# From Choppers to Tabular Knives: The Morphologies, Functions and Implications of an Early Holocene Tool Class

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**Abstract**

*The following paper will examine Early Archaic "choppers" (renamed tabular knives herein) and their possible function or functions as elucidated through their specific occurrences at the Late Paleoindian Mazza site and the Early Archaic John's Bridge site in Vermont, in addition to other early Holocene sites in the state and the broader Northeastern region. A three-part typology for these tools is subsequently proposed. From this analysis and comparison, this essay will briefly examine the implications of this functional and distributional analysis, and what these tools may suggest about the lives of early Holocene peoples.*

It is only within the last twenty-five or thirty years that the human occupation of the early Holocene has been widely recognized in Northeast, particularly within Northern New England and the Maritimes regions.[1] While some past models suggested a possible population hiatus or very low population densities during the Early Holocene for many areas within the region (Fitting 1968; Funk 1979; Funk and Wellman 1984; Rippeteau 1977; Ritchie 1969, 1979; Ritchie and Funk 1971; see Petersen and Putnam 1992; Robinson and Petersen 1992), cultures of the Early Archaic period (and the Late Paleoindian period to a slightly lesser degree) now hold a relatively firm place in regional chronologies, irrespective of the date ranges individual archaeologists believe should be assigned to these cultural manifestations.[2]

In the Northeast, preservation at site deposits dating from both the Late Paleoindian and Early Archaic periods is generally poor and consequently analyses of associated floral and faunal remains are extremely limited as are opportunities for radiometric dating (Robinson and Petersen 1992). Therefore, stone tools and the debitage associated with their manufacture and maintenance serve both as the primary markers of temporal identity for these periods and as indicators of the various activities undertaken at the sites within which they were found (Robinson and Petersen 1992). In the past, the recognition of these early groups in the far Northeast was largely contingent upon the identification of a single artifact class: distinctive projectile point types, supported, of course, by other artifact classes within a given site assemblage and even more rare radiocarbon dates where applicable (Robinson and Petersen 1992). In the case of the Early Archaic period, these projectile point types were first recognized and quantified in regions farther South (Brennan 1979; Broyles 1971; Coe 1964; Dumont 1981; Spiess et al. 1983), and appeared to many researchers to demonstrate broad geographic continuity (Brennan 1979; Funk and Wellman 1984), with rare but notable exceptions e.g. (Funk 1979, 1998a; Thomas 1992, 1997; Thomas and Robinson 1980). An analogous interpretive framework pertained until recently for the Late Paleoindian period and an assumed direct association with point types originating in the Plains and West as well e.g. (Fowler 1974; Funk and Schambach 1964). Recent evidence, however, suggests that a significant degree of regionally distinct stylistic variation existed for both Early Archaic and Late Paleoindian period projectile point forms.

In the mid 1980s through the early 1990s, James Petersen, Brian Robinson and others contributed signifi-

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[1] For the purposes of this paper, the term "early Holocene" refers specifically to the Late Paleoindian and Early Archaic periods.

[2] The term "Early Paleoindian," "Late Paleoindian," and "Early Archaic" are used in this paper as convenient temporal subdivisions, as they are widely employed in the region. The authors are fully aware of the pitfalls inherent in the blanket application of these terms, particularly with regard to the dating of these periods and the possibility of the coevality of specific traits commonly associated with one or more of these periods in certain areas across the region (see Ellis 2004). Additionally, for the purposes of this paper, the term "Late Paleoindian" specifically refers to sites containing evidence of lanceolate points broadly analogous to the "Parallel-Flaked Horizon" in the West and Plains (see Boldurian and Cotter 1999, Petersen 2004).

cantly to the understanding of the Early Archaic period in the region when they persuasively demonstrated that abundant quartz (and other) unifacial tools, coupled with appropriate radiocarbon dates and/or locations in stratigraphically appropriate soil horizons also constitute what is effectively a diagnostic tool suite for these early peoples (Bolian 1980; Curran and Thomas 1979; Dillon et al. 1986; Jones and Forrest 2003; Maymon 1992; Petersen 1991; Petersen and Putnam 1992; Petersen et al. 1986; Robinson and Petersen 1993; Thomas 1992). Whether these tools were used in conjunction with projectiles made of perishable materials that do not preserve in the archaeological record, were used in lieu of projectile points, or represent some form of seasonally or environmentally specific activity is still a matter of some debate. It should be noted, however, that while in Maine, Early Archaic projectile points are rarely recovered, and even more rarely recovered within intact site contexts, abundant quartz unifacial tools have been repeatedly recovered together with diagnostic projectile points in Vermont (e.g. Thomas and Robinson 1980; Thomas et al. 1996) and elsewhere (e.g. Dudek 2005).

Interestingly, another artifact type commonly referred to as the "chopper" or "ovate chopper" was recognized by many researchers early on as often associated with sites attributable to the Early Archaic period in the broader region and sometimes beyond (Barber 1980; Bourque 2001; Ellis et al. 1990; Ellis et al. 1991; Funk 1979, 1998a, b; Funk and Wellman 1984; Kimball 1996; Maymon and Bolian 1992; Petersen 1991, 1995; Petersen and Putnam 1992; Ritchie and Funk 1971; Sanger et al. 1992; Starbuck 1980; Thomas 1992, 1997; Thomas and Robinson 1980; Thomas et al. 1996). Yet, this artifact type, while often being considered characteristic, perhaps rightfully never rose to typological status as temporally diagnostic of the Early Archaic period. Presumably, this was at least partly because similar looking and perhaps analogous artifact types have been recovered from later sites in the region, particularly from those attributed to the Vergennes Phase of the Late Archaic period (Funk 1988, 1998a; Ritchie 1980a, b; Ritchie and Funk 1971; Turnbaugh 1977; see Petersen 1991). Additionally, little thought was or has been expended on the function of these artifacts as they relate to Early Archaic cultures, and they have traditionally been designated as crude chopping tools, or elsewhere as simple knives or expedient hide scraping tools, following convention by Ritchie and/or Funk (Funk and Wellman 1984; Ritchie and Funk 1971). This was despite the fact that the common and seemingly preferred choices of materials for these choppers (such as sandstone, siltstone, phyllite, and other relatively soft rock types) would have been woefully inadequate for chopping functions.

Recently, excavations by the University of Vermont Consulting Archaeology Program at the Late Paleoindian Mazza site in Colchester have offered new insight into this somewhat overlooked artifact type, or at least chronologically expanded the range of its use by Native Americans. The Mazza site represents the first systematically excavated Late Paleoindian site in Vermont with diagnostic projectile point fragments. A full reporting of the site will be presented in an in-progress technical report. For the purposes of this article, however, the authors wish to focus primarily on a single artifact recovered during the course of excavations at the Mazza site; a characteristic tabular knife. The occurrence of a tabular knife, as they will be referred to in all subsequent references herein, in a Late Paleoindian context caused the authors to ruminate on the relative longevity of this artifact type, its potential function or functions by early Holocene populations, and what an assessment of these aspects may mean for early cultures in the Northeast, particularly within the northern New England-Maritimes region.

