Notched Oblique Scrapers in Vermont Paleoindian Lithic Assemblages

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Abstract

Analysis and comparison of the lithic assemblages from five systematically excavated Paleoindian sites in Vermont has yielded a shared, potentially unrecognized scraper type. These notched oblique scrapers are described relative to their site contexts and to each other. This paper also endeavors to locate and assess this scraper type in other Paleoindian lithic assemblages in the Northeast and beyond. Finally, a tentative explanation for the morphology, manufacture, use and/or reuse of this scraper type is postulated.

Recent excavations conducted by the University of Vermont Consulting Archaeology Program (UVM CAP) of one Late Paleoindian period site and another probable Paleoindian period site in the northern Champlain Valley have contributed significantly to our understanding of early human presence in Vermont. Specifically, the Mazza site (VT-CH-9179), located in Colchester, is now recognized as the first systematically excavated Late Paleoindian site in Vermont. Similarly, the Arbor Gardens site (VT-CH-885) represents a probable Paleoindian encampment north of the Mazza site, also in Colchester. Both sites lie within the northern part of the Lake Champlain drainage basin. The Mazza site is situated on Sunderland Brook, a tributary of the Winooski River, and the Arbor Gardens site is located on Allen Brook, a tributary of Malletts Creek. Analyses of tools excavated from these two sites and subsequent comparison to artifact assemblages of Vermont's other systematically excavated Paleoindian sites has yielded a shared, potentially unrecognized scraper type. These scrapers, here called "notched oblique scrapers" (Figure 1), are described relative to their site contexts and to each other. This paper also endeavors to identify and assess this scraper type within other Paleoindian lithic assemblages in the Northeast and more broadly, North America. Finally, a tentative explanation for the morphology, manufacture, use and/or reuse of this scraper type is postulated.

Figure 1. *Paleoindian Notched Oblique Scrapers. Top row from left: Reagan site, Okemo site, Mahan site, Arbor Garden site. Bottom row from left: Mazza site, Mahan site, Mahan site.*

Vermont's Paleoindian Prehistory in Context

A Paleoindian presence in the Northeast was officially recognized in the early 1950s, with the near-contemporaneous recognition of the Shoop site in Pennsylvania (Carr 1989; Withoft 1952), the Bull Brook I and II sites in Ipswich, Massachusetts (Byers 1954, 1955; Jones 2003; Spiess, et al.1998), and the Reagan site in Highgate, Vermont. (Haviland and Power 1994; Ritchie 1953; Spiess, et al. 1998). Though these sites have yet to be exhaustively analyzed and reported upon,[1] archaeologists now attribute the Bull Brook site assemblage to the Early Paleoindian Gainey/Bull Brook phase, while the Reagan site apparently includes various Early and Late Paleoindian point styles, including the Crowfield and Holcombe types, among others. (Ritchie 1953; Spiess, et al. 1998). Thus, as long as 40 to 50 years ago, archaeologists have known about several northeastern archaeological sites representing nearly the entire sequence of what is now referred to as the Early Paleoindian period.

Just over a decade after the recognition and discovery of Bull Brook, Shoop and Reagan, the excavation of the Debert site in central Nova Scotia expanded the known range of Paleoindian peoples into the Maritimes region (Jones 2003; MacDonald 1985; Spiess, et al. 1998). The identification of the Debert site came while additional Paleoindian sites in the Northeast were being discovered, further establishing the presence of people in this portion of North America during Paleoindian times.

In the mid to late 1990s, the discovery and systematic excavation of the Late Paleoindian Varney Farm site in Turner, Maine, a single occupation site with gracile, parallel flaked, Eden/Scotsbluff-like points (Petersen, et al. 2002; see Doyle, et al. 1985), helped fill in, in broad terms, the Paleoindian time-line for the Northeast.

1. James Petersen is currently endeavoring to analyze the surviving Reagan site artifacts.

As a geographic region, the Northeast today is a rather broad and somewhat amorphous area, comprising a number of states and provinces, representing a wide variety of ecological niches and environmental zones. Excluding political boundaries, this is an equally apposite assertion for the late Pleistocene period (Spiess and Wilson 1987). However, in reference to archaeology, any designation of the Northeast as a distinct region must be reconciled with the knowledge that cultural infiltration was almost certainly relevant at different times, especially during the Paleoindian period. Evidence suggests cultural contact northward from the Mid-Atlantic states and eastward from New York and the Great Lakes region. Yet, despite its environmental and historocultural heterogeneity and in refutation of the Ritchie-Fitting hypothesis, many archaeologists now assert that the Northeast bears archaeological witness to continuous occupation and in-situ technological and cultural developments from the Paleoindian period through to historic times (Jones 2003; Petersen and Putnam 1992; Thomas 1992).

Vermont, both geographically and culturally, is located at the center of this northeastern region. Indeed, the geography of Vermont is somewhat emblematic of the entire Northeast in that it exhibits many characteristics of its collective length and breadth. This must have been particularly true during the late Pleistocene epoch. The Green Mountains and associated uplands divide the state as a spine running north/south through its entirety. While Vermont is land-locked and has no ocean coastline at present, during the late-Pleistocene, Lake Champlain was actually the "Champlain Sea," when it was an inland arm of the Atlantic Ocean ca. (13,000-10,800 BP). The landscape was relatively young and dynamic, given dramatic post-Pleistocene transformations in wetland vegetation and fauna.

Soon after entering what is now Vermont, people adapted to the diverse topography, hydrology and ecology of the area and the variable resources it had to offer. This is evident not only in the location of excavated sites, as will be elucidated, but also more generally in their exploitation of the two major lithic sources in Vermont: Hathaway formation chert and Cheshire quartzite.

Hathaway formation chert has a microcrystalline structure and varies in color from a uniform olive green to green, with black mottling through to uniform black (Burke 1997; Georgiady and Brockmann 2002; Spiess and Wilson 1987). It occurs in readily visible outcrops on or near Lake Champlain shore areas of northern Vermont. Its presence is definitely (macroscopically) recorded at the Early Paleoindian Mahan site (VT-CH-197) in Williston, Vermont (Thomas, et al., 1998), the Reagan site in Highgate, Vermont (James B. Petersen. Personal communication, 2004), and the Mazza and Arbor Gardens sites in Colchester, Vermont (personal observation). Notably, Hathaway chert is also reported in greater or lesser concentrations at the Bull Brook I and II (Grimes, et al. 1984, 1985; Spiess, et al. 1998; Spiess and Wilson 1987), and the DEDIC (or Sugarloaf) sites in Massachusetts (Spiess, et al. 1998), the Whipple site in New Hampshire (Curran 1984, 1994, 1996; Spiess, et al. 1998), the Leibman site in Connecticut (Spiess, et al. 1998), and the Vail (Spiess, et al. 1998), Adkins (Gramly 1988; Spiess, et al. 1998), Michaud (Spiess, et al. 1998; Spiess and Wilson 1987), Lamoreau (Spiess, et al. 1998), and Dam sites in Maine (Spiess, et al. 1998). In other words, Hathaway chert from Vermont is widely distributed among Early Paleoindian sites in New England, at least on the basis of the present level of macroscopic identification and analysis.

