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# Gaining Insight into Lithic Technology in Eastern Pennsylvania through the Study of an Amateur Collection

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## INTRODUCTION

The farm fields of east-central Pennsylvania contain an abundance of artifacts that span much of regional prehistory. Not surprisingly, many of these artifacts have been collected by local amateurs. Archaeologists vigorously debate the merits of working with amateur collectors (Pitblado 2014; Pitblado et al. 2022). With the potential benefits of collaboration in mind, we analyzed an amateur collection of lithic artifacts from Kramer Farm (KF) in Kutztown, Pennsylvania (Fig. 1). Amateur collections often exhibit bias toward formal tools (e.g., projectile points; Shott 2017). Here, that bias is an asset, as we focused specifically on projectile points. We explored how morphometric attributes (e.g., blade width), indices of retouch, raw material, and projectile point type varied in relation to each other. Our analysis provides insight into projectile point design, lithic technological organization, and land use in east-central Pennsylvania.


**Fig. 1:** Map showing the location of Kramer Farm in Kutztown, Pennsylvania. Sources of tool-quality stone occur in the Reading Prong.

## KRAMER FARM ASSEMBLAGE

The KF assemblage includes projectile point types (Fig. 2) that suggest occupation from the Early Archaic through the Late Woodland periods (~10,000 BP to the time of European contact; Custer 2001), as well as other tools typical for the region (e.g., scrapers, awls, expedient flake tools). Most of the tools were manufactured from chert, jasper, argillite, quartzite, and quartz, raw materials available locally from outcrops in the Reading Prong (Fig. 1; Hatch 1993).

## ANALYSIS

Our analysis focused on hafted bifaces: "lithic tools that have been extensively modified by chipping and have two sides or faces that meet to form a single edge that circumscribes the entire specimen" (Andrefsky 2006:744). Put simply, hafted bifaces are spear tips, arrow heads, and bifacial knives. The KF assemblage includes 145 hafted bifaces, 119 of which are sufficiently complete to assign to point type. We collected basic qualitative (e.g., raw material, point type) and morphometric data (e.g., blade shape, size; Fig. 3) for these points. We also calculated the hafted biface retouch index (HRI; after Andrefsky 2006) for 63 points (52.9%) in the KF assemblage. HRI provides a measure of the extent to which projectile points have been resharpened. Thus, HRI provides a measure of tool curation (after Shott 1996), which relates to point design, raw material preferences, and land use strategies.


**Fig. 2a:** Early Archaic (10,000-9000 BP) projectile points (n=9).


**Fig. 2b:** Middle Archaic (9000-6000 BP) projectile points (n=7).


**Fig. 2c:** Late Archaic (6000-4300 BP) projectile points (n=14).

**Table 1:** Attribute descriptions for measurements illustrated in Figure 3.

| | Description | |
|---|---|---|
| Attribute name | From | To |
| BLL: blade length | Tip of biface | Tip of shoulder |
| NH: neck height | Neck | Base |
| HL: haft length | Top of haft element | Base |
| BLW: blade width | Shoulder | Shoulder |
| NW: neck width | Neck edge | Neck edge |
| BW: base width | Base edge | Base edge |
| SBC: shoulder to corner | Shoulder | Basal corner |

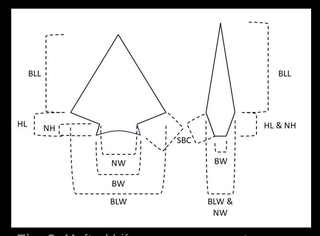
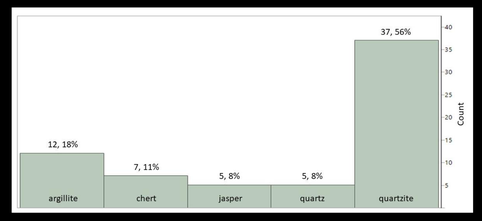



**Fig. 3: H**afted biface measurements (adapted from Andrefsky 2005).

## RESULTS & DISCUSSION

Of the 119 typable points in the KF assemblage, more than half represent types introduced in the Middle Archaic (n = 66, 55%). Quartzite is the dominant raw material during this time, accounting for more than half of the points (Fig. 4). Quartzite is the preferred material for stemmed points, a pattern that contrasts with notched and lanceolate forms. The predominance of quartzite during the Middle Archaic and for stemmed points accords, as most Middle Archaic points present in the KF assemblage are stemmed types (n = 57, 86.3%).

**Fig. 4:** Histogram of raw materials used for points in the KF assemblage during the Middle Archaic.




Interesting patterning emerges when we examine measures of resharpening (HRI) and other morphometric variables for Middle Archaic stemmed points. For example, the HRI values for quartzite points are significantly lower than the HRI values for chert and jasper (Fig. 5), suggesting that chert and jasper points were more intensively resharpened and curated than quartzite points. Admittedly, this pattern is based on a small sample, yet it is a pattern that holds across all points for which we calculated HRI (Fig. 6).