The following essay will examine these artifacts and their possible function or functions as elucidated through their specific occurrences at the Late Paleoindian Mazza site and the Early Archaic John's Bridge site in Vermont, in addition to other Early Holocene sites in the state and the broader Northeastern region. A three-part typology for these tools is subsequently proposed. From this analysis and comparison, this paper will briefly examine the implications of this functional analysis, and what these tools may possibly suggest about the lives of early Holocene peoples at the sites where these tools have been recovered.

## The Mazza Site: A Brief History of Investigations

It is not the goal of this paper to provide a comprehensive overview of the Mazza site excavations and results. A more comprehensive summary will be presented elsewhere. In order to provide the necessary context for the tabular knife recovered from this site, however, the following is a brief overview of the history of excavations of the Mazza site and a short summary of its results.

Archaeological investigations related to the Mazza site (designated VT-CH-9179 in the Vermont State

Files) began in 1984 and extended subsequently over the next 20 years. Located in Colchester, to the east of Malletts Bay Avenue, the Mazza site first was identified during a Phase I surface survey of a level, sandy outwash terrace, now cultivated as a corn field and pumpkin patch by members of the Mazza family (Dillon et al. 1986). The terrace is bounded on the east by an unnamed tributary of Sunderland Brook, and by Sunderland Brook proper immediately to the south. Sunderland Brook flows into the Winooski River, which in turn flows directly into Lake Champlain at the Burlington/ Colchester line.

The general project area lies within the western edge of the physiographic subdivision of Vermont known as the Champlain Lowland. It is a region of rolling country, with hills, low mountains, north-south trending ridges with less rugged areas between flat lakeshore terraces and river floodplains (Jacobs 1950). The Champlain Lowland lies within the greater Champlain Basin and comprises the northwestern part of the state, extending north-south for approximately 160 km (100 mi), and ranging from 16-24 km (10-15 mi) in width.

The initial Phase IB survey was conducted in order to determine archaeologically sensitive areas along the proposed route of the Chittenden County Circumferential Highway (CCCH), which is still in revised planning at this time. Ten artifacts were recovered during the 1984 Phase I surface survey of this terrace. Two of these, a lithic scraper fragment made from a non-local material and a utilized lithic flake, were recovered within the southern and eastern portion of the sample area. Additional walkovers, however, did not result in the recovery of any additional artifacts. Thus, the tested area was determined not to be eligible for the National Register of Historic Places and cleared for future construction.

In 2002, a redesign of a proposed highway interchange placed previously untested areas of the VT-CH-9179 site vicinity within the path of the proposed CCCH. As a result, the UVM CAP conducted a Phase IB site identification survey within these untested areas. Limited testing was conducted along the portion of the eastern terrace edge of VT-CH-9179, adjacent to the previously recovered lithic scraper fragment. The artifacts recovered included the tip portion of what then appeared to be a secondary stage preform, a modified flake and a utilized flake all made of a non-local material subsequently determined to be Mt. Jasper rhyolite from Berlin, New Hampshire.

A Phase II site evaluation of the Mazza Site was conducted shortly thereafter in November, 2002. A total of 49, 50 x 50 cm test pits, six (1 x 1 m) test units, and two 1 x 0.5 m test units were excavated in 2.5 m intervals along a horizontal grid established for the site area. Of these, 34% ($n$=16) were positive for prehistoric Native American artifacts. One lithic tool of note recovered during phase II excavations was the basal portion of a secondary-stage biface, preform or knife made from Mt. Jasper rhyolite, which articulated with the biface tip excavated during the Phase I survey. The completed biface is gracile in cross-section and exhibits a fine, transverse-oblique flaking pattern. The tabular knife that is the subject of this paper was also recovered during this stage of work.

Phase III data recovery was conducted between August 18 and September 2, 2003. The data recovery strategy involved the excavation of 1 x 1 m test units within and adjacent to previously excavated portions of the site area. Vertical control was maintained during both Phase II and III excavations by measurement below an arbitrary datum. The majority of 1 x 1 m test units were excavated in 10 cm levels below datum with respect to soil horizons and stratigraphic units as well. As artifacts were encountered, units were expanded upon until densities became sufficiently low that further excavation was deemed unnecessary or until the project time allotment was expended. In total, 64.75 m² (212.4 ft²) were excavated during Phase III data recovery. A gross total of 86.5 m² (283.7 ft²) of the site were excavated cumulatively during Phases I-III at the Mazza Site.

The cumulative 2002-2003 Phase I-III excavations resulted in the recovery of 751 total artifacts, of which 67 (8.9%) were lithic tools or tool fragments. Laboratory refits resulted in a total of 58 tools or tool fragments (Table 1; Figure 1). The remaining artifacts include lithic debitage of various materials (91.1%).

The majority of recovered artifacts (n=443; 59.0%) comprise Mt. Jasper rhyolite, likely originating from quarries in and around Berlin, New Hampshire. The next most common type (n=140; 18.6%) is an aggregate category that refers to various non-local cherts. This material designation primarily includes cherts macroscopically attributable to sources in the Hudson valley in New York, although several pieces of lithic debitage resemble chert from the Onondaga formation in western New York and/or Ontario. The latter association should not be considered conclusive, however. Additionally, a number of flakes appear to be a fine-grained gray to tan chert with translucent inclusions. These inclusions may instead signal that the material is

Table 1.

| Mazza Site Tool Types and Quantities | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tool Type: | Late Paleoindian Projectile Point Fragments: base | Late Paleoindian Projectile Point Fragments: other | Woodland Projectile Point (isolated hunting loss) | Fragmentary Biface | Biface Knives or preforms | Biface Edge Fragments | Unifacial tools (probable scraping tools) | Modified or Utilized Flakes | Chopping tools | Hammerstone | Abrader | Tool (unknown function) | Tabular Blade | Total |
| Count: | 4 | 4 | 1 | 1 | 2 | 4 | 8 | 28 | 2 | 1 | 1 | 1 | 1 | 58 |

a rhyolite or felsite, though it is m acroscopically dissimilar to Mt. Jasper rhyolite or Mt. Kineo felsite from Maine. Its source remains unknown. No recovered artifacts appear to be made of Munsungan chert. Lesser amounts of other materials also are represented including local Hathaway chert (n=78; 10.4%), quartzite (n=29; 3.9%), quartz (n=11; 1.5%), local Clarendon Springs chert (n=5; 0.7%), shale (n=1; 0.1%), sedimentary stone (n=1; 0.1%) and untyped felsite (n=5; 0.7%), one flake of which closely resembles a material informally referred to as Mt. Ascutney felsite. The remaining artifacts (n=38; 5%) are classed as untyped materials, which collectively include a number of course materials possibly collected near to the site area.