Cheshire quartzite is a gray to white quartzite that can be fine to very fine-grained, particularly when extracted from choice exposed outcrops (Giorgiady and Brockmann 2002; Spiess, et al. 1998). These outcrops occur sporadically along the western spine of the Green Mountains throughout the central and south-central portion of Vermont. Some outcrops are accessible at relatively low elevations, such as the Heffernan quarry in Bristol, Vermont (Knight 2003). In other areas, Cheshire quartzite quarries occur at significant altitudes (Lacy 1997). A number of prehistoric Cheshire quartzite quarries and even more locations with tested quartzite boulders and cobbles have been recorded in Vermont thus far. Without extensive fine-grain analysis, however, designating a definitive quarry source for any given artifact is purely speculative.

It is important to note that fine to very fine-grained Cheshire quartzite is often found as debitage or as partial or complete tools (such as the Gainey-like projectile point from VT-CH-197 or the Mahan site) in local Paleoindian lithic assemblages. This suggests that at least a portion of the material was recovered directly from a quarry source and not from glacially dispersed cobbles and boulders. Among Vermont's Paleoindian lithic assemblages, Cheshire quartzite is reported for the Mahan site (Thomas, et al. 1998), the Arbor Gardens site (personal observation), and the Mazza site (personal observation). It is also reported from the Whipple site in New Hampshire (Curran 1984, 1994, 1996; Spiess, et al. 1998), and the Dam site in Maine (Curran 1984; Spiess, et al. 1998).

In summary, although only a few excavated Paleoindian sites have been excavated in Vermont thus far, it is easy to surmise that this portion of the Northeast was, nevertheless, regularly inhabited, trafficked and exploited by Paleoindian people. This assertion is espoused to make the case that Vermont is a metonym, or it provides a representative sample of northeastern Paleoindian culture.

Notched Oblique Scrapers in Vermont's Paleoindian Lithic Assemblages

The first recognition of the notched oblique scraper type came soon after Phase II excavations at the Mazza site in Colchester in the fall of 2002. The site is situated in a farm field adjacent to the deeply incised Sunderland Brook channel, a tributary of the lower Winooski River. The identification came following a revisit to the site by UVM CAP archaeologists after it had first been identified in the testing of sites prior to the construction of the Chittenden County Circumferential Highway (CCCH) (Thomas, et al. 1998). The site was initially identified in 1984 on the basis of several

surface collected artifacts in Richard Mazza's lower farm fields. These included a small spurred scraper or graver made of a very fine-grained, lustrous, exotic material (most likely Normanskill chert from the Hudson Valley), and a probable bipolar core made of local Cheshire quartzite (Dillon, et al. 1986).

In 2002, the site was revisited as part of a supplemental Phase I survey of newly defined highway impacts associated with a proposed interchange. The survey work included the previously untested edge of the terrace on which the site was first identified. A transect of five 2.5-meter interval test pits (0.5 x 0.5 meters) yielded a scraper and a point tip of an exotic lithic material, later determined to be Mt. Jasper rhyolite from Berlin, New Hampshire.

As a result of these finds expanding the previously known site area, Phase II site evaluation work was undertaken soon thereafter. The Phase II results confirmed the Paleoindian designation originally made for the site. A biface base fragment was unearthed that articulates with a previously recovered biface tip, forming an ovate, transverse parallel-flaked perform, or knife made of weathered, high quality Mt. Jasper rhyolite.

A combination of 1.0 x 1.0 meter test units and 0.5 x 0.5 meter test pits excavated during the Phase II study yielded up a number of other lithic artifacts. These include lithic debitage that seems to represent at least five different lithic sources (four exotic), as well as a number of other tools. Unfortunately, the Mazza site is located on the edge of a frequently plowed farm field. Consequently, the plow zone is deep extending 40-50 cm into the subsoil in some places. Despite this disturbance, some test units contained lithic debitage below the deepest plow zone, nearly 70 cm below the surface in one area, in intact sediments. Thus, it is highly probable that artifact concentrations at the Mazza site correspond to the original location of artifact deposition, and it apparently represents a single occupation attributable to the Late Paleoindian period.[2]

Specific to the topic of this paper, on the last day of phase II excavation, UVM archaeologists unearthed a single scraper in a test pit at the western edge of the site area (Figure 2). Its morphology was unusual, as was the material from which it was made. The overall scraper measures 4.56 cm in length, though its distal end is broken and missing, and it is 2.4 cm wide. One straight working edge measures 3.48 cm. Another working edge may have been lost during manufacture or use. A conspicuous notch is present on the edge opposite the retouched margin, and a possible spur protrudes beyond the notch concavity. Use wear is indeterminate due to the course nature of the material used in its manufacture.

The artifact is made of an unusual sedimentary, or possibly flow-banded metamorphic material, but its source is unknown. Curiously, the proximal end is the thickest portion of the tool. This may be explained by the presence of a partially formed reduction scar on one side of the base, where the tool maker may have attempted to thin the base of the tool. The coarse, unpredictable nature of the material may have thwarted this attempt, causing its discard.

