South and 40 South grid points which correspond with concentrated house and foundation debris. The house foundation proper appears to lie directly south of our test unit S8E3.

Geomagnetic survey at the Murphy site did prove effective in confirming historic period features such as tree burns, as well as nineteenth-century structures. However, no data of value was produced in the search for Palaeo-Indian Area A. After the survey was carried out in June, West Knoll Area B was discovered.

WEST KNOLL AREA B EXCAVATIONS

The Murphy site West Knoll is located 30 m north of the ravine and approximately 50 m west of the county road (Figure 7). It is situated

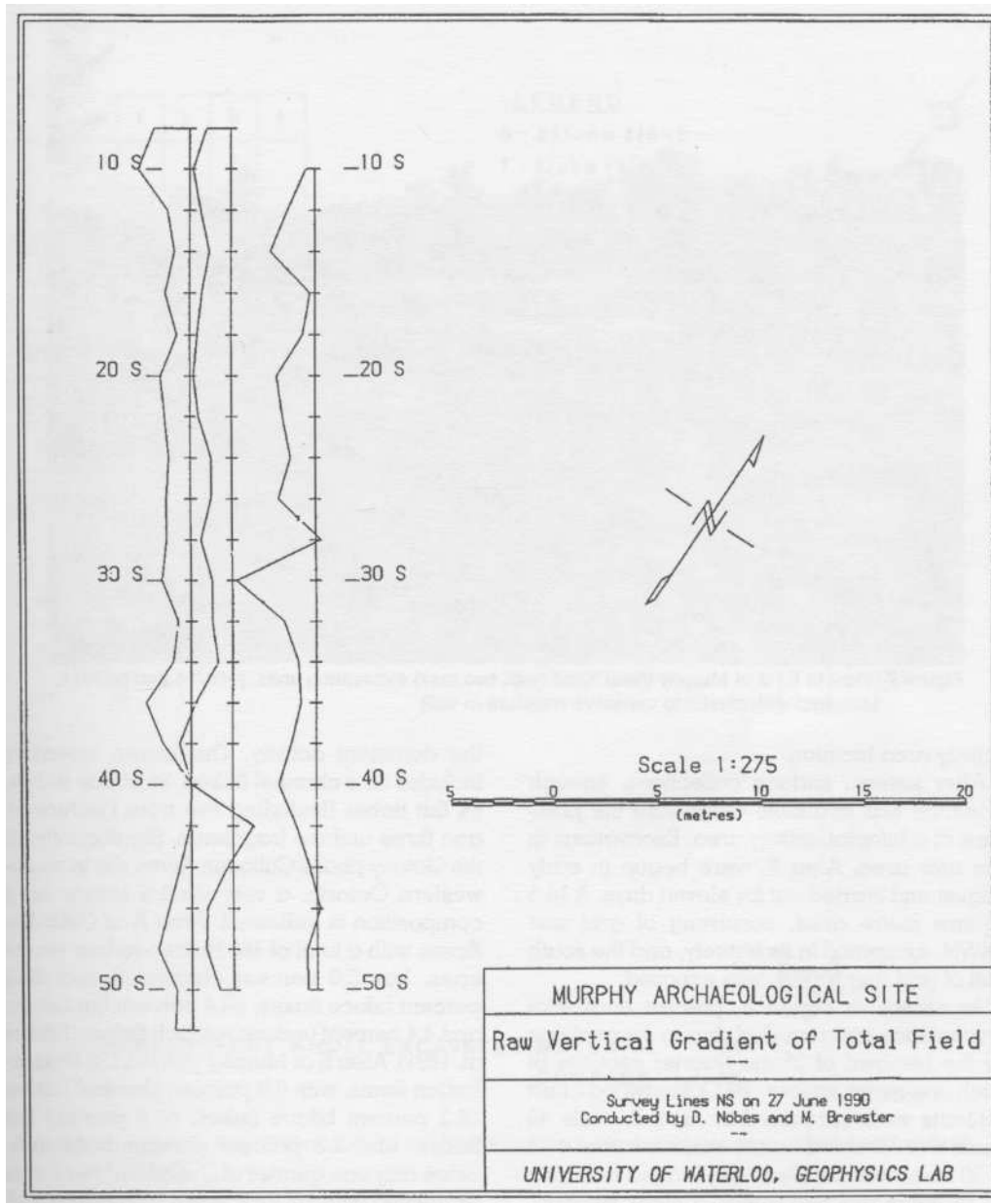

Figure 6. Geomagnetic Cross-Overs, Southeast Knoll

on a pronounced local rise in topography and has experienced considerable erosion.

Although no Palaeo-Indian artifacts had been found on the West Knoll prior to 1990, an experiment was devised to determine if erosion had routinely scoured artifacts from the surface of this topographic feature located very near the site ravine, and only a short distance from artifact-producing Area A. Observations taken on-site during heavy rain storms had indicated that water washing over the heavy clay field surfaces carried *away* small flakes. Given the possibility that buried artifacts might still remain in place, a 30 by 60 m field area was repeatedly roto-tilled using a manual gas-powered unit. Surface collection was then carried out during the next subsequent heavy rain. This resulted in the recovery of numerous small bifacial retouch flakes and broken flat flakes of Collingwood chert, indicating an

Figure 7. View to East of Murphy West Knoll (with two main **excavation** units, N4W14 **and** N5W14, covered with plastic to conserve moisture in soil).

activity area location.

After several surface collections, enough evidence was available to indicate the presence of a bifacial activity area. Excavations in this new area, Area B, were begun in early August and carried out for eleven days. A 14.5 square metre area, consisting of grid unit N4WI4, excavated in its entirety, and the south half of grid unit N5W14, was exposed.

As shown in Figure 8, precise horizontal provenience was provided during excavations by the removal of 25 cm quarter sections of each one-metre square. 84 Collingwood chert artifacts were recovered in Area B, while 46 items were located on the surface within a 20 to 30 metre radius. Densities ranged from one to 15 items per metre with a clear trend towards higher densities in the western part of the excavation. Four metres southwest of the main excavation, a three-metre test area yielded only one additional flake.

Area B appears to represent an activity area of about 10 metres north-south by 16 metres east-west. Based on surface density and the area sampled, we can estimate that several hundred additional artifacts are present. A surprisingly high ratio of channel flakes to other debris (nine items out of 130) suggests fluted point manufacturing and/or finishing as the dominant activity. The known inventory includes nine channel flakes, 34 biface flakes, 84 flat flakes (including five from Feature 5), and three uniface fragments. Significantly, at the Gainey phase Culloden Acres site in southwestern Ontario, a very similar biface area composition is indicated. Area B at Culloden Acres, with a total of 160 Palaeo-Indian recoveries, has 5.0 percent channel flakes, 36.3 percent biface flakes, 54.4 percent flat flakes, and 4.4 percent uniface retouch flakes (Ellis et al. 1991). Area B at Murphy yielded 130 Palaeo-Indian items, with 6.9 percent channel flakes, 26.2 percent biface flakes, 64.6 percent flat flakes, and 2.3 percent uniface fragments. Since only one-quarter of Culloden Area B was excavated with 1/8 inch mesh, compared with 100 percent at Murphy, it is expected that small flat flake counts are actually higher than they appear at Culloden Acres. Clearly, there are very strong similarities between the two biface areas at Murphy and Culloden Acres.

The recovery of eight channel flakes and no fluted point fragments suggests that Culloden Acres is a short-term "gearing up" site (Ellis et al. 1991). This is also the situation at Murphy Area B, which has no fluted points or fragments and abundant channel flakes as well as several types of biface thinning and reduction