All artifacts were analyzed macroscopically for material type with the aide of comparative lithic collections. Additionally, several archaeologists from around the Northeast region corroborated several material type attributions, particularly the Mt. Jasper rhyolite examples. Nevertheless, while UVM CAP feels confident in the material type designations of the Mazza site artifacts, all material assignations must be considered tentative without the aid of elemental or other fine-grained analysis.

In lieu of datable material, unfortunately none of which was present at the Mazza site, perhaps the most notable artifacts recovered were the three definitive and one possible projectile point bases. Though small, these artifacts nevertheless display definitively Late Paleoindian characteristics, including a lanceolate morphology, gracile cross section, basal grinding, particularly along the lateral margins, and a transverse parallel or parallel oblique flaking pattern, similar to some Late Paleoindian flaking strategies in the West and High Plains (Bradley 1993; Irwin-Williams et al. 1973; Irwin and Wormington 1970; Mulloy 1959; Pitblado 2003; Wormington 1957). This flaking pattern is a lso in evidence on two bifaces, one of which was referenced above. These bifaces were made on elongated flakes and may possibly represent short projectile point preforms,

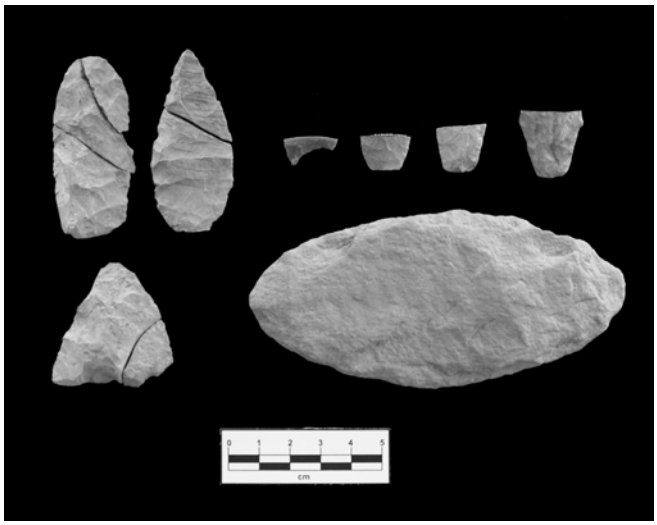

Figure 1. Top, from left - Flake knives or preforms; Late Paleoindian projectile point bases; Bottom, from left - Reworked biface fragment; Oviate tabular knife.

but are more likely bifacial knives (Irwin and Wormington 1970; Irwin-Williams et al. 1973) (Figure 1).

One of t he projectile point bases exhibits a contracting stem that terminates at two subtle shoulders, approximately one third to one fourth of its presumed length (Figure 2b). The distal termination is a transverse break just above the shoulders where the blade margins begin to contract toward the tip. The proximal end of the base is squared or flat relative to the lateral stem margins. The stem portion of the base is heavily ground, partially obscuring but not obliterating the flaking pattern across both surfaces of the stem and along the lateral margins. Evidence of grinding ceases, however, at the shoulders where two consecutive, fine sharpening flake scars are present on one shoulder edge.

After the excavation of the Mazza site had concluded, UVM CAP fortuitously examined a Late Paleoindian lanceolate projectile point from the collection of Mr. Richard Gonyeau (Figure 2a). This point,

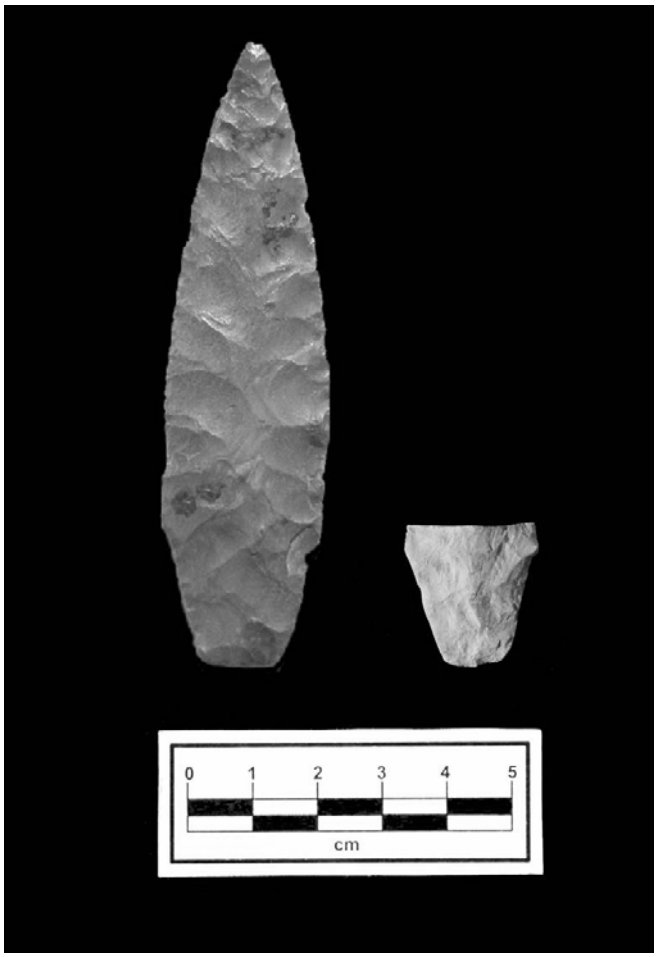


Figure 2. 2a (left): Late Paleoindian projectile point from the Gonyeau Collection; 2b (right): Mazza site projectile point base.

likely made of Munsungan chert, exhibits the same stem to shoulder to blade morphology as the previously described base from the Mazza site. The projectile point was surface collected by Mr. Gonyeau's father, likely on his fields near the Colchester/Milton border, where Mr. Richard Gonyeau still lives. These fields are relatively near the Mazza site (approximately 8.9 km as the crow flies) and are located on a similar sandy landform. Another probable early site, the Arbor Gardens site, is located just across U.S. Route 7 from the fields Mr. Gonyeau's father collected (Toney and Crock 2003; see Toney and Crock, pp. 1-19 in this Volume).

While the projectile point base from the Mazza site and the point from the Gonyeau collection clearly represent Late Paleoindian projectile point forms, the authors are unaware of any points with a similar stem to shoulder to blade morphology from other sites in the region (Figure 2). As Mazza represents the first systematically excavated Late-Paleoindian site with diagnostic tools in the state, this is not surprising at least on a local level. Additionally, while gracile and finely-flaked lanceolate points still are the prominent hallmark of Late Paleoindian period components in more easterly portions of the Northeast, a number of blade and base forms with no apparent Western analog are evident in regional archaeological sites, including points with acute isosceles triangular blades and prominently notched and stemmed bases (e.g. Chapdelaine (ed.) 1994; Dumais 2000; Julig (ed.) 2002; Petersen et al. 2000, 2002; Storck 2002; Thomas 1992, 1997; Wright 1995). These regional forms may even occur within the same site as lanceolate points with morphologies similar to point styles in the West (Chapdelaine (ed.) 1994; Petersen et al. 2000, 2002; Storck 2002). This intra-site projectile point variability also seems to pertain to the Mazza site.