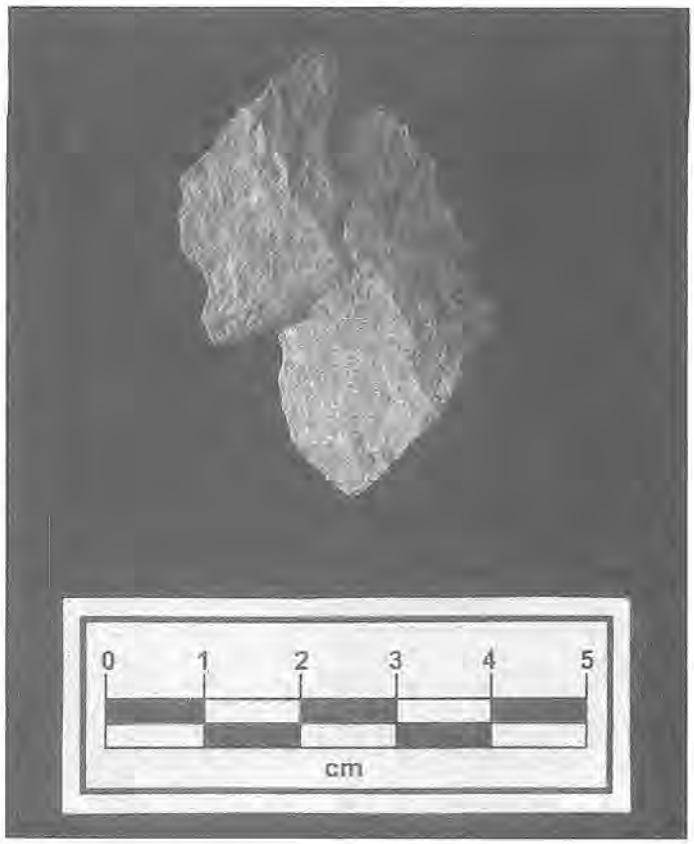

Figure 2. *Notched Oblique Scraper recovered from the Mazza Site.*

Oddly enough, this probable scraping tool, hereafter referred to as a "notched oblique scraper," turned out to be the most dissimilar of all the morphologically analogous tools reviewed in this paper. Nonetheless, it was distinct enough to warrant an initial comparison with three other tools recovered from Vermont's first systematically excavated Paleoindian site, the Mahan site.

The Mahan site was first discovered in Williston during another surface walkover in preparation of the Chittenden County Circumferential Highway in 1984. Mahan lies on and around a prominent bedrock knoll which lies roughly 15 meters above the adjacent Allen Brook, a tributary of the Winooski River (Thomas, et al. 1998). The location of the Mahan site is notable in that it does not correspond to the informal model of Paleoindian site presence, being relatively far from Lake Champlain and nearby high sandy terraces related to the former Champlain Sea margins. Ten separate areas ultimately were mitigated at Mahan with varying amounts of artifacts recovered from each. Both Paleoindian, and later, post-Paleoindian evidence was recovered.

Initially, a number of tools were recovered at the Mahan site, including characteristic "spurred scrapers." The latter tools led

2. Phase III site mitigation was conducted by UVM CAP during the fall of 2003. While analysis of the artifact assemblage and site context is ongoing, the excavation did yield four bases of Plano-like lancolate projectile points. Thus, the Mazza site definitely establishes a Late Paleoindian presence for Vermont, and is one of the few systematically excavated Late Paleoindian sites in the Northeast.

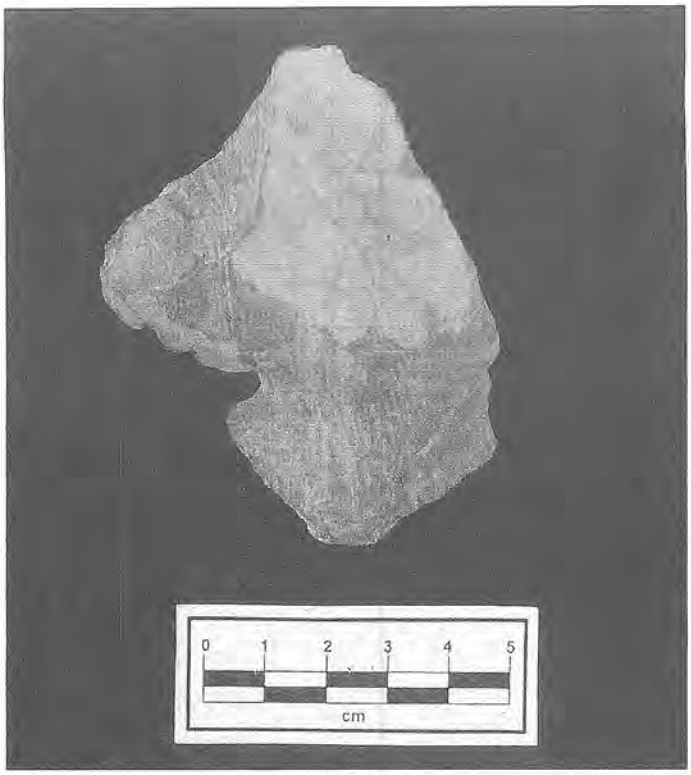

Figure 3. *Notched Oblique Scraper recovered from the Mahan site.*

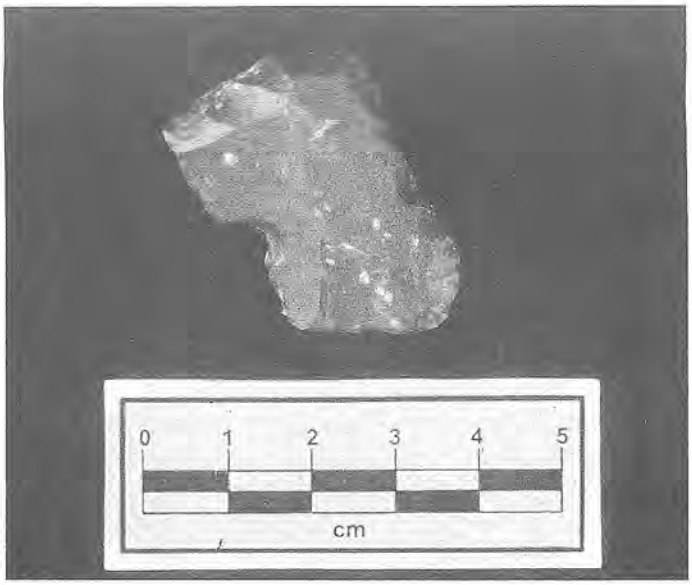

Figure 4. *Notched Oblique Scraper recovered from the Mahan site.*

to the designation of the site as potentially Paleoindian in age and thus, quite significant. Nevertheless, the initial route of the CCCH avoided the Mahan site and it was nearly a decade before it was revisited. After a redesign of the CCCH alignment placed a portion of the site in jeopardy, the decision was made to undertake Phase III data recovery there (Thomas, et al. 1998).

The largest notched oblique scraper (Figure 3) from the Mahan site was recovered from Area 2, an excavation area 88 square meters in size. Area 2 had the highest artifact tally of the ten sampling areas at the Mahan site, totaling 1,719 tools and flakes. The tools recovered from Area 2 include four projectile point fragments and one complete projectile point (recovered in two pieces), two knives, three scrapers, one biface, five biface preform blanks, and two utilized flakes (Thomas, et al. 1998). Under initial analysis this tool was referred to simply as a "notched stone" because of both its material and use-wear pattern.