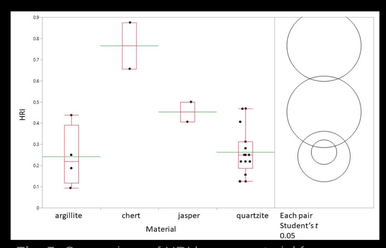



**Fig. 5:** Comparison of HRI by raw material for stemmed points (n = 25). The means are represented by the green lines.

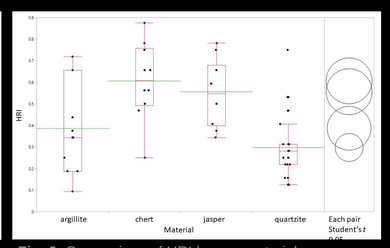



**Fig. 6:** Comparison of HRI by raw material for all points (n = 63). The means are represented by the green lines.

Focusing on the most common stemmed points, we found that HRI values are significantly higher for Poplar Island points than other stemmed point types (Fig. 7). To add more points into the analysis, we also examined blade width (mm) at the midpoint of the blade. Blade width should decrease with biface resharpening, providing a complementary measure to HRI. We found that Bare Island, Piney Island, and Poplar Island points all trend toward greater resharpening than Pequea points (Fig. 8). The range of variability exhibited by Pequea points can be accounted for by differences in raw material, with chert, jasper, and argillite exhibiting greater degrees of resharpening than quartzite (Fig. 9).


**Fig. 2d:** Early Woodland (2700-2100 BP) projectile points (n=8).

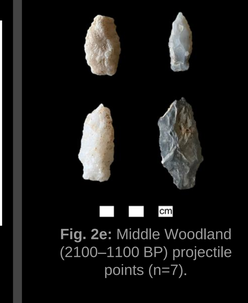



**Fig. 2e:** Middle Woodland (2100–1100 BP) projectile points (n=7).


**Fig. 2f:** Late Woodland (1100-500 BP) projectile points (n=6).

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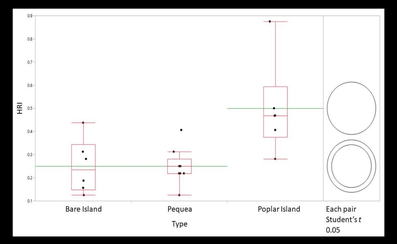


**Fig. 7:** Comparison of HRI for common Middle Archaic stemmed points. The means are represented by the green lines.

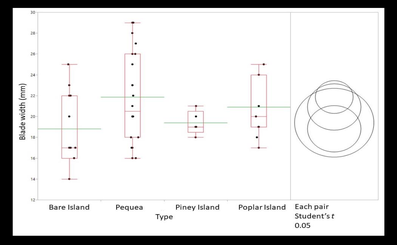


**Fig. 8:** Comparison of blade width (mm) at blade midpoint for common Middle Archaic stemmed points. The means are represented by the green lines.

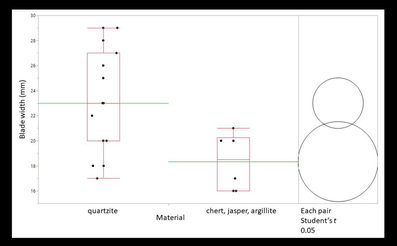


**Fig. 9:** Comparison of blade width (mm) at blade midpoint for Pequea points. The means are represented by the green lines.

Quartzite appears in the KF assemblage in the Middle Archaic (~7000-8000 years BP). Rather than extend the use life of chert and jasper points through intensive resharpening, the prehistoric inhabitants of the region could have turned to quartzite. This pattern is not evident, however. Instead, our analysis suggests that chert and jasper were preferred for the manufacture of projectile points and subject to resharpening to maximize their potential utility throughout regional prehistory.

## CONCLUSION

We presented the analysis of projectile points from the KF assemblage in east-central Pennsylvania. We found that Middle Archaic stemmed points are most common in the assemblage. Interestingly, chert and jasper points had higher HRI values than other raw materials for stemmed points, as well as other point forms. This pattern holds across all periods represented by the points in the KF assemblage. Thus, our analysis demonstrated that the prehistoric inhabitants of east-central Pennsylvania maximized the utility of chert and jasper throughout regional prehistory even on a lithic landscape that included tool-quality stone close at hand (Fig. 1).

Subsequent analysis will examine patterns of breakage, which may allow us to define specific uses (e.g., cutting, sawing, projectiles) for the hafted bifaces in the KF assemblage and better account for variability in measures of resharpening and curation. Presently, we conclude that, despite the controversy that surrounds their study, collaboration between archaeologists and amateur collectors can be beneficial, as archaeologists gain access to assemblages that allow us to expand our understanding of the past.

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