In summary, judging by the spatial distribution of artifacts and tools, refit debitage and tool fragments, heat altered lithic material and artifact densities, it seems likely that the Mazza site represents a single family occupation or a locus of a larger settlement. There also may be other potentially related artifact concentrations or loci in the area, as indicated by the unifacial tool recovered farther into the center of the landform, and a continuation of low lithic debitage counts identified north of our contiguous block excavation at the northern end of the site. Unfortunately, these areas were outside the area of potential project impact, and thus could not be explored. It is difficult to infer a season of use for this site, given the poor preservation qualities of the soil and the great antiquity of the occupation. The tabular knife recovered from the site, however, may give some indication of this and will be explored below.

### A Brief Note about the John's Bridge Site

The John's Bridge site was identified in June, 1979, as a result of archaeological assessments for a Vermont Agency of Transportation bridge replacement project over the Missisquoi River in Swanton. Data recovery was completed in June and July, 1980 (Thomas 1992, 1997; Thomas and Robinson 1980).

The John's Bridge site (VT-FR-69) represents a single component Early Archaic site. It produced numerous cultural features and a distinctive tool inventory, including a regionally distinct type of Early Archaic projectile point, designated the Swanton Corner-

Notched type (Figure 3).

Three Radiocarbon dates derived from one deep pit feature returned respective ages of 7780 ±225 B.P., 8240 ±240, and 8340 ± 2 45 B.P. These radiocarbon ages provide a mean radiocarbon date of 8120 B.P for the site (Thomas 1992, Thomas and Robinson 1980). As this site has been documented previously, no additional summary will be provided herein (Thomas 1992, 1997; Thomas and Robinson 1980).

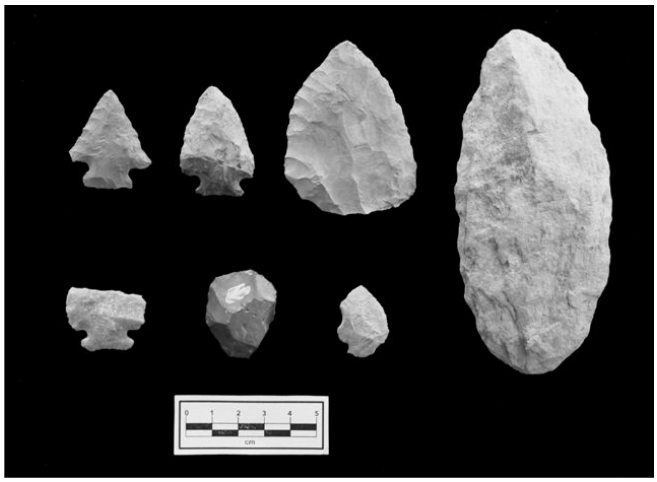

Figure 3. Select artifacts from the John's Bridge site, Swanton, Vermont. Top from left: Early Archaic Swanton Corner-Notched Projectile Points; low-shouldered preform; Ovate tabular knife. Bottom from left: Early Archaic Swanton Corner-Notched Projectile Point; scraper made of Munsungan chert; unifacial projectile point made from Mt. Jasper rhyolite.

## Forms and Functions of the "Chopper" in Northeastern Early Holocene Sites

### History

One of the first explicit references to tabular knives in Northeastern archaeological literature comes from Ritchie and Funk's seminal article on then-recently discovered Early Archaic sites on Staten Island in New York (Ritchie and Funk 1971). Prior to these discoveries, it was thought by many that there was an interregnum in the human occupation of the Northeast after the initial Paleoindian entrance into these areas, or at best a very limited and ephemeral settlement that left only scant traces in the archaeological record (Fitting 1968; Ritchie 1969). Yet, the Staten Island findings, however significant, meant for some only a slight northward movement of the frontier of abandonment (Funk and Wellman 1984; Rippeteau 1977; Ritchie 1979; see Robinson and Petersen 1992).

In any case, the article noted the prominence of "choppers" in the Early Archaic sites reported. Despite the fact that Ritchie and Funk explicitly acknowledged that they felt these tools were involved in hide processing and were seemingly different and distinct from what archaeologists in more southerly regions referred to as choppers (Fowler 1957, 1959; Lewis and Lewis 1961), they nevertheless continued the use of the term (Ritchie and Funk 1971:57). Consequently, following their convention, the term "chopper" has remained popular in the regional literature even into the present. With such appropriation, some researchers have also tacitly accepted the function indicated by the term, and thought little more about these artifacts.

In their reporting of the John's Bridge site, Thomas and Robinson broke from this convention when they designated these tools as tabular knives, and also provided an objective and fairly detailed description of each of the six specimens recovered from the site (Thomas and Robinson 1980). As stated previously, it is this term that the authors have also chosen to adopt when referring to this tool type.

When attempting to infer a function for these tools made of meta-sedimentary stone, they hypothesized that these knives could have been used to separate hide from a carcass (Thomas 1992; Thomas and Robinson 1980). In part, their logic was that a comparable knife made from a sharper material such as chert would possibly tear the hide on which it was employed. Apart from chopping and hide separation, other authors have also hypothesized hide-related functions for these tools, including generalized hide working (Ritchie and Funk 1971) and hide scraping (Ellis et al. 1991). Others have suggested that these tools may have been useful for the removal of periosteum from marrow bones (Kimball 1996), or more recently as a tool used for some form of plant processing or perhaps digging (Jones and Forrest 2003). While the authors believe that these tools served a function different from any of those listed above, we do agree with the basic logic behind the hypothesis that these tools were used for a purpose other than chopping or cutting as proposed by Thomas and Robinson (1980). This topic will be explored more fully below.

### *Form*

In addition to function, some researchers have also given

Table 2.

| Tabular Knife Measurements from Select Vermont Early Holocene Sites | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Site Name and Number* | *Catalog #* | *Morphology (as defined herein)* | *Material* | *Maximum Length (mm)* | *Maximum Width (mm)* | *Maximum Thickness (mm)* | *Weight (gm)* |
| Mazza Site (VT-CH-9179) | 1103-1 | ovate | sandstone | 121.7 | 56.6 | 10.3 | 95.5 |
| John's Bridge Site (VT-FR-69) | 608 | informal or asymmetrical (possibly fragmentary) | course quartzite | 82 | 30 | 14.5 | 32.2 |
| | 2791 | ovate | course quartzite | 145 | 65 | 14.5 | 130 |
| | 5787 | ovate | sandy shale? | 130 | 60 | 15 | 114 |
| | 5948 | ovate | fine-grained sendimentary rock | 80 | 47.5 | 17 | 78 |
| | 8491 | asymmetrical | shale? | 107 | 77 | 7.1 | 62 |
| | 9807 | informal or ovate (fragmentary) | slate | 125 | 56 | 6.4 | 53.4 |
| Bessette II (VT-FR-140) | 5133 | ovate | shale | 148.2 | 83.7 | 12.2 | 219 |
| | 5651 | ovate | shale | 104 | 50.1 | 10 | 76.2 |
| | 6079 | informal | slate | 66.5 | 29.4 | 4.4 | 12.4 |