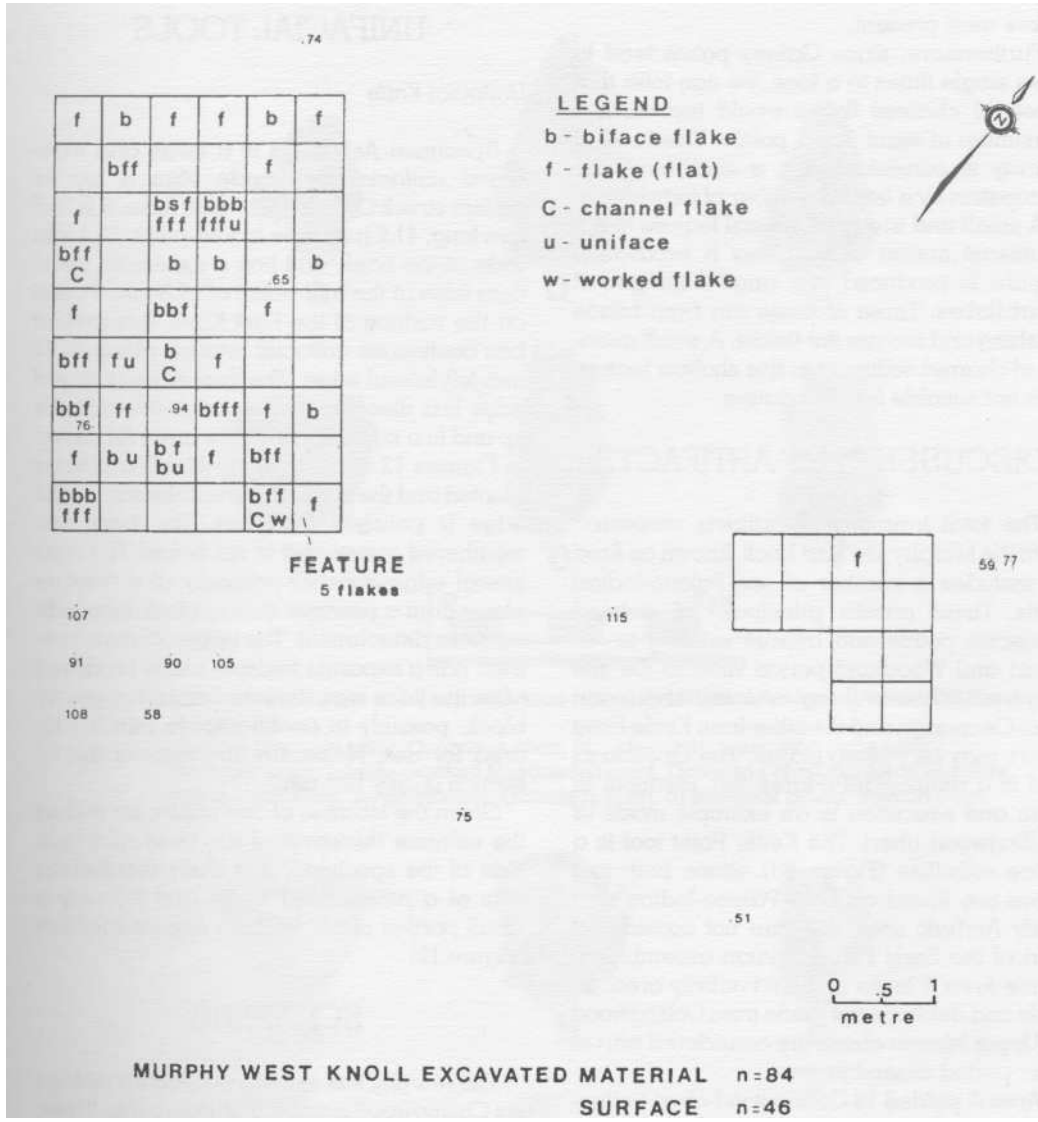

Figure **S.** Murphy Site Area B Excavations on West Knoll (showing distribution of excavated and surface material).

debris.

Based on the recovery of four proximal channel flake sections from Murphy Area B, a minimum of two bifacially fluted Gainey points is indicated. The character of each proximal section recovered (i.e., thickness, width and flake scars) strongly suggests these were points with single facial flutes. The presence of two distinctive biface edge flakes, one a highly finished and well-flaked biface and the other a more crudely flaked, thicker, and roughly finished biface, suggests that there were at least two on-site stages of manufacture prior to the final removal of flute or channel flakes.

Only a portion of Area B could be excavated due to time constraints. However, since surface biface thinning flakes document an activity area roughly four times the size of the excavated area (about 60 square metres), and since Area B lies on a tightly-defined small knoll, a reasonable case can be made for estimating total Area B assemblage size. Since four proximal channel flake sections were found and since no medial or distal fragments join these proximal sections, a very strong case can be made that as many as 16 channel

flakes were present.

Furthermore, since Gainey points tend to have single flutes to a face, we can infer that these 16 channel flakes would represent a maximum of eight fluted points. This level of activity is consistent with a short-term site occupation by a limited number of individuals.

A small and irregular subsoil feature in the southeast corner of the Area B excavation (Figure 8) produced five small Collingwood chert flakes. Three of these are from biface finishing and two are flat flakes. A small quantity of charred sediment in this shallow feature was not suitable for C-14 dating.

DISCUSSION OF ARTIFACTS

The total inventory of artifacts recovered from the Murphy site East Knoll, known as Area A, includes a number of non-Palaeo-Indian tools. These consist principally of isolated projectile points and bifaces relating to Archaic and Woodland period visits to the site (Figure 9). Two of these artifacts, one made from Onondaga and the other from Kettle Point chert, may be Palaeo-Indian. The Onondaga tool is a denticulate (Figure 9e), identical in form and execution to an example made of Collingwood chert. The Kettle Point tool is a piece esquillée (Figure 9d). Since both tool types are found on Late Palaeo-Indian and Early Archaic sites, they are not considered part of the Early Palaeo-Indian assemblage. Since Area A lacks an intact activity area, all tools and debitage not made from Collingwood or Upper Mercer cherts are considered part of later period assemblages.

Area A yielded 18 Collingwood chert unifacial tools or fragments, which were recovered principally from the site surface. Six scrapers, including two formal spurred end scrapers (Figure 10a,b), two expedient end scrapers (one on a piece esquillée fragment and one on a bipolar object), one large side/end scraper (Figure 11), and one scraper fragment, were recovered. Also present were a large unifacial knife (Figure 12), a denticulate (Figure 10c), six unifaces or fragments showing either retouch or diagnostic thickness, two retouched flakes, and two ventral scraper retouch flakes. All are made from Collingwood chert and indicate a substantial unifacial activity area.

UNIFACIAL TOOLS

Unifacial Knife

Specimen AeHk-1-14 is a large and elongated unifacial tool made from a top or bottom-struck Collingwood chert flake. It is 76.5 mm long, 41.2 mm wide at mid-point, 32.4 mm wide at the base, and has a maximum thickness (also at the mid-point) of 12.3 mm. Found on the surface of the East Knoll, this artifact has continuous unifacial retouch along its 77 mm left lateral edge. The thicker right lateral edge has discontinuous retouch towards the tip and in a small spokeshave area. As shown in Figures 12 and 14, the tip of this artifact is blunted and the upper 43 mm of the left lateral edge is polished from use. The base has weathered cortex and is not flaked The right lateral edge consists primarily of a fracture plane from a previous quarry block longitudinal flake detachment. The upper 25 mm, however, has a separate fracture plane produced after the flake was detached from the quarry block, possibly in an attempt to thin the tip area for use. Maximum thickness of the tip section is only 10.5 mm.

Given the location of use polish, as well as the extreme thickness of the base and right side of the specimen, it is likely that hafting was at a pronounced angle and left only a small portion of the tip area exposed for use (Figure 12).

SCRAPERS

The Murphy site surface collections yielded six Collingwood scrapers or fragments. There are two formal spurred end scrapers, two expedient scrapers (one on a piece esquillée and one on a bipolar object), one large side/end scraper, and one end or side scraper fragment (Figure 13).

Formal End Scrapers

The two formal end scrapers are both relatively short, suggesting the possibility of extensive end bit sharpening. Specimen AeHk-1-4 (Figure 13a) is the longer of the two scrapers (32.3 mm) and has an extremely convex bit. Bit width is 28.4 mm without compensating for convexity. Bilateral end bit spurs are quite pronounced with the left spur somewhat

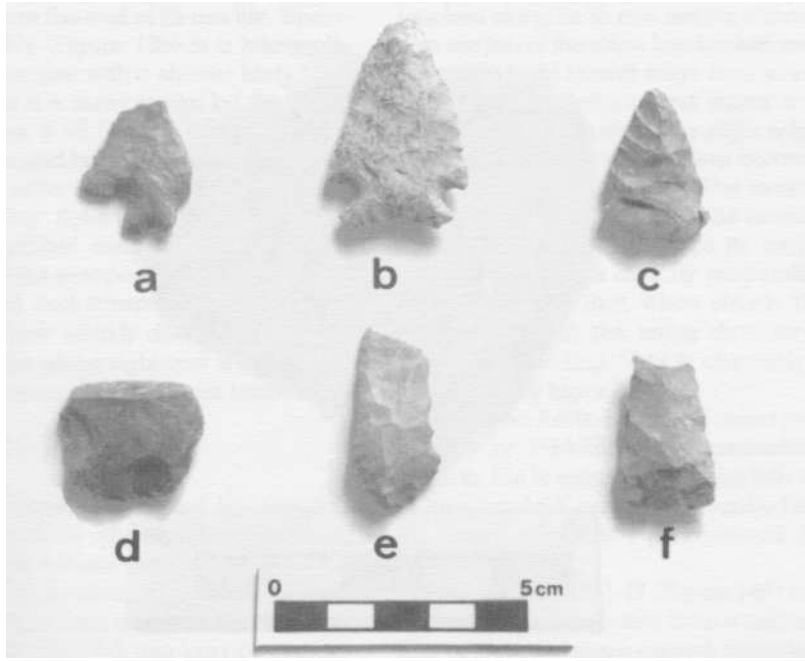

Figure 9. Early/Middle Archaic and Early Woodland Points and Other Unassigned Artifacts at the Murphy Site
(a) bifurcate base point, Onondaga chert, (b) side-notched, serrated blade point, Ancaster chert, (c) side-notched Meadowood point, Onondaga chert, (d) piece esquillée, Kettle Point chert, (e) denticulate, Onondaga chert, (f) triangular biface, Bayport chert.

