Notes on the Lowe Flared Base Projectile Point

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Abstract

The Lowe Flared Base projectile point type was initially identified by Winters as a diagnostic feature of the Allison and LaMotte cultures of the Wabash River Valley. This paper reports the analysis of formal and functional characteristics of a sample of Lowe points from five Allison and LaMotte sites in the Wabash River drainage area. The sample is analyzed by replicating Winters' scheme of metric and geometric observations. These facilitate comparison with Winters' description and with other established types of the expanding base form. Patterning in microscopically observable traces of wear damage indicate the existence of multiple uses for this point type.

Introduction

Howard Winters, in 1963, defined the Lowe Flared Base projectile point type as a diagnostic feature of the Allison and LaMotte cultures of the Central Wabash Valley. Like many other Middle to Late Woodland cultures of Eastern North America, the Allison and LaMotte had an expanding base projectile form in their tool inventory. Salient features of the type were characterized as,

> ". . . a markedly flaring, straight-sided stem; straight (rarely concave or convex) base; beveling of all edges of the sides of the stem; frequent grinding of the sides of the stem; beveling of the base; frequent beveling of the edges of the blade; high incidence of hexagonal and lenticular cross sections; and a lanceolate or triangular blade." (16)

Winters also stated that, "Once the attributes of these points have been learned, we doubt that there would be any possibility of confusing Lowe points with other expanding stem types." (16)

This study serves to replicate Winters' metrical and geometrical analysis; to compare metrical characterizations of selected expanding point types; and to observe artifact alterations of functional significance. The specimen are from two site excavations, the Daugherty-Monroe Site, and the Kuester Site, and from three surface collections, Remmel, Darwin and Sandy Ridge sites. Recently, carbon-14 tests have dated Allison and LaMotte occupations between A.D. 1 and A.D. 600, Apfelstadt (2), Pace (11), and Stephens (14).

Formal Analysis

Methods

The methods employed consist of the metric and geometric measurements of length, width, thickness, and form. These characteristics are further subdivided to include maximum length, blade length, stem length, maximum width, basal width, stem width, and maximum thickness (Figure 1). Geometric observations include blade edge form,

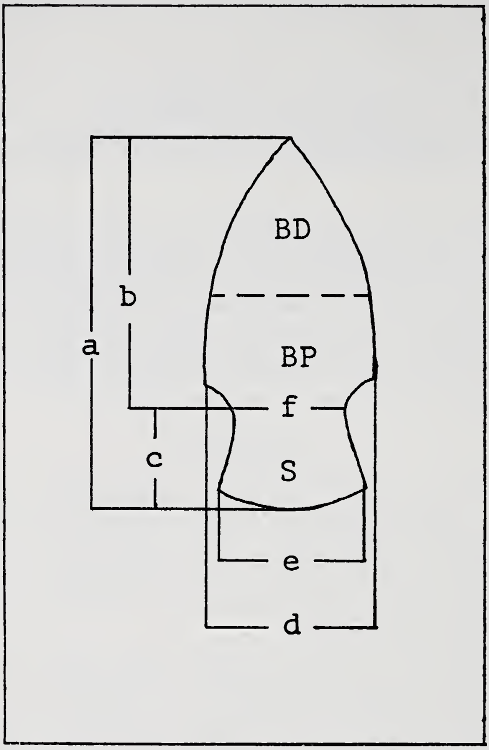

FIGURE 1. *Units of separation and measurement; S. stem, haft element, BP. proximal blade segment, BD. distal blade segment, a. maximum length, b. blade length, c. stem length, d. maximum width, e. basal width, f. stem width.*

blade form, basal edge form, shoulder form and cross section. The definition of, and the method for measurements replicate the analytical schemes presented by Ahler (1), Binford (3), and Winters (17).