It is composed of slate and was initially recorded as having limited use-wear. During the course of the present analysis the senior author re-examined the tool and found some rounding and possible crushing on one edge. Moreover, the base of the tool was flaked in order to shape it. Finer use-wear analysis is problematic due to the course nature of the stone in the present case.

This Mahan notched oblique scraper measures 8.0 cm long, is 6.48 cm wide, and has a mean thickness of 1.31 cm. If oriented as seen in Figure 3, the tool is plausible as a scraper of some kind. The proximal end, or base, is sharply tapered, or arrow-like, so that the notch and edge opposite the notch form a likely area for accepting a shaft for hafting. Meanwhile, the working edge lies at an oblique angle to the proximal tip Though the size of the tools is significantly different, the morphology of the notched oblique scraper from the Mazza site is remarkably similar to this Mahan site specimen. Further study of the recovered artifacts from Mahan led to the designation of another notched oblique scraper, one much closer in size to the Mazza site specimen.

The second notched oblique scraper from the Mahan site (Figure 4) was recovered outside areas 1-10. Nonetheless, it can be associated with the Paleoindian component at Mahan, on the basis of a macroscopic comparison with other tools from the definitive Paleoindian assemblage there. Several of these tools are identical gray/black Munsungan chert. The tool was originally designated a "spurred scraper" and attributed to the Early Paleoindian occupation of the site (Thomas, et al. 1998). This is an appropriate typological description, as the tool does display a spur of some kind, but it exhibits no use-wear. Thus, we alternatively suggest that it is another notched oblique scraper.

This second notched oblique scraper from Mahan measures 3.44 cm long and 2.5 cm wide. It has a mean thickness is of 0.9 cm. It exhibits three working edges, the first of which is on the left side and measures 1.35 cm long and the second distal edge measures 2 cm. The third edge measures 2.25 cm along the right side of the tool. Perhaps the most notable aspect of this tool is the prominent notch on its left margin. If one looks straight across the tool face from the notch to the right side and small shoulder, it appears likely that it would have complimented the notch in

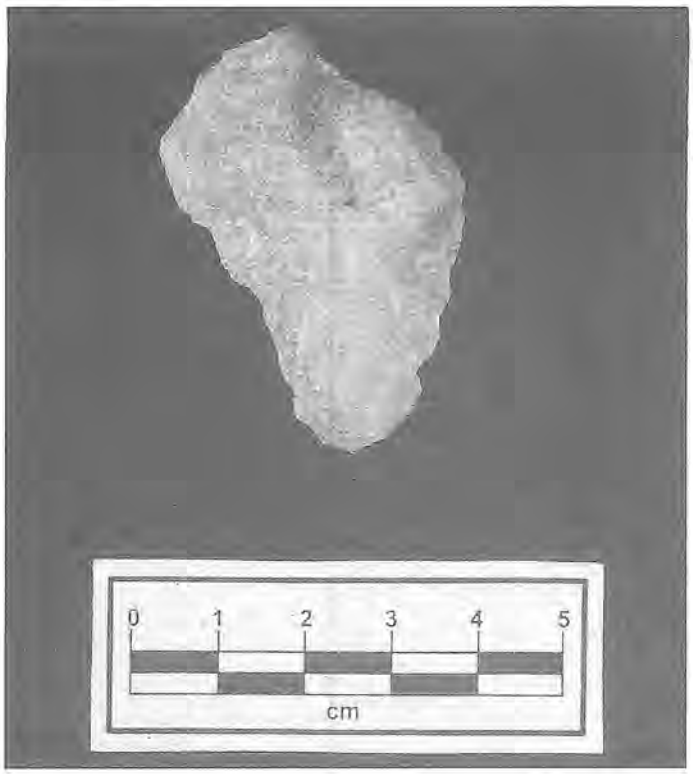

Figure 5. *Notched Oblique Scraper recovered from the Mahan site.*

hafting. This is very similar to the large, previously described notched oblique scraper from the Mahan site. The base (or proximal end) of this scraper is flat, unlike the other proximal ends of other such scrapers reviewed in this paper, which trend to a rounded or tapered point. The dorsal face of this second scraper from Mahan exhibits several flake scars that were apparently made in an attempt to ease hafting. This reduction successfully reduced the proximal thickness of the tool, and was the same thinning process that apparently failed during the manufacture of the notched scraper from Mazza. The direction of these flake scars lends credence to the orientation of the scraper in the photograph as well (Figure 4). Moreover, the ventral face also exhibits two reduction flake scars. This cumulative reduction significantly thinned the base of the tool, most likely to haft it securely and successfully. Its small size may be the result of significant retouch and reworking, a point elaborated upon later.

A third comparable scraper from the Mahan site, roughly corresponding to the other examples, was discovered by revisiting the tool assemblage from the site. Though this scraper lacks the characteristic notch present on the other scrapers, in all other respects it corresponds to the morphology of a notched oblique scraper (Figure 5). The tool is 4.92 cm long, 3.5 cm wide, and 0.99 cm thick. The proximal portion of the tool was fashioned to taper to a rounded terminus, likely in order to accept a haft, while the distal working edge clearly lies at an oblique angle to the proximal end. Due to the coarse nature of the material, any use-wear is indeterminate. Although the notch is lacking, the overall morphology and presumed function of this tool correspond to the others in this sample.

Following the recognition of these morphologically similar tools from several sites, the author examined other Paleoindian lithic assemblages from Vermont to determine whether this scraper type was represented. The answer came soon enough when the articulation of three undiagnostic tool fragments in the laboratory revealed a notched oblique scraper from still another site, the Arbor Gardens site.

During the 2001 and 2002 field seasons, the UVM CAP conducted Phase II and Phase III excavations at the Arbor Gardens site. The site (named after the development that would ultimately subsume the excavated portions of the site), is located on the border of the towns of Milton and Colchester on a sandy terrace overlooking Allen Brook. The Arbor Gardens site was preliminarily assessed to be of Paleoindian antiquity after analysis of the Phase I and Phase II artifacts samples revealed well-weathered "exotic" lithic debitage from the Mt. Kineo rhyolite formation in Maine, and rhyolite from the Mt. Jasper rhyolite formation in New Hampshire. In addition to flaking debris, two conjoining sections of a bifacial knife were recovered, which are morphologically similar to those of other Paleoindian artifact assemblages.

A number of preform and biface fragments were recovered during the phase III excavations, along with several scrapers. The notched oblique scraper described here was recovered from an area designated locus 2, that fell outside of the main activity area. Artifact distribution and types indicate that locus 2, while smaller than locus 1, almost certainly represents another Paleoindian activity area. Since locus 2 was not going to be impacted by the upcoming construction, it was left preserved and in place.