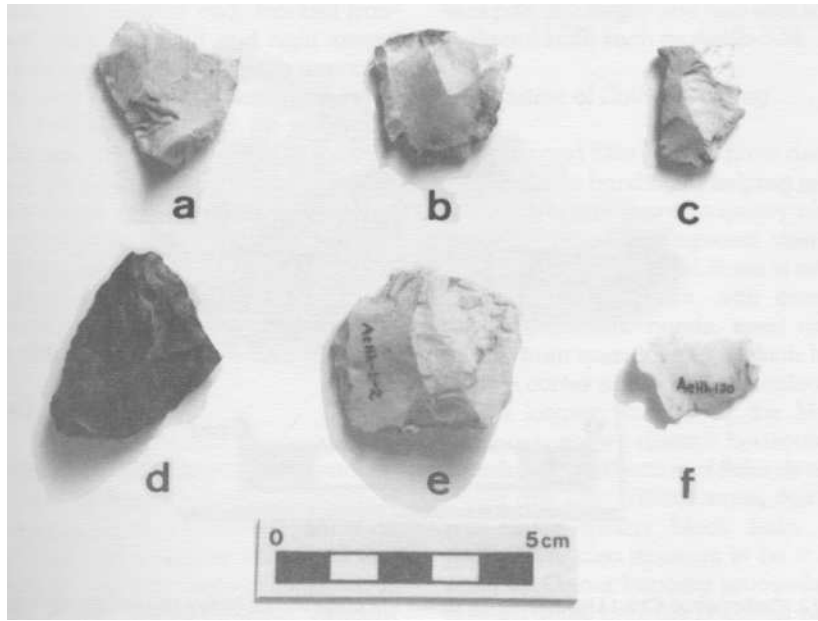

Figure 10. Early Palaeo-Indian Artifacts at the Murphy Site
(a) trianguloid spurred end scraper, Collingwood chert, (b) trianguloid spurred end scraper, Collingwood chert, (c) denticulate with snapped tip, Collingwood chert, (d) biface tip, Upper Mercer chert, (e) piece esquillée, Collingwood chert, (f) biface thinning flake, Collingwood chert.

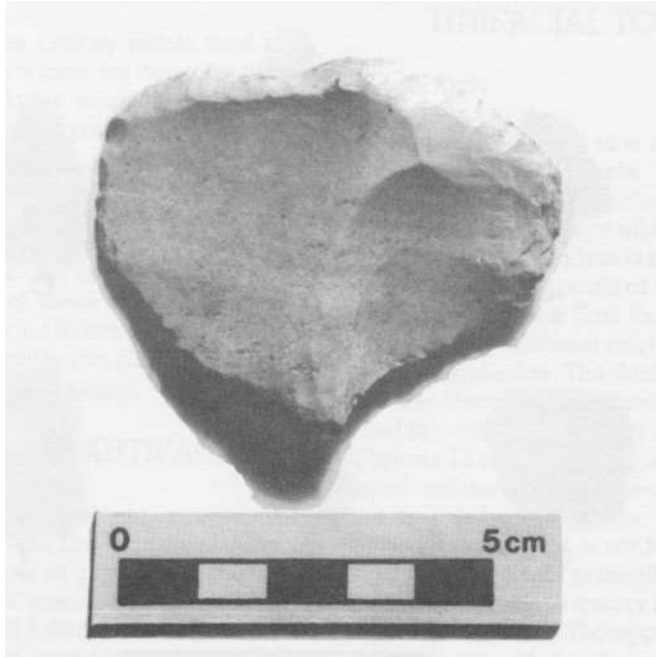

Figure 11. Large Side/End Scraper on Top or Bottom-Struck Collingwood Chert (note colour bands extending horizontally across centre of specimen).

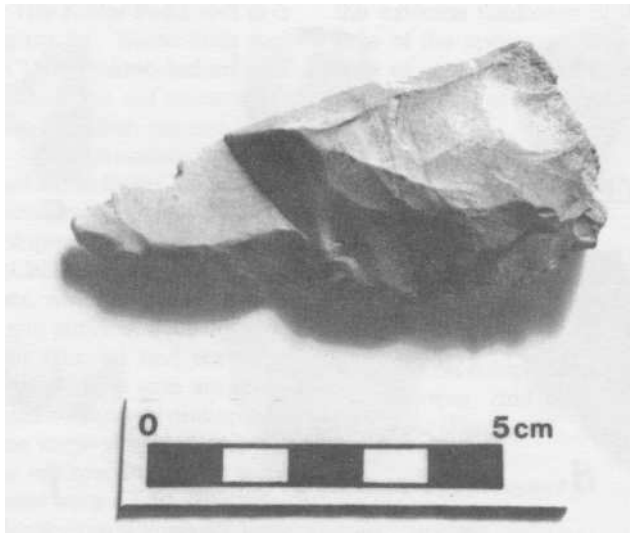

Figure 12. Collingwood Chert Unifacial Knife (lower left edge shows heavy use-polish towards tip).

larger. This scraper has a trianguloid shape with both a thick bit (5.9 mm) and thick body (7.9 mm) and a pronounced thickening at the platform end of the flake. Minor evidence of bit end crushing and the relatively gentle angle of the bit, together with the fact that the convexity of the bit has not been removed by multiple resharpenings, suggests that this scraper was

discarded before the end of its use life. Specimen AeHk-1-479 (Figure 13b) is a bilaterally spurred end scraper with a shorter body (27.3 mm) and flatter (i.e. less convex) bit. Bit width, including spurs, is 29.1 mm. It has a bit thickness of 4.5 mm and body thickness of 6.8 mm. The platform area is poorly defined due to shearing during flake detachment; this is visible as a marked concavity in half of the ventral face of the scraper.

Both spurred end scrapers, AeHk-1-4 and AeHk-1-479, show weakly developed, paired bilateral notches along right and left margins, which is a common Gainey phase trait.

Expedient End Scrapers

Two end scrapers fashioned by applying marginal retouch on other tools are present. Specimen AeHk-1-3 has the appearance of a trianguloid end scraper (Figure 13c) but is much too thin (5.3 mm) and lacks continuous bit end retouch. The 28.6 mm long bit is actually the heavily battered end of a piece esquillée with minimal ventral face retouch suggesting use as an end scraper. The bit end is gently convex. Specimen AeHk-1-43 (Figure 13) is a large and roughly oval object with a heavily battered proximal end, marked fracture planes along both left and right lateral edges, and a crushed distal end with remnants of a bit. This may be a heavily damaged expedient end scraper fashioned on a bipolar object. Although the proximal end of the artifact is atypically thick (11.3 mm) and bifacially worked, the distal end shows discontinuous retouch over a 23.5 mm edge. An extremely flat ventral surface created by shearing, together with distinctive colour markings, suggest that this specimen may also have been involved in piece esquillée manufacture or use.

Side *and End Scrapers*

Both artifacts in this category were surface collected and were made from Collingwood chert. Specimen AeHk-1-1 (Figure 14a) is an extremely large and elegantly fashioned end and side scraper. Retouch is nearly continuous around the entire circumference. Roughly rectangular in shape, this scraper is 52.8 mm long and 64.1 mm wide with its maximum thickness (8.8 mm) directly along the retouched 63.5 mm side and end bit.

The left lateral edge is continuously retouched along its 55 mm length, although a 22 mm section of the edge has broken away. The opposing right lateral edge incorporates the original flake platform and shows no significant retouch apart from very slight edge modification over a 34 mm section below the flat and crushed platform area. The major bit end of this scraper is parallel to the orientation of the colour banding through its center. The striking platform is directly perpendicular to this banding so that, when struck, the flake carried away in the same direction as the horizontal banding. This is obviously a side-struck quarry block flake.

Specimen AeHk-1-1 has no direct parallel in Gainey or Parkhill phase assemblages in Ontario, but is reminiscent in certain respects of "rectanguloid" scrapers described for Gainey phase sites such as Halstead (Jackson 1994:207).

Specimen AeHk-1-47 (Figure 14d) is a small wedge-shaped fragment from a unifacial tool. The presence of steep retouch along the single preserved portion of a lateral edge suggests that this is a side and end scraper fragment. The extreme thickness of this specimen (10.0 mm) makes it unlikely that it originated as a trianguloid end scraper and more likely that it was part of a larger side and end scraper or a unifacial knife such as AeHk-1-14.

Orientation of Colour Banding

Deller and Ellis (1992a) have described the role of colour banding in helping to determine an artifact's orientation to quarry block source material. Since Collingwood chert beds are known to have been laid down in relatively thin and horizontal layers, with corresponding horizontal colour bands, most artifacts are struck from quarry blocks which have top or bottom cortex and horizontal colour bands.

The largest scraper at the Murphy site, AeHk-1-1, shows distinct horizontal banding parallel to the direction of flake detachment. In Deller and Ellis' (1992a) terms, this is clearly a side-struck quarry block flake. Specimen AeHk-1-479 also appears to be a side-struck scraper. Colour banding proceeds at a slight upward angle from the proximal platform end to the distal bit end of the artifact. Specimen AeHk-1-14, a unifacial knife, shows colour banding perpendicular to the flake orientation indicated by the platform. This is obviously a top or bottom-struck quarry block flake. Finally,