passing regard to the form or morphology of these tools. In nearly all cases, this has come as an acknowledgement that some of them are distinctly ovate in outline (e.g. Ellis et al. 1991; Funk 1979, 1998b; Funk and Wellman 1984; Jones and Forrest 2003; Ritchie and Funk 1971). After analysis of the tabular knives from the Mazza and John's Bridge sites, in addition to the Bessette II site (see Table 2), and extensively researching pertinent regional literature for this tool form, the authors feel comfortable in proposing a tentative three-part morphological typology for this tool as it occurs in early Holocene sites in the region. This typology is not meant to be a wholesale re-imagining of this tool, but rather a synthesis and codification of other researchers' observations, relying most heavily on the previous analysis by Thomas and Robinson (1980:91-95). It should also be noted that in forming this typology, the authors are operating under the assumption, which we believe to be accurate, that despite the often "crude" or rough appearance of these tools, many were nevertheless purposefully manufactured into one of the first two forms listed below (see Robinson IV et al. 2004).

1) **Ovate Tabular Knives**: As stated previously, this is perhaps the most commonly manufactured and replicated morphology of the tabular knife tool form. Oval or roughly oval in shape, these tools are commonly unifiacially or bifacially retouched along one or more rarely along both longitudinal margins or the entire tool (Ellis et al. 1990; Ellis et al. 1991; Funk 1979, 1998a; Funk and Wellman 1984; Petersen 1991, 1995; Petersen and Putnam, 1992; Thomas and Robinson 1980; Thomas et al. 1996) (Figure 4). Additional insight into this tool form can be gleaned from Ritchie's and Funk's reporting of what the authors of this paper presume is a rare form of tabular knife made from Pennsylvania jasper (1971:

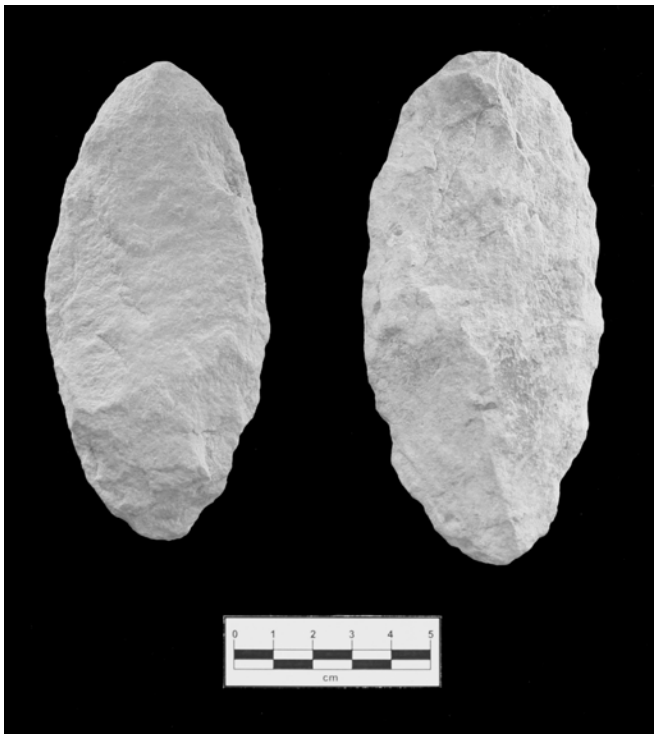


Figure 4. 4a (left) - Ovate tabular knife from the Mazza site. 4b (right) - Ovate tabular knife from the John's Bridge site.

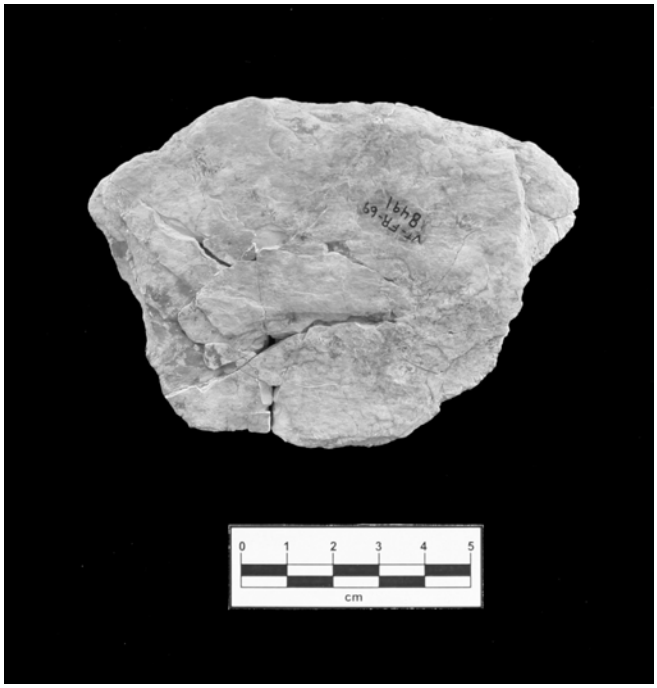


Figure 5. Asymmetrical tabular knife from the John's Bridge site.

Figure 1, #26). With the benefit of additional visible manufacturing detail resulting from the use of cryptocrystalline stone in the creation of this particular tabular knife, one can see that the long edges have a significant amount of edge retouch relative to the narrow ends of the tool. If one examines the tool closely, it also appears that one side of the tool has been sharpened somewhat more than the other. While it is impossible to be certain from the photograph, it appears to the authors that the less sharpened long edge has been ground or dulled, perhaps to facilitate holding in the hand. Indeed, others have noticed this differential sharpening. Thomas and Robinson (1980:91) have even suggested that some of these tools are "backed," which borrows a term from more formally described hand-held scraper classes. The tabular knife from the Mazza site, while generally ovate in outline and relatively finely made throughout, also demonstrates this differential bilateral sharpening (Figure 4a). This is also a trait shared with the next tabular knife category.

2) **Asymmetrical Tabular Knives**: While slightly less common, tabular knives of this category nevertheless seem to occur with some regularity in sites dating to the Early Holocene in the region (Dumais and Rousseau 2002; Ellis et al. 1991; Petersen 1991; Petersen and Putnam 1992; Ritchie and Funk 1971; Thomas and Robinson 1980). The authors include in this category tabular knives that superficially appear to be roughly "tear-drop" shaped. These are defined by a narrow or pointed end that expands into a wider opposing end (e.g. Petersen 1991, Ritchie and Funk 1971). While these may be sharpened around the entire perimeter of the tool, from the few written descriptions it impressionistically seems as if the wider end was used more regularly and demonstrates the most use-wear on the tool.