Locus 2 was centered along the west-facing terrace and the portions of the tool were recovered during phase II testing in three separate test pits. The tool pieces were refit in the laboratory after the overall notched scraper form was recognized.

The notched oblique scraper from the Arbor Gardens site (Figure 6) measures 7.36 cm long and 5.28 cm wide, with a has a mean thickness of 1.48 cm. The working edge length is 3.0 cm, and it exhibits significant rounding and stepping. It is made from a very weathered, poor quality Hathaway chert, perhaps derived from a glacial cobble. The morphology of this tool is interesting for several reasons. First, while this tool is morphologically very similar to the other notched oblique scrapers discussed here, it exhibits two notches on either side of the proximal (or basal) "neck" of the tool. If viewed on the dorsal face, one can easily see the preparation for both notches. Equally intriguing is the fact that the prepared working edge was fashioned on the otherwise blank ventral face, perhaps because the dorsal face had no proper area for retouch. Regardless, using the ventral face likely led to its demise. The fracture line exhibited in the articulated tool corresponds exactly to the area that would have received the greatest

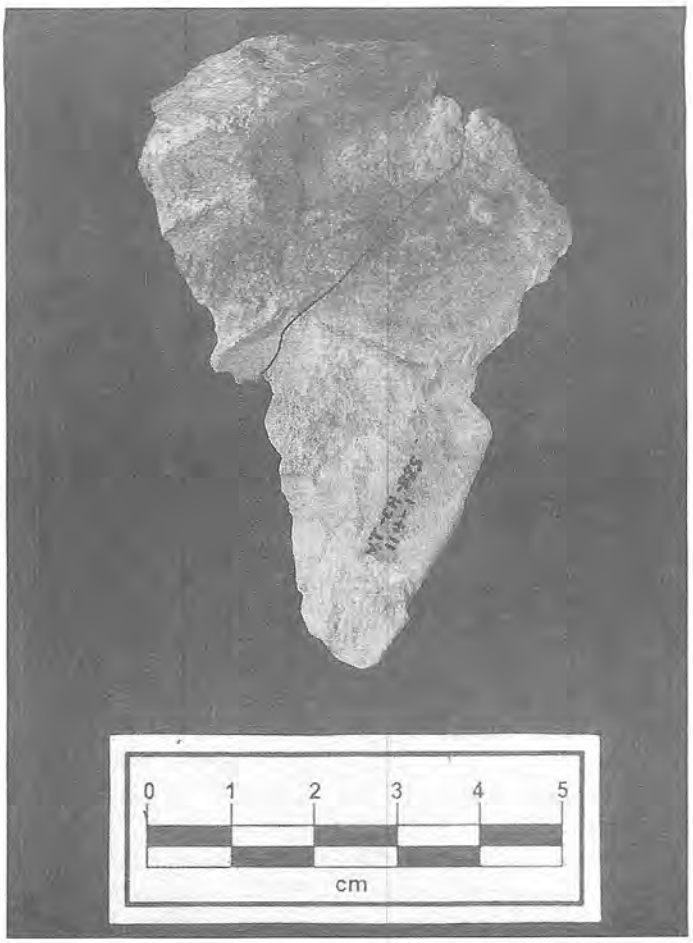

Figure 6. *Notched Oblique Scraper recovered from the Arbor Gardens site.*

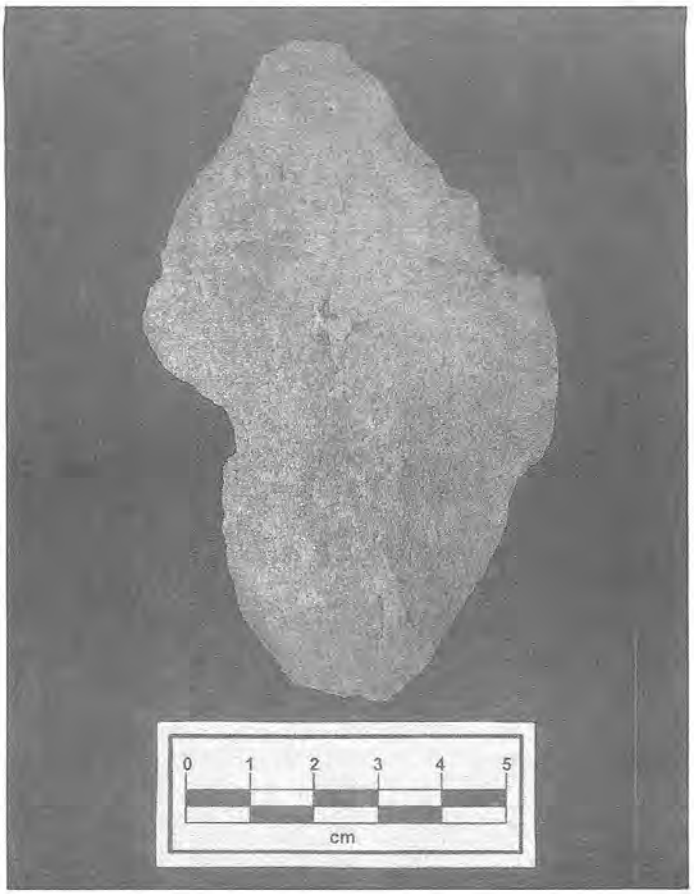

Figure 7. *Notched Oblique Scraper recovered from the Okemo site.*

pressure when the working edge was used. However, in all other areas, this tool corresponds readily to the other notched oblique scrapers in this sample. It has a tapered basal portion, with apparent notch(es) and an oblique working edge relative to the proximal tip.

The Okemo site (VT-WN-289) was identified and sam-pled in 1999 as part of an Act 250 review for the proposed Jackson Gore development at the Okemo resort in Ludlow, Vt. It was suspected to be Paleoindian in age after numerous tools were uncovered that roughly match types attributable to the Paleoindian period, including a small fluted point. In addition, the artifact assemblage contained mostly exotic lithic materials, notably red Munsungan chert, which was regularly utilized by Paleoindian groups, as previously mentioned. Like the Mahan site, the location of the Okemo site does not readily conform to local or regional assumptions about the likely location of Paleoindian sites. Rather, the Okemo site is located at a relatively high elevation at the base of Okemo Mountain in central Vermont. More specifically, it is situated on a level terrace above two tributaries of the Black River. One locational advantage of this site is that game would most likely have been forced into a relatively narrow corridor at this point in the river valley, similar to the setting of the Vail site in Maine (Gramly 1981, 1982). The site would have been well positioned to intercept the game traveling through this natural corridor across the Green Mountains. Archaeological evaluation of the site did not progress beyond the Phase II stage given that the general site area was avoided by developers. Thus, information on the Okemo site is somewhat limited to initial survey and site evaluation data. Nevertheless, the discovery of a crude Gainey-like fluted projectile point made from local Clarendon Springs chert in the central site area confirms its Paleoindian antiquity.