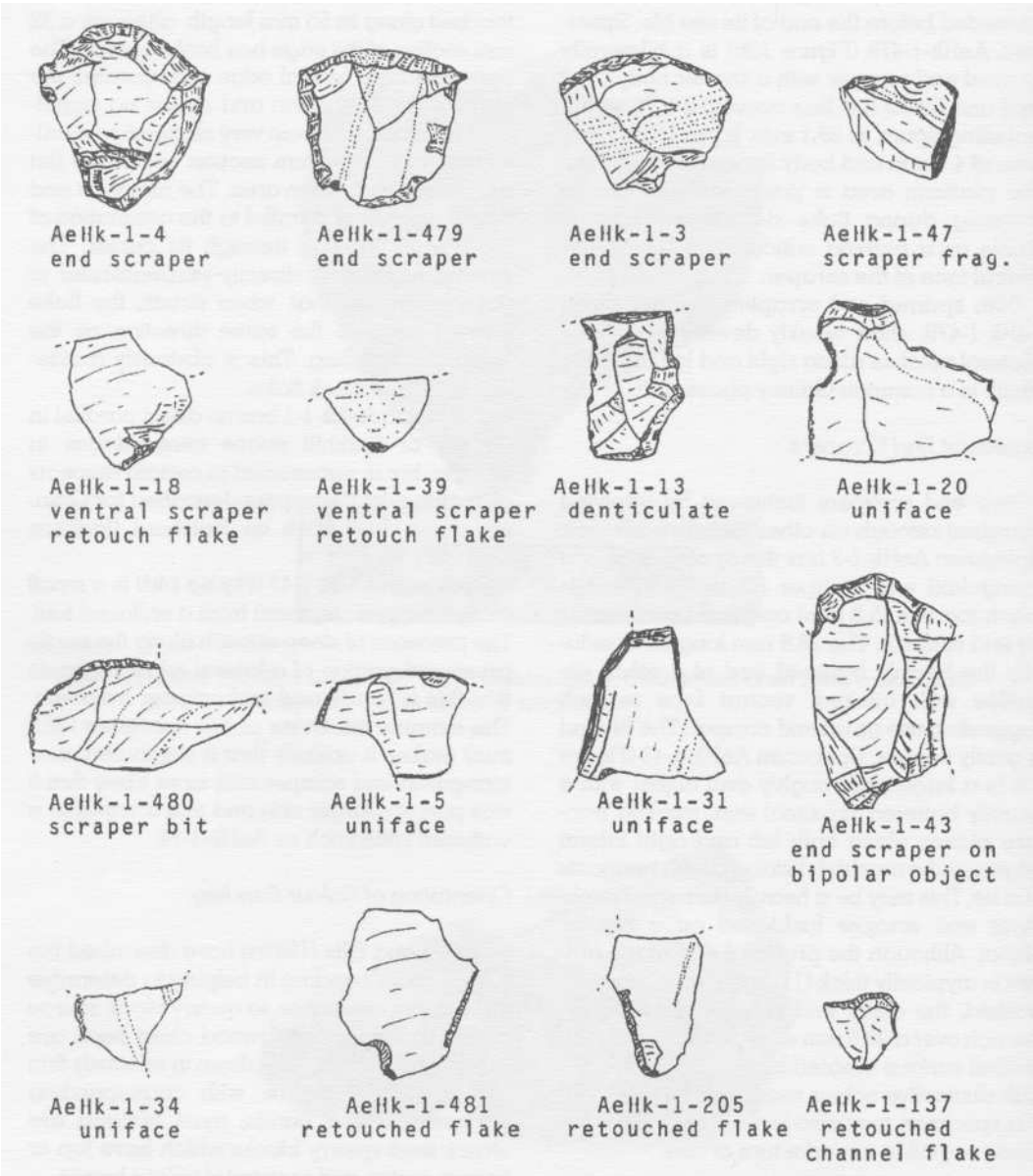

Figure 13. Murphy Site Unifacial Tools (Collingwood chert).

specimen AeHk-1-3 also shows banding parallel to the bit and platform ends. This is also a top or bottom-struck quarry block flake.

Denticulate

Specimen AeHk-1-13 (Figures l0c and 13), a small surface collected tool of Collingwood chert, has some bifacial flaking but is predominantly unifacial. Roughly rectangular in shape, it was an elongated and relatively narrow tool before it was snapped at mid-section. The preserved proximal portion is 29.8 mm long, 16.9 mm wide at mid-point, and 5.2 mm thick. It has a series of spurs along the right lateral margin (retouched unifacially) and some bifacial retouch along the opposing left lateral edge - perhaps to accommodate hafting. A flat striking platform is preserved at the base of the artifact, but there is no colour banding to discern orientation.

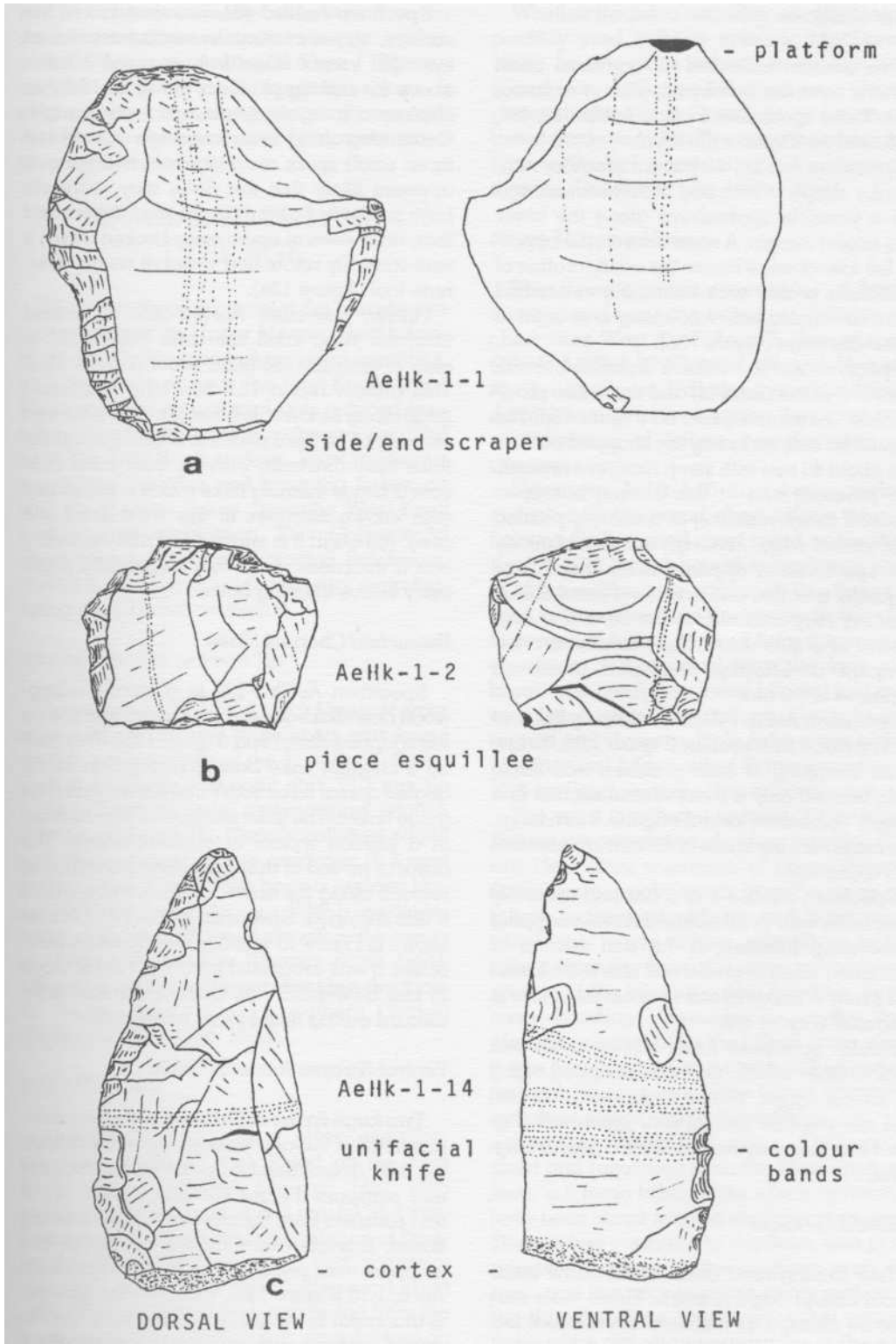

Figure 14. Collingwood Chert Tools from Murphy Site Surface (showing orientation of colour banding).

Other Unifaces

Five surface collected Collingwood chert artifacts have attributes indicative of unifacial tools. These specimens include AeHk-1-20, 480, 31, 5, and 34 (Figures 13h-k, m).

Specimen AeHk-1-20 has an irregular rectangular shape, is snapped at mid-section, and has a possible spokeshave along the lower right lateral margin. A worn area on the opposing left lateral edge shows the configuration of a multiple graver with unifacially retouched spurs at regular intervals along a straight to excurvate edge (Figure 13h).

Specimen AeHk-1-480 is a unifacial tool with a portion of the distal bit and the entire proximal haft section snapped off (Figure 13i). The original bit end, including the snapped portion, was about 40 mm with steep marginal retouch. The proximal end of this artifact has been sheared away, resulting in a sharply pointed right lateral edge. Although this is a relatively thin specimen, it appears likely that it was originally a hafted end scraper. Partial colour banding perpendicular to the bit end is suggestive of a side-struck flake similar to other scrapers at Murphy. Maximum preserved thickness is 6.2 mm.

Specimen AeHk-1-31 is a relatively flat and thick uniface mid-section (Figure 13k). Transverse snapping of both proximal and distal ends has left only a short ventral section of a steeply retouched lateral edge (8.4 mm long). The maximum thickness of 4.2 mm is consistent with a uniface.

Specimen AeHk-1-5 is a flat and relatively thick flake with proximal and distal snapping obliterating function. A 7.6 mm section of retouched edge is preserved with a thickness of 3.3 mm. A unifacial tool of substantial size is indicated (Figure 13j).

Finally, specimen AeHk-1-34 is a flat and thick artifact which has been snapped along all lateral edges. With a thickness of 3.2 mm and one possible partial spur preserved (Figure 13m), this may be a unifacial graver fragment.