Also included in this category is a generally asymmetrical variety that is lees common as understood thus far, but one that nevertheless is quite illustrative in its morphology. One of the two examples identified in our literature review was recovered from the John's Bridge site and was designated as an asymmetrical tabular knife by Thomas and Robinson (1980: 94). As a result, we have chosen to adopt this term when referring to all tabular knives in this category (Figure 5; see Table 2). The blade end of the tool in question has two rounded points

at each end of the blade margin and is significantly wider than the opposing end, which is unsharpened and according to Thomas and Robinson resembles a handle (*ibid*). Another example of this variety of asymmetrical tabular knife was recovered from the Richmond Hill site on Staten Island, as judged by the photograph (Ritchie and Funk 1971: Figure 4, #1). These examples in particular appear to the authors to resemble a more familiar artifact type as known from some subsequent Late Archaic period sites in the region, the ulu.

While semi-lunar knives or "ulus" are commonly viewed as equipment of maritime-based cultures, with their occurrence potentially documented in coastal areas as early as at least the seventh millennium B.P. (Tuck and McGee 1975:83; Turnbaugh 1977), it has long been recognized that cultures ascribed to the Laurentian tradition of the Late Archaic period in interior Quebec and Ontario, New England and New York also made use of these tools (Funk 1988; Ritchie 1969, 1980b), in addition to other groups (Turnbaugh 1977). Indeed, the presence of semi-lunar knives was one of Ritchie's primary criteria for distinguishing certain Laurentian cultural manifestations from other Archaic and Woodland entities in the region (Funk 1988), though the Laurentian concept is now viewed as amorphous at best (Funk 1988; Turnbaugh 1977) . Ritchie even explicitly observed that Early Archaic "choppers" have affinities to similar Late Archaic tools, though he presumed that they were for hide-working at the time (Ritchie and Funk 1971:52). It is also important to note that while finely made slate "ulu" examples have been recovered from Laurentian sites, particularly in burial contexts, tools with a less formal appearance have also been regularly referred to as "ulus" or semi-lunar knives as well (e.g.- Ritchie 1969:Plate 27, #9-11). It seems probable that Laurentian semi-lunar knives or "ulus" from interior locales had a somewhat different function or functions from those recovered from maritime sites owing to the dearth of aquatic mammals in these inland areas. In any case, the morphology of many of these tools appears analogous to the earlier tool type the authors are reviewing in this paper. It is our contention that this shared morphology might also hint at a shared function, and this will be explored below.

While conducting research for this article, the authors also noted the occurrence of what appear to be tabular knives from another Late Paleoindian site in Quebec. In their reporting of site CIEe-9 in the Témiscouata region of Quebec, Dumais and Rousseau note the occurrence of several artifacts that they refer to as possible knives (*couteau*) or scrapers (*racloir*) (Dumais and Rousseau 2002). These tools certainly appear to be tabular knives. They are made from tabular pieces of sandstone and demonstrate bifacial sharpening on at least one long edge. Indeed, the example in Figure 5 (left side) recovered from ensemble C is noted to have an unsharpened edge in order to facilitate handling (*ibid*: 64). While not completely analogous to the morphologies just described, minimally the example from ensemble C in Figure 5 could be considered an asymmetrical tabular knife.

3) **Informal Tabular Knives**: As the name suggests, this is a catch-all category that denotes any tabular knife that does not readily conform to the first two categories. Some of these may indeed be more expedient in nature than the other two categories. It seems, however, that there may also be other forms that have not yet been fully recognized due to the limited sample upon which the authors are currently able to comment. Indeed, it impressionistically seems as if there may be another elongated variety of this tool form, but the examples are too few to quantify with any certainty. Other artifacts may represent preforms of the first two categories, but that is also difficult to distinguish based upon the limited sample size and nature of the tools.

As stated previously, another shared aspect of these tools is the near-ubiquitous use of sand-rich meta-sedimentary stone (sandstone, phyllite, shale, siltstone, etc.) in their manufacture. As these stone types do not demonstrate the fine fracturing properties of crypto-crystalline materials, they have often been considered less preferable, likely more "expedient" in nature, and probably casually recovered from near to the site vicinity. Yet, lithic materials of any variety do not occur evenly or prominently over all landscapes (Goodyear 1989; Sanger et al. 2003). As this raw material preference is evident at Early Holocene sites from Quebec to Staten Island, it seems just as logical to assume that these materials were purposefully selected as it does to assume that they casually acquired. Again, it is hoped that this article in part demonstrates that the morphologies of this tool are often purposefully produced and routinely replicated. It follows, therefore, that the materials from which these tools were often fashioned are equally meaningful and purposeful choices. Additionally, there may be practical reasons why these stones were preferred by early Holocene groups.

***Function***

The previous arguments have attempted to demonstrate that these tools are indeed characteristic of early Holocene archaeological sites in northeastern North America and that the morphologies and materials commonly used in their manufacture represent the purposeful and meaningful choices of their makers. Furthermore, as a result of analyses and general research into this tool form, it is the authors' hypothesis that the intended function of this tool form was not chopping or hide processing, but rather that these tools possibly represent implements for use in other activities, namely fish processing.

While no specific association between these tools and fish processing has been demonstrated in the region thus far (as far as the authors are aware), there are several reasons for the presumed association. As mentioned previously, the generally poor preservation inherent in northeastern archaeological sites greatly hinders the identification and/or recovery of any floral or faunal remains, particularly from those sites of early Holocene antiquity. This is especially germane in the case of fish remains, where the fragile nature of their bone structure makes their preservation especially problematic. Yet, despite this, several sites have yielded both fish remains and tabular knives in associated contexts, often in addition to other faunal and floral remains (Barber 1980; Maymon and Bolian 1992; Petersen 1991; Petersen and Putnam 1992; Spiess 1992a; Thomas and Robinson 1980). Perhaps the closest association between tabular knives and fish remains comes from the John's Bridge site, where several tabular knives were found immediately adjacent to a feature that yielded catfish remains (*Ictalurus* sp.) (Thomas and Robinson 1980). Other sites have demonstrated tabular knives and fish remains within the same stratagraphic horizons or arbitrary levels below datum (e.g. Petersen 1991).

Looking more broadly, nearly all of the sites from which tabular knives have been recovered are immediately adjacent to substantial bodies of water or related watercourses. While this will be explored more fully below, the association of fish remains and tabular knives at a significant number of early Holocene sites, and the more common incidence of site locations associated with lacustrine, riverine and/or wetland resources indicates that these environments were significant to non-maritime Early Archaic and Late Paleoindian subsistence (Doyle et al. 1985; Jones 1997; Jones and Forrest 2003; Kuehn 1998; Nicholas 1987, 1998; Spiess 1992a, b; Spiess et al. 1983; Yesner et al. 1983). This is quite different from what the evidence thus far suggests for the preceding Early Paleoindian period. As Spiess notes, "[Early] Paleoindian sites in the New England-Maritimes region are found most often on glacial-outwash sands, and almost never in river alluvium," (Spiess 2002:145; see Petersen et al. 2000, Spiess 1992b). The creation and utilization of tabular knives can be viewed therefore as a possible product of changing subsistence strategies, rather than simply a shift to more localized, expedient or "crude" materials and/or forms.