The scraper in question from the Okemo site was recovered from an isolated locus somewhat distant from the site proper, as currently understood (Figure 7). It is the largest scraper in this sample, measuring 10.12 cm long, 6.28 cm wide, and has a mean thickness of 1.29 cm. If viewed on its dorsal face, this scraper has a pronounced notch on its left margin that exhibits slight rounding, with another ground notch opposing it on the right margin. This scraper exhibits two working edges, the left edge displaying some intermittent stepping. However, the coarse nature of the material precludes unequivocal use-wear determination. The right

margin working edge exhibits rough retouch but no apparent use-wear. The dorsal face of the tool appears thinned, though no obvious reduction scars are present, and there appears to be some dorsal polish. This scraper was manufactured from a rough quartzite, which initially may have been a piece of fire cracked rock, or a piece of quartzite that was purposefully heated to obtain an appropriate piece of workable stone.

The Reagan site was initially discovered in the 1920s by William Ross, an early and prominent Vermont artifact collector. The site is located in East Highgate, Vermont, less than six miles from the Canadian border and approximately eight miles southeast of Missisquoi Bay. The site proper occupies a portion of the high flank of a hill, from which one has unobstructed view south and east of the river and river valley, and the Green Mountains in the distance to the southeast. It lies within a thin sandy matrix most likely deposited during the Champlain Sea's intrusion into the Champlain Valley during the Late Pleistocene period (Ritchie 1953). Sometime before William Ritchie's visit to the site in the early 1950s, a clear-cutting of the pine stand on the hill exposed the upper sand matrix and caused it to shift and form dunes. William Ross and another collector Benjamin Fisher recovered artifacts intermittently amidst these dunes from the 1920s through the 1950s.

Though much of what constitutes the Reagan collection initially came to light as a result of Ross's and Fisher's efforts, Ritchie's survey, followed by Giovanna Peebles' survey in the 1970s, and their various reports on their findings provide context for the artifacts recovered from the site, and constitute a systematic survey for purposes of this paper. James Petersen's forthcoming analysis should further address some of the vagaries surrounding this assemblage, at least for the portion of the collection that survives in public hands. In particular, it is readily apparent in the light of current understanding that this assemblage represents a number of Paleoindian time periods, including the Early Paleoindian and Late Paleoindian periods.

Specifically, the notched oblique scraper in the Reagan assemblage was not published by Ritchie in his 1953 article in *American Antiquity*. There is little doubt, however, that this scraper belongs to the Reagan assemblage, since it matched the material described by Ritchie as, "a banded black and grayish brown chert of good quality" (Ritchie 1953:250). This material supposedly comprised the largest percentage (32.4%) of the Reagan artifact inventory, and is now recognized as Hathaway chert. The particular banding and color exhibited on this and on many of the Reagan tools is somewhat particular to this assemblage, possibly the product of long term and consistent weathering across the sample (Figure 8).

The scraper measures 6.84 cm long, 6.47 cm wide, and has a mean thickness of 1.18 cm. Though there is no apparent use-wear exhibited on any edge of this tool, the inferred working edge measures 3.0 cm long. It was made from a large flake and is primarily unifacial, with the majority of the reduction and retouch occurring on the dorsal face and edges. However, there is some slight ventral retouch on the basal portion of the tool, most likely to facilitate hafting. In addition, there is obvious ventral reduction to shape the notch on the left side of the tool, if viewed on the dorsal face. The notch on the opposite side of the tool has been less purposefully or obviously shaped.

Figure 8. *Notched oblique scraper recovered from the Reagan site.*

Regional identification of Notched Oblique Scrapers

This study was limited to Paleoindian assemblages excavated in Vermont, and were readily available to UVM CAP. However, the senior author extensively researched regional and national Paleoindian literature to look for other examples of this scraper type, either in illustration, and/or text. It quickly became apparent that without direct analysis it would be imprudent to speculate about the nature of any tool.

The reasons for this are clear. The majority of publications necessarily produce only black and white photographs with limited resolution, equally, illustrations are of varying degrees of quality and resolution. Moreover, even when illustrations and photographs are of good quality, it is apparent that they require a certain amount of inferential extrapolation that the senior author, for the purposes of this study, could not perpetrate. Additionally, it often transpires that because of limited print and figure space, not all tools recovered from a site are individually referenced or illustrated (Bamforth 1991). Given that the notched oblique scraper is newly recognized here, the likelihood that other

similar tools would not be referenced was significant. Thus, while the authors noticed a number of tools that may correspond to this scraper type, from Northeastern and other Paleoindian sites, these artifacts cannot be confidently related to this scraper category. However, there is certain tertiary evidence that this scraper class may be represented at other Paleoindian sites and this argument is elucidated in the following section.

It is also interesting to note that hafted tools with a working edge oblique to the haft are present in the Paleoindian record in general. Specifically, the Late Paleoindian period toolkit in the West includes a number of knives, most notably the Cody knife from various Cody complex assemblages, which exhibit very similar edge orientation to the scrapers referred to here (Frison 1991; Frison and Todd 1987; Irwin and Wormington 1970). Of course, knives such as the Cody and Hell Gap varieties are largely bifacially worked, and the authors are not suggesting that they had analogous uses or were technologically similar. Rather, the important thing is that we can demonstrate Paleoindian peoples did manufacture and use hafted tools with oblique working edges, along with the more common blade, end, and side edge varieties.

Scraper Manufacture and Use

As per convention, we have chosen to place the tools surveyed here under the "scraper" rubric. Yet, the term "scraper" is fraught with implied meaning as to function, where often this implication may not be warranted. As with other Paleoindian unifacial tool types, any assertion about the nature of their intended or actual use is inherently speculative. Intuitively, it seems reasonable to assume that these scrapers were used to butcher or dress game. However, the shared morphology of these tools, with variable material and use-wear, make any precise assumption about their use problematic.