Retouched Flakes

Two Collingwood chert flakes show intentional lateral edge retouch. These tools may also be classed as unifaces. An unusual feature is the inverse retouch on the ventral, rather than dorsal, face (Figure 13).

Specimen AeHk-1-481, recovered from the surface, shows continuous ventral retouch of the right lateral edge from a point 9.0 mm above the striking platform, along an 18.6 mm edge area, to an abrupt change in edge angle. Continuing along this same edge are at least three small spurs resulting from snapping. It appears likely that this flake may originally have functioned as a multiple spur graver and that, after several spurs were broken away, it was ventrally retouched to serve as an alternate tool (Figure 13n).

Finally, specimen AeHk-1-205, excavated from the West Knoll site area (N5W14SE), is also a ventrally modified flake (Figure 13o). This artifact has a 13.0 mm long retouched edge along its lower left margin (when viewed ventrally). The flake platform is thinned and the flake itself markedly curved. Both traits indicate a biface thinning flake which is consistent with known activities in the West Knoll site area. Although it is snapped at mid-section, it has a thickness of 3.2 mm suggesting a primary biface thinning flake.

Retouched Channel Flake

Specimen AeHk-1-137 is a small Coilingwood chert flake showing marginal retouch on the snapped distal end (Figure 13p). This may be a channel flake base, judging from small angled dorsal flake scars consistent with flute guide flakes. The flake platform is also isolated in a fashion typical of channel flakes. The distal or bit end of this flake shows continuous retouch along the entire 12.0 mm width where it has snapped. Specimen AeHk-1-137 is also shown in Figure 15 with the West Knoll channel flakes. It was excavated from West Knoll (Area B) unit N4W14dNE - an area of channel flake discard during fluted point production.

Ventral Scraper Retouch *Flakes*

Two large flakes of Collingwood chert show distinctively flat and smooth surfaces indicating their detachment from the ventral faces of end scrapers (Figure 13). Since none of the end scrapers from the site show these missing flakes, it is obvious that two additional end scrapers were retouched at the site. Specimen AeHk-1-18 (Figure 13e), found on the surface, is triangular in outline with a perfectly smooth dorsal surface and a striking platform which has carried away part of the bit of the original

tool. This flake has clearly been struck from the smooth ventral face of an end scraper or other uniface. Specimen AeHk-1-39 (Figure 13f), also surface collected and triangular, shows a similarly smooth dorsal (originally ventral) surface but with no obvious bit areas carried away by detachment.

BIFACIAL TOOLS AND DEBITAGE

Bifacial tools are scarce at the Murphy site and consist of an Upper Mercer chert biface tip and a Collingwood chert piece esquillée, both found on or near the East Knoll. Some Collingwood chert unifacial tools reduced from biface fragments have also been described from the East Knoll surface. Most numerous are biface thinning and trimming flakes, as well as channel flakes, from the West Knoll surface and excavation. This Collingwood chert biface debitage, including flat flakes, relates to the postulated fluted point manufacturing area known as Area B.

Bifacial Preform or Point Tip

Specimen AeHk-1-24, a black Upper Mercer chert bifacial preform or point tip, was found on the surface south of the East Knoll. Snapped at or above mid-point, this 37.7 mm tip section shows full facial and marginal retouch (Figures I0d and 15). Heavily polished edges and the thickness of this specimen (8.3 mm) suggest that it may have been a preform discarded during manufacture. With a maximum width of 34.2 mm, this tip falls within the range of Gainey type points (Simons et al. 1984). Minor use of Upper Mercer chert is a diagnostic Gainey phase trait in southern Ontario (Deller and Ellis 1988, 1992b).

Piece e*squillée*

A classic example of a piece esquillée, specimen AeHk-1-2 was found on the East Knoll surface (Figures l0e and 14b). With maximum dimensions of 38.4 mm by 33.4 mm, a rectangular shape, strong evidence of bipolar thinning and end crushing, and maximum thickness of 11.1 mm, this Collingwood chert artifact shows lateral edge expansion from the base which is consistent with manufacture on a bifacial preform base.

Whether the piéce esquillée is a distinct tool, possibly used in bone splitting (MacDonald 1968), or simply an exhausted bipolar core (Goodyear 1993), its attribution as a Gainey phase diagnostic in Ontario is so far uncontested (Jackson 1994). The absence of this tool type on Parkhill phase sites in Ontario is intriguing (Deller and Ellis 1988, 1992b).

Biface Thinning Flakes

There are numerous examples of biface thinning and trimming flakes on Collingwood chert from West Knoll Area B. Two of these flakes, AeHk-1-30 (Figures 10f and 15c) and AeHk-1-83 (Figure 15d), are described here in detail because of the bearing they have on a consideration of biface manufacturing sequences.

Specimen AeHk-1-30 is a large, surface collected Collingwood chert biface thinning flake on Collingwood chert found on the West Knoll. It is 29.4 mm long with a maximum width of 18.9 mm. This is an extremely thin flake (1.9 mm) with pronounced thickening in the platform area (3.4 mm). Marked flake curvature is consistent with removal from the face of a broad and gently excurvate bifacial tool such as a fluted point. The platform area is heavily ground and shows multiple flake scars typical of a finished biface edge. It incorporates an 11.8 mm long section of the original edge.

The most significant feature of this biface flake is the orientation of colour banding (Figure 15c). Since a majority of biface thinning flakes are normally struck from the sides of a biface (compared with tip and base areas which are much smaller overall), a typical biface thinning flake will show a transverse section of the biface's colour banding. In this case, banding perpendicular to the flake platform suggests that the biface (from which it was struck) has horizontal banding consistent with manufacture of the biface from a top or bottom struck quarry block flake.

Specimen AeHk-1-83, also of Collingwood chert and recovered from the West Knoll surface, is a large biface flake which appears to have been struck from an early stage preform. There is less curvature to this flake, and much greater thickness in the platform area (6.4 mm), and few prior flake removals evident on the dorsal surface. The three visible primary flake scars are all perpendicular to the platform and transverse across the biface. This

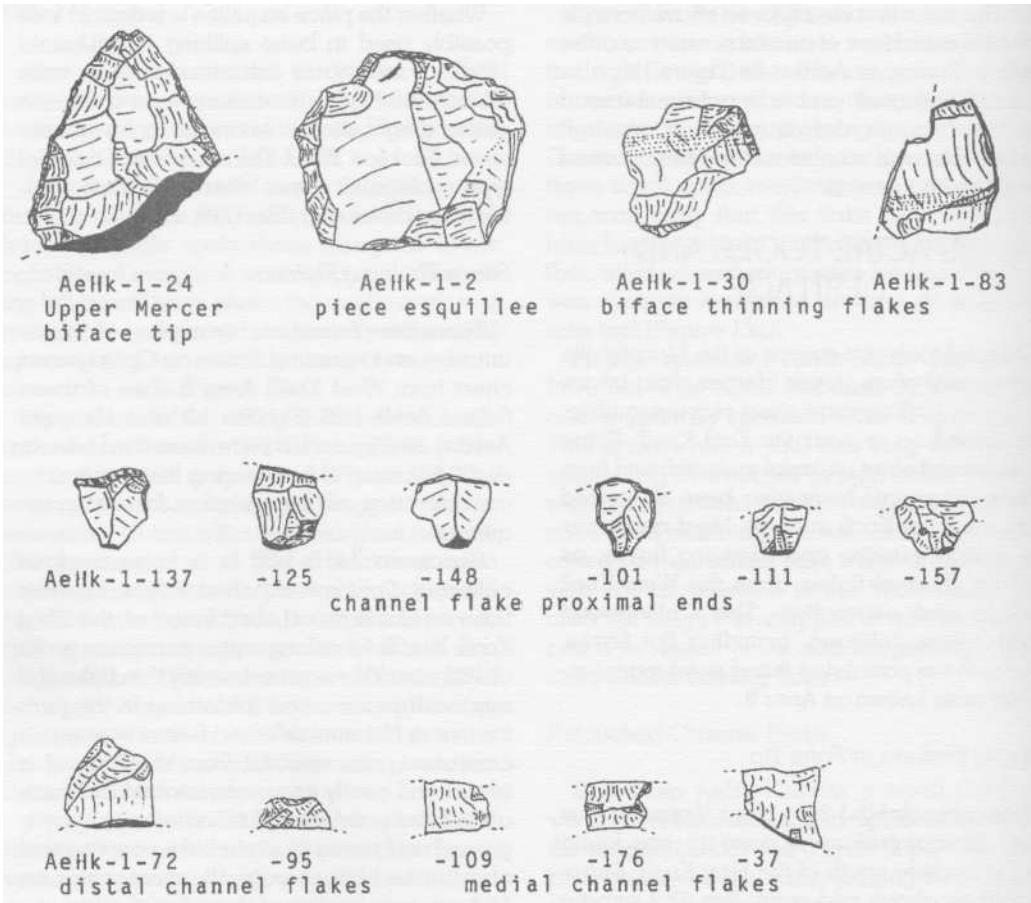

Figure 15. Murphy Site Bifacial Tools and Flakes (all are Collingwood chert except for AeHk-1-24 which is Upper Mercer chert).

contrasts with AeHk-1-30 which has six major dorsal scars (both perpendicular *and* parallel to the platform) consistent with a nearly complete biface. Depth of flake scars is also much greater on AeHk-1-83, suggesting an early stage bifacial preform. The platform area is extremely thick and long and represents the actual preform edge. A 22.8 mm edge section is preserved with two major facets from previous edge removals. The flatness of one 16.9 mm facet suggests the original edge of a roughed out preform or quarry block flake. The orientation of colour banding perpendicular to the platform area on this specimen (Figure 15d) indicates that banding was transverse or horizontal across the preform. This is consistent with an artifact made on a top or bottom struck quarry block flake.