Indeed, returning to Thomas and Robinson, the notion that these tools performed a function for which fine-grained materials would not be as suitable is apposite. Of course, it is widely acknowledged that cultures of the Early Paleoindian period manipulated a refined and adaptable toolkit (e.g. Bamforth 1986), and that their subsistence strategies in the Northeast were predicated at least to a significant degree upon large terrestrial fauna (Spiess et al. 1998). Therefore, the notion that the introduction of tabular knives represents a refinement in the technology of hide processing practiced by Paleoindians seems as unlikely as the notion that the introduction of tabular knives represents some form of technological or cultural regression.

Instead, looking at tabular knives objectively, the abrasive and more forgiving qualities of the materials preferred for their manufacture coupled with their elongated blade margins suggest that perhaps they would have better served an actor in fish processing by facilitating the removal of the meat from the gracile and somewhat fragile bone structure. Alternatively, they could have functioned admirably as descaling tools. These inferred functions are certainly tentative, and many other plausible uses can be construed for this tool form, including some aspects of hide processing, the arguments above not withstanding. Indeed, they might have functioned as more general purpose tools, much like the ulu to which multiple uses are ascribed ethnohistorically (Turnbaugh 1977).

In summary, while the authors believe that these tools most likely represent early tools for use in fish processing, the most essential and demonstrable points are that these tools began to be manufactured in the Late Paleoindian period and are widely recognized by the Early Archaic period. It is additionally recognized that the sites within which these tools are regularly recovered are prominently positioned near to major water sources, particularly within riverine settings. Furthermore, what-

ever the function of these tools, it is recognized that they are not merely informal expedient tools but were manufactured and replicated purposefully, likely with an equally purposeful choice in materials. Finally, less formalized or broadly analogous versions of this tool form continued to be used through the Late Archaic Period, where aquatic resources certainly gained in importance.

***Discussion***

While the progression from the Paleoindian period to the Early Archaic period, as elucidated through durable material remains, is often seen as one of the most dramatic technological and perhaps cultural shifts in Northeastern prehistory, there is nevertheless growing evidence of continuity over time. This continuity further refutes some earlier models of a population hiatus during the Early Archaic (Fitting 1968; Petersen and Putnam 1992; Robinson and Petersen 1992), and also helps clarify some of some of the shifts in technology and isochrestic style occurring during the transition between these periods.

Evidence of this continuity is at least partially a result of the increasing recognition of Late Paleoindian sites in the region. In many senses, these sites bridge the chasm between the Early Paleoindian and Early Archaic periods. For example, while the use of non-local lithic raw materials is certainly more prominent during the Early Paleoindian Period, a review of non-local raw material use in Late Paleoindian and Early Archaic sites suggests that non-local raw materials were not abandoned wholesale, but rather that percentages slowly decreased over time (e.g.- Jones 1997; Petersen 1991; Ritchie 1953, 1957; Thomas and Robinson 1980). Of course, there are notable exceptions, including the Mazza site where non-local raw materials are dominant. The authors also recognize the limits inherent in a very small and geographically scattered sample size at present (Petersen et al. 2000), as well as various material identification issues that continue to present obstacles for such generalizations. It is also important to note, however, that the use of specific raw materials (and tools) may have been predicated partially upon the activities undertaken by these groups as well as the seasons within which they were undertaken, especially during the Early Archaic period in the Northeast (Binford 1977).

Increasing evidence of continuity is also evident in certain tool morphologies. The technological similarities between Early and Late Paleoindian projectile points have been widely noted (see Boldurian and Cotter 1999; Petersen 2004, Petersen et al. 2000; Wright 1995). Evidence of continuity between Late Paleoindian and Early Archaic projectile point technology and/or morphologies, however, has until recently been extremely elusive (Petersen et al. 2000). Many have explained this disjuncture by noting the probable disparate origins of each of these isochestric styles; namely, Late Paleoindian projectile point forms originating in the West and Early Archaic forms originating in the South. Depending upon one's interpretation, however, evidence of "stylistic" borrowing might be manifest in the rare incidence of notching on otherwise lanceolate forms in some Late Paleoindian sites in the Northeast (Chapdelaine (ed.) 1994; Chapdelaine and Bourget 1992; Dumais 2000; Ellis 2004; Mason 1981; Ritchie 1980a; Storck 2002; Thomas 1997; Thomas et al. 1996; Will and Moore 2002; Wright 1995).

Wright (1995) asserts that the onset of notching is a direct result of the adoption of the spearthrower in the Great Lakes region, while Ellis (2004) disagrees and suggests that notched lanceolate points (referring to Hi-Lo points) began to be used as multi-purpose tools at this time. Leaving aside techno-functional explanations, the technique of notching may possibly signal one of the first instances of the adoption or adaptation of a stylistic trait with its origins in regions farther south. This is certainly a tentative and conjectural hypothesis, but the insubstantial and potentially non-utilitarian nature of some of the notches, as least as depicted in photographs, could be construed as further evidence of this. Parenthetically, notches can be viewed as just one example of regional variations on the lanceolate form. Coupled with the few available radiocarbon dates, which impressionistically appear to postdate analogous Late Paleoindian manifestations in the West, and limited geomorphological age estimates, the cumulative evidence suggests that perhaps Late Paleoindian occupations in the Northeast occurred later, or perhaps lasted longer than in other areas (Wright 1995). This, in turn, suggests that cultures that made and used Late Paleoindian projectile points perhaps existed contemporaneously with cultures that made and used Early Archaic forms in the south, and perhaps even some northern areas (Stoltman 1978:714). While this "culture contact" suggestion, as opposed to a stylistic drift or in-situ invention explanation is certainly tentative, it is a possibility worth further investigation (Wright 1995:115).

Other apparent technological continuities between the Late Paleoindian and Early Archaic Periods include the production of distinctive bifaces and preforms (e.g. Ellis and Deller 2002; Thomas and Robinson 1980). In

the case of some Early Archaic sites such as John's Bridge, however, the bifaces display low shoulders (Thomas and Robinson 1980). Beyond projectile points, distinctive endscraper and other scraper (Robinson IV et al. 2004) use has also been demonstrated from the Early Paleoindian to Early Archaic periods in some areas.

Looking beyond technology, it has been noted by many researchers that immediately following the Pleistocene epoch, human populations began to practice a more generalized subsistence in many areas across the entire planet (Binford 1972; Hayden 1981). In certain deglaciated areas of the Northeast, there is evidence of groups practicing varied subsistence strategies beginning even during the Early Paleoindian period (McNett 1985; Spiess et al. 1995). In formerly glaciated areas, however, subsistence remains from sites dating to the Late-Pleistocene and Early Holocene are extremely rare. Perhaps because of this, in addition to the relative overabundance of stone hunting equipment represented at sites due to preservation biases (Andrews and Adavasio 1996), many researchers have presumed a strong hunting focus not only for Early Paleoindian groups, but for non-maritime based cultures through to at least the Late Archaic period.