The examples from the Okemo and Arbor Gardens sites in particular, along with the larger slate example from the Mahan site, were made from materials that likely were not transported, but made on-site from some local, readily available material. The Okemo site scraper in particular appears to have been fashioned from a "pot-lid" piece of fire cracked quartzite, or perhaps a quartzite cobble that was heated specifically to retrieve a workable piece of stone. The remnant cortex on the dorsal face seems to bear this out. The largest Mahan site scraper was certainly made from stone that was readily at hand, probably from exposed bedrock at the site. The Arbor Gardens scraper, while manufactured from Hathaway chert, appears to have been made using a poor-quality cobble, also possibly obtained nearby the site. Thus, these examples seem to imply that they were not part of a Paleoindian's "personal gear" (Binford 1979) or "mobile toolkit" (Kuhn 1994).

Kuhn (1994) asserts that from an economic perspective, carrying large cores, blanks or tools is not the most efficient manner for presumably mobile hunters to transport their toolkit. Yet, in many cases this appears to be precisely the reduction and manufacturing strategy many Paleoindian groups were employing. The deliberate selection, procurement and/or trade of high quality raw materials to facilitate tool manufacture also appears to challenge this assumption (Curran 1984). Nevertheless, the fact that important or even essential butchering tools such as large choppers apparently were often manufactured from material at or close to the site is quite relevant (Kuhn 1994; Frison and Todd 1987; MacDonald 1985). These similar tool classes, with their significant mass and thus presumed inertia, were used for essential functions, such as bone and sinew separation, or perhaps even wood or bark processing. Smaller (though highly portable) tools could not easily have accomplished these tasks.

The notched oblique scrapers recognized here are not sufficiently heavy to perform any of the previously stated functions adequately, if held in the hand. If hafted, however, as their shared morphology suggests, the increased leverage provided by the haft (employed in a swinging motion) conceivably could have been used to sever sinew or split bone. The authors do not assert that these were the precise functions performed by this scraper class, rather, that when hafted they were employed in some activity that required a significant amount of force.

It is possible that these scrapers functioned as some have suggested eastern ovate "choppers" did during the Early Archaic period (Funk 1998; Funk and Wellman 1984; Kimball 1996; Petersen 1991; Petersen and Putnam 1992; Thomas 1992, 1997). Namely, that far from chopping, these tools were used in the process of separating skin from a carcass (Thomas 1992, 1997), or more tentatively, in the removal of periosteum from marrow bones (Kimball 1996). Moreover, the fact that they were purposely shaped suggests that they performed a specific or a series of specific functions, rather than serving as expedient tools that were minimally altered and employed largely for their weight. The recurring shape of this particular tool form, whatever its function may have been, also strongly suggests that it was a patterned and familiar form that was purposefully replicated, even where ideal materials were not readily present (Curran 1984). Finally, the deliberate and somewhat complex morphology of this tool form apparently exhibits an economy of raw material and weight, even while they were most likely manufactured on-site from materials readily at hand.

Conversely, the other scrapers in this sample (barring the Mahan quartzite unnotched example, which could have been transported or derived from local material) were almost certainly brought to the site either as finished tools or as raw material later manufactured into the tool form at the site. Most obviously, the small Munsungan chert notched scraper from Mahan is not of local origin. Additionally, the Mazza site scraper, while made from a coarse material, macroscopically also appears to be a non-local rock type.

The Reagan site scraper is perhaps the most interesting example. It is made from high quality Hathaway formation chert, which though technically "local," would still have been transported some thirty miles to the Reagan locality. Therefore, it was either manufactured on-site from transported Hathaway chert,

manufactured at the quarry site, or somewhere en-route between the quarry and Reagan. The fact that it has little or no apparent use-wear suggests that it was made a short time before its loss or discard, and thus it provides insight into the potential portability and reuse strategy of this tool form in general. Moreover, the fact that this tool, manufactured shortly before its loss or discard is morphologically very similar to the others in the sample, and its high quality stone lends further credence to the notion that the morphology of this tool is quite intentional. Notched oblique scrapers must have served a distinct function (or functions) in the lives of the people who manufactured them.

Again, the primary function of these tools was likely one that required significant force, such as separating a skin from a carcass. Of course, this is speculative and these tools may have also served other primary and/or secondary functions. The larger scrapers from the Mahan, Okemo and Arbor Gardens sites seem to have been manufactured on-site for this purpose and then discarded. However, the Reagan scraper and the small Munsungan scraper from the Mahan site (and perhaps the Mazza site scraper) seem to provide evidence of another strategy of tool manufacture and curation.

It has been noted that Paleoindians practiced alternative forms of tool manufacture and curation as need, or the availability of time or raw materials dictated. (Gramly 1999; Gramly and Yahnig 1991; Kuhn 1994; Tankersley 1998). Our increasing understanding of the varied environmental zones present in the Northeast during this dynamic period of environmental change lends credence to the notion that Paleoindians, far from being exclusively nomadic big game hunters, must have practiced a varied and more generalized food procurement strategy than has been historically attributed to them (Binford 1980; Eisenberg 1978; Meltzer and Smith 1986: Tankersley 1998). Thus, it follows that varying means for tool manufacture and curation would have been required as well. The Reagan scraper and the Mahan Munsungan scraper may be further evidence of this, contradicting a simple model of transportation efficiency.

The Reagan scraper is a relatively large tool that, when hafted, would have taken up considerable and presumably precious space and weight in a Paleoindian hunter's "toolkit." This imposition of efficiency may have been offset by the tool's potential for retouch and reuse. The fracture on the Arbor Gardens scraper represents the area of greatest force impact and thus the area most likely to fracture. Thus, one can see that even after breakage, the knapper was still left with two considerable masses of raw material from which tools could be created or replenished. Specifically, the basal portion of the tool could have been reworked by Paleoindians into a more recognizable tool class.

It is now widely accepted that "spurred" scrapers, graver scrapers, or other derivations of the name are a distinctive tool class, characteristic of the Paleoindian period (Gramly 1982, 1988; Grimes, et al. 1984; Kraft 1973; MacDonald 1985; Rogers 1985, 1986; Tomenchuk and Storck 1997) Rogers notes that after a systematic study of stream terraces in Kansas, only spurred end scrapers reliably occur in Paleoindian assemblages, while gravers of other types occur with similar frequency throughout the prehistoric record (Rogers 1985, 1986). Yet, the specific function of the "graver" spurs and thus, the reason why they would have been intentionally manufactured on end scrapers, is still largely unknown. Elucidation is further complicated by the fact that these spurs do not regularly show use-wear that offers insight as to their function (Grimes, et al. 1984; MacDonald 1985).

Weedman, in her ethno-archaeological study of lithic scraper use among the Gamo in Ethiopia notes that spurs are not only unintentionally manufactured on scrapers, but that these accidental spurred scrapers, in the hands of an inexperienced hide-worker, may actually tear the hide on which they are employed (Weedman 2002). Her study appears to encompass all protrusions on scrapers that archaeologists may recognize as graver spurs, rather than the more standardized spurred end scraper type. Yet, presumably, similar results could be expected with only spurred end scrapers. So then, what is the reason for the relatively common spurs on Paleoindian end scrapers? The answer may lie in their manufacture, or re-manufacture, as the case may be.