The two biface thinning flakes, AeHk-1-30 and AeHk-1-83, are important in several ways. First, these flakes demonstrate at least two distinct stages of biface manufacture on the West Knoll: larger, earlier stage preforms and somewhat smaller, later stage, finished bifaces. Colour banding on both specimens, in relation to platform and flake orientation, suggests that both bifaces were made on top or bottom struck quarry block flakes rather than on side-struck flakes typically used for end scrapers at the Murphy site.

The presence and dominance of channel flakes in the West Knoll Area B artifact assemblage strongly suggests a relatively complete sequence of biface manufacture — from early stage preforms, through more finished bifaces, to channel flake removal from finished fluted points.

Biface Flake Comparisons

Analysis of bifacial flake size and attributes for the Murphy site is informative when compared to similar data for the Halstead site in south-central Ontario (Jackson 1994). Both sites were excavated using 1/8 inch mesh recovery screens, show Collingwood chert dominance, and have strong Gainey phase identifiers. To avoid skewing factors associated with flaking properties of different raw materials, only Collingwood chert biface flakes are compared between the two sites. The Murphy sample consists of 27 specimens from Area B and the Halstead sample of 62 specimens from mixed Area A-B.

The Murphy site biface flake debris is clearly identified with the fluting of projectile points and associated stages of biface manufacture situated on a local topographic prominence. The biface flake area at Halstead (Area B) is more diffuse and is known to overlap with a unifacial tool activity area (Area A). The presence of several channel flakes suggests that it is comparable with the Murphy biface area, while the overall character of the debitage also indicates biface reduction, as well as finishing of fluted points.

Table 5 offers a metric comparison of biface flakes at Murphy and at Halstead. The mean length of intact Murphy biface flakes is 11.4 mm, width is 9.6 mm, thickness is 1.5 mm, and weight is .2 grams. These measurements compare closely with Halstead means of 11.5 mm length, 9.5 mm width, 1.8 mm thickness, and .3 grams. Where the two samples differ substantially is in the greater thickness and weight of the Halstead biface flakes. The Murphy flakes tend to be slightly shorter and wider than those at Halstead.

Flake platform attributes support similar bifacial treatment at both sites, while metrics (see Table 5) again indicate greater size at Halstead. Mean platform length at Halstead is 5.1 mm, thickness is 1.4 mm and depth is 1.1 mm. This compares with a mean length of 4.1 mm, thickness of 1.23 mm, and depth of 1.1 mm at Murphy.

The Halstead site biface flakes either are derived from larger bifaces in general, or represent a different stage of biface reduction. A large outre passé flake at Halstead, weighing 3.7 grams, has a length of 48 mm and provides a minimum width for at least one Halstead biface. This is clearly a preform stage biface prior to finishing and fluting.

The differences between the two sites may simply reflect the relative dominance of fluting activity in the Murphy site Area B assemblage. Murphy has at least eight channel flakes whereas Halstead has only five - indicating that at least one or two more fluted points were finished at Murphy. What is significant is that biface flake measures confirm the same type of activity at these two small Gainey phase sites in widely separated parts of southern Ontario.

Finally, 16 of the 30 biface flakes at Murphy show distal end breakage, while only 20 of 62 flakes at Halstead have this attribute. Such breakage is normally associated with biface finishing (see Deller and Ellis 1992a).

Channel Flakes

A total of nine definite and two possible channel flakes (all of Collingwood chert) were recovered from West Knoll Area B (Figure 15). There are four definite channel flake bases or proximal sections (AeHk-1-137, 125, 148, and 101), and two possible proximal sections (AeHk-1-111 and 157). There are also two distal channel flake sections (AeHk-1-72 and 95), and three medial channel flakes or mid-sections (AeHk-1-176 and 37).

The proximal channel flake sections (Figure 15e-h) all share characteristic platform isolation, thickness, dorsal guide flake removal scars, and distal breakage 10 to 15 mm above the platform. The medial and distal channel flake sections all show pronounced flatness in cross-section and broad, shallow collateral dorsal flake scars. The absence of refits among' any of the nine to eleven identified channel flake sections suggests that additional specimens may lie within the unexcavated portions of Area B.

The two possible channel flake proximal sections, AeHk-1-111 and AeHk-1-157, have the width and dorsal flake scar patterns of channel flakes but have platforms more consistent with biface thinning flakes. That is, they are flat in plan view rather than having isolated platforms. For purposes of statistical comparison, only the definite channel flakes will be included in the Area B assemblage.

Comparison of Murphy site channel flakes with those from other Gainey phase sites, and from the Parkhill phase Thedford II and Parkhill sites, confirms the identification of Murphy

Table 1. Murphy Site Scraper Metrics (mm)

Specimen No.	Maximum Body L.	W.	Th.	Wt.(g)	Maximum Bit L.	W.	Th.
AeHk-1-4	32.3	28.4	7.9	6.94	28.4	5.2	5.9
AeHk-1-479	27.3	29.1	6.8	4.58	29.1	3.1	4.5
AeHk-1-3	23.9	28.6	5.3	2.85	28.6	1.8	4.0
AeHk-1-47	(17.4)	(19.8)	9.8	2.46	(19.8)	5.6	6.0
AeHk-1-480	(20.4)	38.4	5.6	3.26	38.4	1.9	4.2
AeHk-1-1	52.8	64.1	8.8	28.96	64.1	5.1	7.8

*all of the above specimens are on white Collingwood chert
** Specimens AeHk-1-4, 479, and 3 are classed as end scrapers, AeHk-1-47 as an end/side scraper fragment, AeHk-1-480 as a probable end scraper bit end, and AeHk-I-1 as a side/end scraper.

Table 2. Murphy Site Channel Flakes on Collingwood Chert

		Maximum Artifact				Platform			
No.	Type	L.	W.	Th.	Wt.	Att.	L.	Th.	Depth
.125	proximal	8.6	13.2	3.6	.65	Fac, G	4.2	1.9	1.0
.148	proximal	13.7	13.2	3.3	.57	Fac, G	5.6	1.8	1.6
.101*	proximal	13.1	10.2	3.0	.44	Fac, G	3.6	1.6	-
.72	distal	14.8	15.0	1.9	.43				
.95	distal	5.3	11.9	1.2	.10				
.37	medial	13.6	13.3	2.1	.40				
.176	medial	8.0	10.7	1.6	.16				
.109	medial	8.3	11.2	1.3	.17				

* specimen .101 has a modified distal end

Table 3. Comparative Mean Channel Flake Measurements on Ontario Gainey Sites

			Maximum Artifact				Platform		
No.	Type	Material	L.	W.	Th.	Wt.	L.	Th.	Depth
MURPHY									
n=3	proximal	Collingwood	11.8	12.2	3.3	0.55	4.5	1.8	1.3
n=3	medial	Collingwood	10.0	11.7	1.7	0.24			
n=2	distal	Collingwood	10.1	13.5	1.6	0.27			
All types		Collingwood	10.7	12.3	2.3	0.37	same as proximal		
HALSTEAD									
n=2	proximal	Collingwood	17.4	20.0	1.8	0.73	4.6	1.0	1.8
n=1	medial*	Collingwood	11.3	9.7	1.4	0.15			
n=2	distal	Collingwood	18.9	13.0	1.5	0.57			
All types		Collingwood	18.1	16.5	1.7	0.65	same as proximal		
CULLODEN ACRES									
n=4	proximal	Collingwood**	13.5	10.7	1.9	0.34	4.1	1.6	1.4
n=3	medial	Collingwood	11.3	13.7	1.7	0.31			
All types		Collingwood	12.5	12.0	1.8	0.32	same as proximal		
SNARY									
n=1	proximal	Collingwood	19.6	11.4	1.7	0.48	6.4	1.8	1.2

* Halstead medial channel flake is not included in overall mean calculations.
** one exotic brown chart channel flake is included in the Culloden Acres sample.

as a Gainey site. Table 2 provides raw metric data for the Murphy site channel flakes. Table 3 compares measurements on proximal, me-dial, and distal channel flake sections at four Ontario Gainey sites: Murphy, Halstead, Culloden Acres, and Snary. Finally, Table 4 compares measurements of proximal channel flake sections from these same four Ontario Gainey sites, plus the Gainey type site, with two major Ontario Parkhill phase sites: Thedford II and Parkhill.

Mean width for the total Gainey phase proximal channel flake sample is 13.5 mm, with a standard deviation of 3.8 mm. This compares with the Parkhill phase mean value of 10.5 mm, with a standard deviation of 1.9 mm. An unpaired t-test comparing these two samples, with 36 degrees of freedom, gives a t value of -3.201. Since p is greater than .0005 and less than or equal to .005, there is a greater than 99.5 percent probability that the Gainey and Parkhill phase channel flake samples represent statistically independent populations.

The relatively high standard deviation of the Gainey phase sample (3.8 mm) suggests some overlap between some Parkhill and Gainey sites.

Comparison of the Murphy site sample alone against the Parkhill phase data is informative. Using an unpaired t-test, at 23 degrees of freedom, a value of -1.477 is given. Since p is greater than .05 but less than or equal to .1, there is a greater than 90 percent and less than 95 percent probability that the Murphy channel flake sample is from a population (i.e., point type) independent of those seen on Parkhill phase sites.