While nearly all have acknowledged that hunting was certainly important for subsistence during the late Pleistocene and early Holocene epochs, at least seasonally, and that its relative importance probably increases further back in time, some researchers have challenged hunting as the sole significant subsistence strategy of these early groups. Much of this criticism has come in the form of environmental syntheses, some of which suggest that by the time Paleoindians arrived in formerly glaciated areas of the Northeast or shortly thereafter, the environment was more complex and diverse than had earlier been presumed (Custer and Stewart 1990; Davis and Jacobson 1985; Nicholas 1988). In contrast to tundra or parkland, this somewhat ameliorated environment perhaps would not have been amenable to gregarious herd animals for much of the year. Because of this, some have suggested that groups whose subsistence and possibly culture was predicated upon large terrestrial fauna (K strategists) would quickly have had to adapt, if indeed this subsistence strategy was ever truly central to these people (Cannon and Meltzer 2004; Loring 1997; Meltzer and Smith 1986). The environment during these early post-glacial periods has as yet not been sufficiently quantified, however, and planetary and local events and conditions may have significantly affected local environments within the region (e.g. Li 1996; Newby et al. 2005).

Some researchers have gone further and suggested that while boreal forest or mixed woodland conditions pertained for many areas, particularly by the Early Archaic period, the carrying capacity of these environments was significantly enhanced by the utilization of the riverine, lacustrine and wetland resources within them (Curran and Dincauze 1977; Dincauze 1988; Jones and Forrest 2003; Nicholas 1987, 1988, 1998; Ridge 2003; Yesner et al. 1983). Rather than a population abandonment or crash, data now suggest that many Early Archaic groups simply shifted their subsistence focus and their occupation areas to water sources and to the partial extraction of aquatic resources, at least on a part-time or seasonal basis. It is within these environments that the majority of Early Archaic sites have been identified in any case. Furthermore, this pattern seemingly begins to emerge in the preceding Late Paleoindian period as well, with several stratified riverine sites demonstrating Late Paleoindian remains at their basal depths (Bolian 1980; Doyle et al. 1985; Petersen 1991; Sanger et al. 1992; Sanger et al. 2003).

Paralleling the trajectories of some lithic technologies, the documented site locations and possible subsistence strategies of these respective periods do not suggest an abrupt shift, but rather a gradual change that likely began in the Early Paleoindian period, continued during the Late Paleoindian period, and became fixtures by the Early Archaic period. This shift, as tentatively exemplified by the adoption of tabular knives by early Holocene groups as illustrated above, is likely one toward aquatic resources.

Moving to a more impressionistic vein, it is also interesting to note that in the case of the Mazza site, Sunderland Brook likely never hosted runs of sizable fish, though the Winooski River into which Sunderland Brook flows certainly did. While it has been argued that large anadromous fish species were not necessary important to early Holocene subsistence (Carlson 1988), and it is also acknowledged that the procurement of smaller aquatic fauna (such as alewife and eel) were indeed harvested *en masse* at certain locales during the early and mid-Holocene (Brigham et al. 2001, Petersen et al. 1994) the large size of the tabular knife at the Mazza site, if used for fish processing, suggests that it was used upon larger species of aquatic fauna. Of course, individual fish such as catfish (as at John's Bridge) could have been procured within Sunderland Brook, but regular and predictable procurement of larger fish likely required a journey to a more sizable water source.

Corollary to this argument, new paleoenvironmental reconstructions suggest that the Champlain Sea may have been in existence even into the Late Paleoindian period. While very tentative at this point, new work with varve chronologies, $^{14}C$ dates, and other techniques suggests later dates for many post-glacial hydrological events in this region (Ridge 2003, Ridge et al.1999, Wright 2006), where once it was widely believed that these events predated human occupation (Mason 1960). If indeed this was the case, and it must be stressed that it may not be, the Champlain Sea represents an enormous maritime resource base, where many species of fish and even aquatic mammals could have been procured (Loring 1980). Alternatively, Lake Champlain and the Winooski River would still have been an essential resource base for these early people, and nearby sources of aquatic species.

Finally, tabular knives have the potential to be used to help elucidate gender-specific activities, though it is recognized that "reading gender" from Paleoindian and Early Archaic tool assemblages is extremely problematic for archaeologists (e.g., Chilton 2004). Leaving aside the male bias noted for Paleoindian studies in general, with their presumed hunting focus (Chilton 2004), and widely-held assumptions that stone tools and their manufacture were the exclusive province of men (Gero 1991), agency, sociality and community are rarely explicitly considered in preceramic hunter-gatherer groups in general, in favor of functional and environmentally predicated interpretations derived from the limited and prominent data sets available to researchers (Chilton 2004, DeVore 1968).

This paper has demonstrated, however, at least a partial or seasonal shift toward aquatic resources by the Early Archaic period and a recognizable tool form associated with many of these sites. While conjectural, it is reasonable to infer that these tools may have been utilized and perhaps manufactured by women. There is no direct evidence for this, but it is at least apparent that some sites demonstrate aquatic and terrestrial faunal remains within the same features, areas or arbitrary levels below surface. This in turn suggests multiple subsistence strategies and task differentiation, perhaps implemented along gender lines.

Additionally, the ulu, as it is known ethnohistorically, is often reported as a "woman's knife" or as a tool primarily utilized by women (e.g. Mason 1892, Turnbaugh 1977). While it is acknowledged that there is likely no direct connection between formal ulus and the tools discussed in this article, it is at least illustrative that tools with a broadly similar morphology and perhaps function are an acknowledged part of women's toolkits in groups that have been historically used as ethnographic analogues for Paleoindians and other early Holocene groups.

## Conclusion

Owing to the dearth of preserved subsistence remains within late Pleistocene and early Holocene sites within the broader region, and the limited resolution that environmental reconstructions currently provide, lithic (and other) artifacts will likely continue to provide the most diagnostic evidence of the relative age and subsistence activities of these early groups, at least in the short and medium term. This paper recognizes that fact and presents a comprehensive analysis of a non-projectile point tool type to help broaden the range of tools to which we can ascribe temporal and functional attributes.

While the authors suggest that these tools were used for some form of fish processing, the functions and implications of the tabular knives illustrated above are speculative and certainly subject to debate. It is hoped that this paper has minimally demonstrated that tabular knives began be manufactured in the Late Paleoindian period and are widely recognized by the Early Archaic period. Furthermore, this paper has demonstrated that the sites within which these tools are regularly recovered are prominently positioned near to major water sources, particularly within riverine, lacustrine and wetland settings. Finally, whatever the function of these tools, it is recognized that they are not merely informal expedient tools but were manufactured and replicated purposefully, likely with an equally purposeful choice in materials.

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