Grimes, et al. (1984:164-165), in their analysis of the Bull Brook assemblage end scrapers, note that:

> ...judging from the present sample, spurred scrapers seem to represent one extreme of a spectrum of lateral edge modifications which includes constriction, notching and ventral thinning. These modifications probably represent alternative means of adapting end scrapers to a haft. Spurred end scrapers may be the end product of periodic resharpening and bit attrition of *notched specimens*.
>
> In effect, this process would continually reduce the bit to notch distance, to the point where they ultimately converged, producing the characteristic spur. If this hypothesis is correct, spurred end scrapers may be a "diagnostic" Paleoindian artifact only in the sense that they are the by-product of a strategy for maximizing tool-use longevity, a trait associated with Paleoindian lithic technology... (emphasis added).

Indeed, the notched oblique scrapers discussed in this paper, particularly the examples made from knappable stone, represent the initial stage of a tool that could have been eventually reworked into a characteristic spurred end scraper. Here, we only wish to call attention to those spurred scrapers that exhibit a notch below the spur (Figure 9a). Spurred end scrapers without notches may represent a reworking of another tool type, retouch beyond the point where the spur and edge converged, or purposeful production of that scraper form.

Certainly, the fact that these scrapers are so relatively common in Paleoindian lithic assemblages attests to the need for these tools. Doubtless many were made directly as the need arose. It is only the form with the notch below the spur that seems particularly problematic, if called to explain its morphology in any way

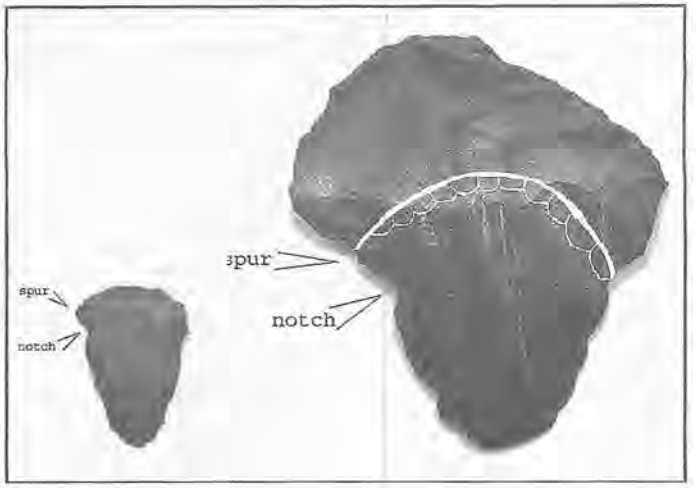

Figure 9a (on left). *A spurred end scraper recovered from the Mahan site. The spur and notch have been indicated.* Figure 9b (on right). *Notched Oblique Scraper from the Reagan site with proposed reduction, spur and notch indicated. Photographs not to scale.*

other than as the result of reworking. Moreover, it is almost certainly true that spurs on end scrapers, once present, would sometimes have been utilized for gravers or for any other number of purposes. This paper only asserts that spurs were not necessarily manufactured intentionally on end scrapers, but rather, they may have been the incidental result of reworking.

If one examines Figure 9a, it appears that while the spur may be problematic, or at best innocuous if the scraper were to be employed, the reduction or eradication of the spur might decrease the useable edge length rendering the tool useless for its intended purpose. Indeed, others have noted that by the time archaeologists recover end scrapers in their most common form, they often have already undergone such serious rework that they are near the end of their use-life. This may be one of the reasons that they appear so commonly: they were often discarded (Gramly 1982; Grimes, et al. 1984; Spiess and Wilson 1987).

The small Munsungan scraper from the Mahan site may be evidence of this reduction strategy. It still retains the residual notch from its previously larger form, and indeed the thinning scars on its base seem to confirm that the scraper was still intended to be hafted until the time of its loss or discard. But judging by the steep edge angle on the oblique working edge, as well as the rather abrupt basal truncation (though mediated by thinning), both the proximal and oblique distal ends apparently were once larger. The tool appears to have been reworked and/or resharpened after one or several breakage episodes. Thus, this tool seems to be an intermediary form between the original Reagan-like tool stage, and the severely reduced, though characteristic, spurred end-scraper stage.

It needs to be reiterated that the present sample is rather small, both in number of specimens studied and number of sites studied. The number of sites reviewed here represents almost the entirety of extensively excavated Paleoindian sites in Vermont and consequently, all the sites to which the principle author had direct access. However, it must be noted that in the case of three sites (Mazza, Arbor Gardens, and Okemo), relatively small percentages of the assumed site expanse were excavated. In the case of Mahan, which represents a potentially huge area (an eighth of a hectare in size), an equally small percentage of the site was excavated, but the number of units excavated was much higher, and so too the overall number of artifacts, including notched oblique scrapers, recovered (Thomas, et al. 1998). Finally, for this and other reasons, the hypotheses espoused in this paper must still be viewed with hesitation. However, they do represent a plausible and compelling argument, not only for the use of these scrapers by Paleoindian groups, but for their further reduction into other, more widely recognizable scraper forms.

Conclusion

Much has been made of Paleoindian bifacial lithic technology and it has been the subject of a voluminous amount of scholarly literature. The reasons for this are obvious. The aesthetic beauty of these tools, coupled with an ingenious economy and an enduring mystery as to certain functional aspects of their form coalesce to present the archaeologist with near-undeniable appeal. Yet, beyond the cursory artifact inventories in site reports and monographs, far less functional, economic or theoretical thought has been given to Paleoindian non-projectile point tool classes or forms, including scrapers. Presumably, as much if not more knowledge may be derived from these varied and often well executed permutations of stone. They were certainly important to the cultures that created and used them.

Indeed, though the process of their manufacture and curation is still far from completely understood, one of the few things that an archaeologist may take for granted in most instances is that a projectile point's primary function was to kill prey. The same near-certainty of function cannot currently be placed upon any other Paleoindian tool class. This article represents a very tentative step in that direction. At its most basic, this article tentatively recognizes a new tool form for the Paleoindian period in Vermont. It most likely has regional correlates, but the authors currently refrain from imposing this rubric upon individual tools without direct examination. More broadly, possible manufacturing strategies, function(s), and curation strategies for this tool class have been presented. Only further study of this and other Paleoindian unifacial and expedient tool classes will confirm these suppositions.

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