Small sample size will have a significant impact on phase comparisons using channel flake width alone. However, it is obvious that Parkhill and Gainey phase sites in general differ in this characteristic. Parkhill phase channel flakes are consistently *narrower* than those on Gainey phase sites. Mean width appears to be the only measurement where there is such a distinction. This proves true not only of samples of proximal channel flake fragments but also of all types of channel flakes combined. Although the technological significance of this differentiation has yet to be identified, it is not surprising that Parkhill phase Barnes points have narrower channel flakes since the points themselves tend to be narrower than Gainey type fluted points.

It is hoped that this preliminary study will be followed by an examination of channel flake attributes using larger sample sizes and a greater diversity of attributes for comparison.

Flat Flakes

A natural by-product of biface production and, especially, finishing is the frequent breakage of distal flake ends resulting in a large population of what are known as "flat flakes" Medial flake fragments are also included. Sullivan (1992) developed a simple measure of activity area differentiation using such distal flake fragments. An index value of maximum fragment dimensions (DMax) plotted against mean weight proved to have analytical value.

Modifying Sullivan's technique to include medial and distal flat flakes, Collingwood chert samples from three Gainey phase sites (Halstead, Sandy Ridge, and Murphy) were compared. Each site was excavated with identical techniques including use of 1/8 inch mesh screens. Since a different activity profile applies to each site (combined unifacial and bifacial activity at Halstead, predominantly unifacial activity at Sandy Ridge, and predominantly bifacial activity at Murphy), it was reasoned that the potential for flat flake indices to reflect these differences was high.

As with the Halstead site biface flakes, the flat flakes at Halstead are also the largest of the three site assemblages, with a DMax value of 7.22 and mean weight of 0.04 g (see Jackson 1994:322). This supports a hypothesized reduction of larger bifaces, especially when the effects of some uniface activity with smaller flake size are considered. At Murphy, the DMax value is 7.17 with a mean weight of 0.05 g. Finally, at Sandy Ridge, the DMax value is 5.65 with a mean weight of 0.02 g.

Both DMax and mean weight measures are considerably lower at Sandy Ridge than at either Halstead or Murphy. This is consistent with the dominance of uniface activity at Sandy Ridge; the very low incidence of Collingwood chert bifacial tools and biface flakes at the site supports this observation. Flat flakes at Sandy Ridge are derived mainly from end scraper reduction or rejuvenation (Jackson 1994).

Halstead and Murphy have a similar prevalence of bifacial activities, as is indicated by the dominance of channel flakes and evidence for the reduction of both early and late stage bifacial preforms. The lower mean weight index at Halstead indicates only that it shares

Table 4. Mean Proximal Channel Flake Measurements for Gainey and Parkhill Phase Sites

	Maximum Artifact					Platform		
	L.	W.	Th.	Wt.	Attrib.	L.	Th.	Depth
GAINEY PHASE SITES								
Halstead n=2	17.4	20.0	1.8	0.73	Fac, G	4.6	1.0	1.8
Murphy n=3	11.8	12.2	3.3	0.55	Fac, G	4.5	1.8	1.3
Gainey n=3	17.9	14.9	2.1	0.63	Fac, G	4.1	1.5	1.2
Culloden Acres n=4	13.5	10.7	1.9	0.34	Fac, G	4.1	1.6	1.4
Snary n=1	19.6	11.4	1.7	0.48	G	6.4	1.8	1.2
PARKHILL PHASE SITES								
Thedford II n 6	16.3	10.9	1.7	0.37	Fac, G	NA	NA	NA
Parkhill n=47	14.7	10.4	1.5	NA	NA	4.3	1.6	NA

*Thedford II and Parkhill data from Ellis (1993:pers. comm.). Snary data from Wortner and Ellis (1993). Gainey and Culloden Acres measurements taken with permission from D. Simons and C. Ellis, respectively.

Table 5. Average Biface Flake Metrics, Murphy and Halstead

Biface Flake Size

	Length	Width	Thickness	Weight
Murphy Average:	10.1 n=17	8.62 n=27	1.48 n=27	0.15 g n=27
Halstead Average:	11.48 n=41	9.52 n=61	1.78 n=61	0.33 g n=61

Biface Flake Platform Size

	Length	Thickness	Depth
Murphy Average:	4.08 n=26	1.26 n=26	1.08 n=18
Halstead Average:	5.10 n=59	1.41 n=59	1.12 n=55

*Excluding the Halstead specimen .56-123-154-254 outre passé, Halstead flake size averages are: 10.57 length, 9.34 width. 1.73 thickness, and 0.27 g. weight. Platform sizes reduce to 4.96 length, 1.35 thickness, and 1.06 depth.

characteristics of uniface reduction with Sandy Ridge. This is suggested by overlap in the unifacial and bifacial activity areas at Halstead and by a similarly high overall representation of end scrapers in the assemblage.

What this initial study of flat flake indices seems to indicate is that it is possible, with *only* debitage present, to characterize activity areas and identify distinct functional types of small Gainey phase sites. The functional differentiation of Gainey phase flat flake, biface flake, and uniface flake populations warrants further study.

SITE SUMMARY

Test excavated in 1990 and intermittently surface collected over the past 30 years, the Murphy site is an excellent example of a small, interior Palaeo-Indian site with Gainey phase affinity and activity area differentiation. The dominant use of Collingwood (Fossil Hill Formation) chert in the Murphy tool assemblage is a classic identifier of Early Palaeo-Indians throughout southern Ontario. Located more than 200 km from the chert source area, Murphy also provides evidence for group range and mobility in southern Ontario comparable to that known for the Gainey phase elsewhere (e.g., Wortner and Ellis 1993), and for Clovis-related groups throughout the northern parts of eastern North America (Anderson 1990; Cochran et al. 1990; Tankersley 1990).

A Gainey phase identification at the Murphy site relies on multiple lines of evidence. The dominance of Collingwood chert identifies Murphy as either Gainey or Parkhill while the presence of Upper Mercer chert confirms a Gainey phase identity. Upper Mercer chert artifacts have not been found on Parkhill phase sites (Deller and Ellis 1992b; Simons et al. 1984). Jackson (1994) has also drawn attention to the apparently exclusive use of crystal quartzes on Gainey phase sites in Ontario. Interestingly, a single crystal quartz flake was recovered from Area B at the Murphy site.

Murphy site channel flakes also support a Gainey phase identity. Statistical evaluation of channel flake samples from a number of Gainey and Parkhill phase sites in Ontario and Michigan indicates a significant tendency towards greater channel flake width on Gainey phase sites. There is a greater than 90 percent probability that the small Murphy site channel flake sample is from a statistically independent population when compared to Parkhill phase samples from Thedford II and Parkhill.

Wortner and Ellis (1993) have also drawn attention to the likelihood that a higher percentage of proximal channel flake sections than medial or distal sections will be recovered on Gainey phase sites. This technological trend is linked to the fact that Gainey channel flakes are noticeably shorter than Barnes point (Parkhill phase) channel flakes. At the Murphy, Halstead, and Culloden Acres sites, proximal channel flake sections account for about 40 percent, 50 percent and 60 percent, respectively of total channel flake section samples. This compares with only about 25 percent proximal sections at the Parkhill type site (Jackson 1994). As noted by Ellis and Payne (1995), at least some channel flakes tend to collapse close to the proximal end on removal. Since Gainey flute scars are, by design, short, it is reasonable to expect that a high number of proximal sections might include the entire flute. At the Murphy site, proximal fragments of channel flakes are dominant and are greater in width than at Parkhill phase sites.

Other Gainey phase identifiers at Murphy include pieces esquillées (one complete specimen and one fragment partially reworked into an end scraper) which are not found on Parkhill phase sites in Ontario. There is also an absence of typical Parkhill phase traits such as miniature fluted points on channel flakes and alternately bevelled bifaces (Deller and Ellis 1992a). Other Parkhill phase traits not present at Murphy include backed bifaces, hafted perforators, and narrow end scrapers with convex bit ends and steep retouch. Typical Gainey phase traits not present at Murphy include reworked fluted drills and pseudo-burin spalls showing strong lines of percussion. The absence of the latter items may simply reflect small sample size. Two other traits at Murphy are also diagnostic of Gainey phase sites elsewhere; these are the presence of bilaterally notched, hafted end scrapers and a preponderance of formal end scrapers.

Although the Murphy site sample of end scrapers is quite small, there are certain attributes which fall neatly into the expected range for Gainey phase sites. These include flatter bits than those on Parkhill end scrapers, paired lateral mid-point notches (AeHk-1-479), prominent right lateral bit spurs and, finally, edge expansion of 20 to 25 degrees (AeHk-1-4). Since only two intact trianguloid end scrapers are present, with some divergences, it seems preferable to rely on other, multiple lines of evidence in confirming a Gainey phase identity for Murphy (Jackson 1994).

SE FI'T .F,MENT IMPLICATIONS

Apart from its significance as a newly identified Gainey phase site in southern Ontario, the Murphy site is also important for its contribution to our understanding of internal site structure. For the first time, at a Gainey phase site in Ontario, a distinct activity area devoted nearly exclusively to fluted point manufacture

Table 6. Comparative Channel Flake Measurements for Gainey and Parkhill Phase Sites

	Maximum Artifact				Platform		
	L.	W.	Th.	Wt.	L.	Th.	Depth
GAINEY PHASE SITES							
Halstead n=5	16.8	15.1	1.6	0.55	4.6	1.0	1.8
Murphy n=8	10.7	12.3	2.3	0.37	4.5	1.8	1.3
Gainey n=27	17.5	15.4	1.9	0.63	4.1	1.5	1.2
Culloden Acres n=7	12.5	12.0	1.S	0.32	4.2	1.6	1.4
PARKHILL PHASE SITES							
Thedford I I n=23	17.9	11.7	1.8	0.51	NA	NA	NA
Parkhill n=192	14.4	11.0	1.8	NA	4.3	1.6	NA

*All Halstead, Murphy, and Culloden Acres channel flakes on Collingwood chert. All Gainey channel flakes on Upper Mercer chert. All Thedford II channel flakes on Collingwood chert except for one on Bayport. All Parkhill channel flakes on Collingwood chert except for four unknown, six Bayport, and ten Onondaga.

* Parkhill phase data is from Deller and Ellis (1992a; 1992b) and C. Ellis (1993: pers. comm.). Gainey and Culloden Acres samples measured with permission of D. Simons and C. Ellis, respectively.

' N.A. denotes measurements not available.

has been identified. Although Gainey sites such as Culloden Acres and Halstead do have areas where fluted points were produced and channel flakes removed, they do not have as clear a separation of activities as at Murphy. Murphy also adds to an increasingly clear picture of unifacially and bifacially segregated activity areas on small Gainey phase sites.

As noted for sites in the Rice Lake area of south-central Ontario, Gainey phase settlement systems undoubtedly involved a whole series of site types including major base camps and/or killing grounds, as well as various smaller logistically and residentially organized camps related to seasonal dispersal of hunters and family groups across the southern Ontario landscape (Jackson 1990, 1994). Comparisons of activity area size with the size of ethnographically known hunter-forager groups (Binford 1978; Wiessner 1974; Yellen 1977) strongly suggests that small Gainey phase sites in Ontario had occupying groups of less than 30 individuals and likely closer to 15 to 20. This suggests a seasonal dispersal of band-size groups. We should expect, therefore, that there will be a wide range of site organizational constraints dependent upon the major activity guiding choice of a site location, group size, and season of use.

Excavation of small Gainey phase sites, such as Murphy and Culloden Acres in southwestern Ontario and Halstead and Sandy Ridge in south-central Ontario, is important for showing the range of activities of small dispersed groups. At present, the only unusual and slightly larger Gainey phase site in Ontario is Udora (Storck 1988; Storck and Spiess 1994). The identification of numerous widely separated activity areas at Udora results in a somewhat confusing picture since it is not clear if occupations are contemporaneous. However, the presence of cached artifacts and large quantities of Collingwood chert reduction debris indicates that this may be a Gainey phase "staging" site. For example, a group exhibiting ranging behaviour and exploiting Collingwood chert sources 80 to 100 km further west may have stopped at Udora to reduce or cache some of these materials and continued further eastward another 60 to 80 km into the Rice Lake area - the easternmost known area of Gainey phase site occurrence. Since Collingwood chert is the preferred raw material on all known Ontario Gainey phase sites, a specific relationship to source areas is expressed. Lithic raw material use at sites such as Udora combines logistical and residential traits in a manner atypical of sites such as Murphy or, indeed, Sandy Ridge and Halstead, which are much more distant from quarry sources. It is predicted here that Gainey phase staging sites similar to Udora will logically be found between southwestern Ontario sites like Murphy and the Collingwood chert source.

The total Murphy site tool assemblage is very similar to the Halstead site in south-central Ontario. Halstead is a logistically

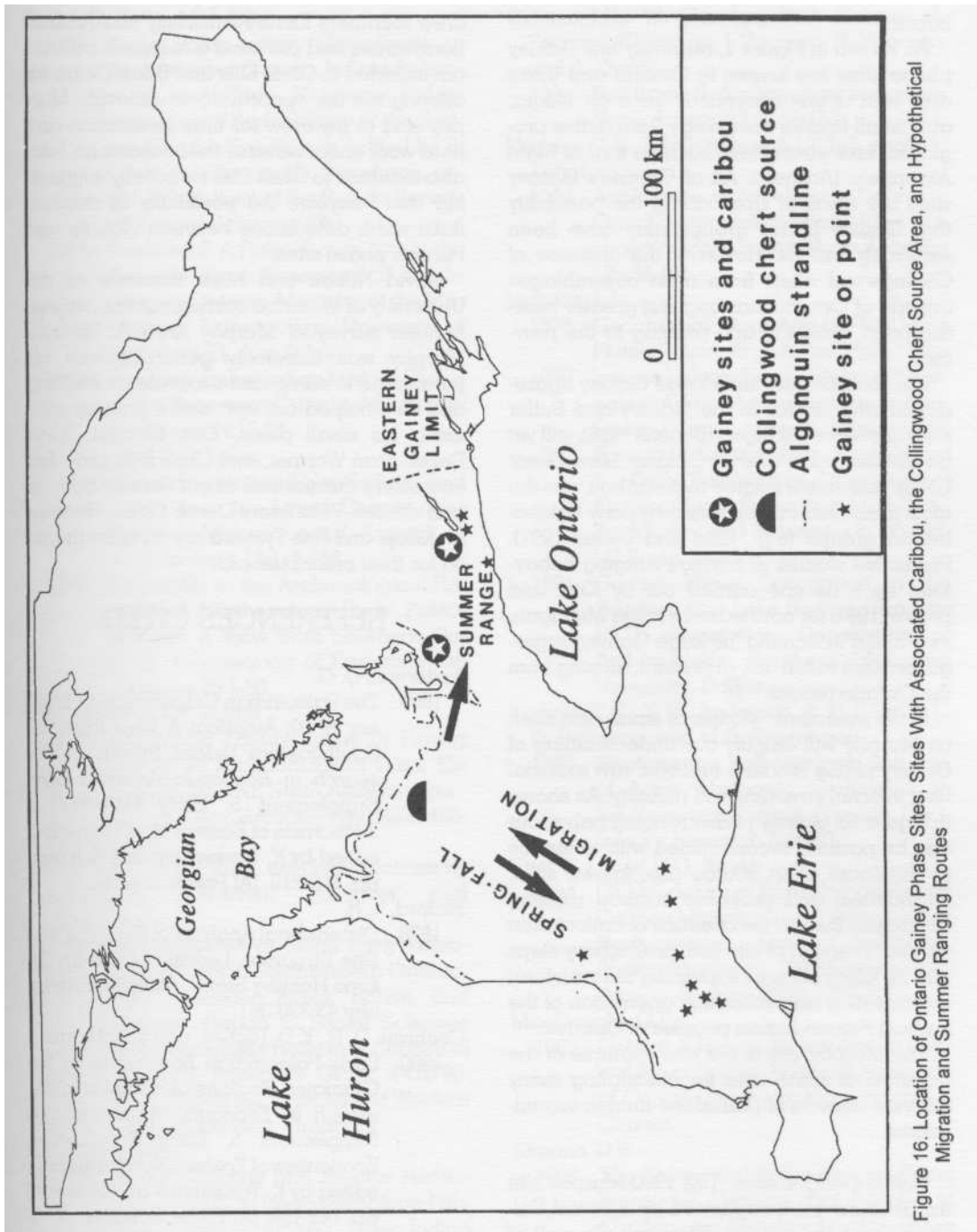

Figure 16. Location of Ontario Gainey Phase Sites, Sites With Associated Caribou, the Collingwood Chert Source Area, and Hypothetical Migration and Summer Ranging Routes

organized, residential site with evidence of both bifacial and unifacial activity. At Halstead, the uniface area is well-defined, while the biface area is less so. This provides an interesting contrast with Murphy where the biface area is well-defined and the uniface area is more ephemeral. Together, the Murphy and Halstead sites offer a picture of "paired" activity areas on small Gainey phase sites. Further research is needed into these apparently small group occupations to determine the precise nature of on-site activities and residential

habits.

As shown in Figure 1, relatively few Gainey phase sites are known in Ontario and these are, with a few exceptions such as Udora, almost all interior sites away from active proglacial lake strandlines such as that of Main Algonquin (Ardtrea). All of Ontario's Gainey sites are small in size, raising the possibility that Gainey phase groups may have been extremely mobile. However, the absence of Collingwood chert from most assemblages outside of Ontario may suggest greater internal band cohesion and ranging in the province.

It is conceivable that a large Gainey aggregation site, similar to the Gainey and Butler sites in interior Michigan (Simons 1996), will yet be discovered in interior Ontario. Most Great Lakes researchers agree that caribou was the most likely resource exploited by Early Palaeo-Indian groups (e.g., Ellis and Deller 1997). Predictive studies of caribou ranging behaviour, such as one carried out by Krist and Brown (1994) for northeastern lower Michigan, may assist in locating the large Gainey aggregation sites which are, at present, missing from the Ontario record.

In the meantime, studies of small sites such as Murphy will amplify our understanding of Gainey phase site size, function, raw material use, internal structure and mobility. As shown in Figure 16, Gainey phase ranging behaviour can be partially reconstructed with reference to dominant chert source use, known sites, strandlines, and probable caribou ranging behaviour. Even in the absence of critical data on exact season of site use, preliminary steps can be taken towards explaining the structural organization and economic orientation of the earliest Palaeo-Indian peoples of Ontario.

The Murphy site is but one example of the potential of small sites for elucidating many different aspects of prehistoric human organization.

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