Results

Tables 1 through 3 are constructed to compare similar analyses of expanding base projectile point samples with this analysis. Table 1 compares sample size (N), mean value (X), and range for the metrical units of maximum length, maximum width, and maximum thickness from Winters' analysis (17), Montet-White's analysis (10), Prufer's analysis (12), Freeman's analysis (6), each separate ISU site sample, and their composite, listed as ISU Survey. Table 2 presents a comparison of the blade length, stem length, basal width, and stem width categories for the individual site samples, their composite, Winters' analysis,

TABLE 1. *Comparison of maximum length, maximum width, and maximum thickness.*[1]

Sample	Max. Length N	Max. Length X	Max. Length Range	Max. Width N	Max. Width X	Max. Width Range	Max. Thickness N	Max. Thickness X	Max. Thickness Range
ISU Survey	81	4.73	2.97-7.93	183	2.26	1.63-2.99	203	0.65	0.46-1.23
Winters' Survey	9	4.20	3.00-7.70	21	2.30	1.60-2.80	10	0.70	0.50-0.80
Steuben-stemmed	12	5.09	------	15	2.71	------	-	---	------
Expanding Stem	7	5.23	4.20-6.20	12	2.52	2.10-2.80	13	0.82	0.60-1.00
Chessar Notched	7	0.03[2]	3.30-5.60	27	2.32	1.70-3.00	28	0.50	0.30-0.80
Remmel Site	52	4.64	2.97-7.93	153	2.27	1.63-2.99	173	0.65	0.46-1.23
Kuester Site	8	5.29	3.99-6.85	9	2.19	1.95-2.40	9	0.64	0.54-0.81
Daugherty-Monroe Site	21	4.74	3.48-7.27	21	2.13	1.80-2.80	21	0.71	0.56-1.16

[1] In centimeters.
[2] See Prufer (12).

TABLE 2. *Comparison of blade length, stem length, basal width, and stem width.*[1]

Sample	Blade Length N	Blade Length X	Blade Length Range	Stem Length N	Stem Length X	Stem Length Range	Basal Width N	Basal Width X	Basal Width Range	Stem Width N	Stem Width X	Stem Width Range
ISU Survey	81	3.50	2.03-6.67	199	1.23	0.61-1.80	193	2.01	1.25-2.70	202	1.59	1.18-2.32
Winters' Survey	9	2.90	1.70-6.30	30	1.40	1.10-1.80	24	2.10	1.80-2.60	32	1.60	1.30-2.00
Expanding Stem	-	---	------	12	1.38	1.20-1.60	13	2.28	1.80-2.90	14	1.60	1.30-1.90
Remmel Site	52	3.38	2.03-6.67	169	1.24	0.64-1.80	165	2.03	1.25-2.59	172	1.61	1.18-2.32
Kuester Site	8	4.08	2.80-5.62	9	1.20	0.91-1.46	7	2.05	1.61-2.40	9	1.53	1.30-1.61
Daugherty-Monroe Site	21	3.58	2.40-5.84	21	1.14	0.61-1.48	21	1.79	1.56-2.70	21	1.45	1.21-2.16

[1] In centimeters.

TABLE 3. *Comparison of percentages for geometric characteristics.*

Sample	Blade L	Blade T	Blade edge : CV	Blade edge S	Basal edge : S	Basal edge CV	Basal edge CC	Shoulder form : SL	Shoulder form SQ	Shoulder form B	Cross section : BCV	Cross section PLCV	Cross section HX	Cross section R	Cross section TR[1]
ISU Survey	57	43	57	43	61	27	12	61	36	03	71	15	12	02	00
Winters' Survey	28	72	28	72	74	20	06	69	28	03	50	06	35	06	06
Remmel Site	57	43	57	43	61	29	10	62	35	03	72	17	09	09	00
Kuester Site	56	44	56	44	78	00	22	56	44	00	67	00	33	00	00
Daugherty-Monroe Site	62	38	62	38	57	24	19	62	38	00	67	09	24	00	00

[1] L, lanceolate; T, triangular; CV, convex; S, straight; CC, concave SL, sloped; SQ, squared; B, barbed; BCV, biconvex; PLCV, plano-convex; HX, hexagonal; R, rhomboidal; TR, Trapezoidal.

and Freeman's analysis. Table 3 aids the comparison of the geometric attributes by showing the percentage of occurrence for each form.

As seen in this analysis, the Lowe Flared Base projectile point type exhibits an average length of 4.73 cm with a range from 2.97 cm to 7.93 cm. Mean width is 2.26 cm, and the average thickness is 0.65 cm. (Table 1). The type has a markedly flaring straight-sided stem; most frequently a straight basal edge, although convex forms are not rare; shoulders are most often sloped; a high incidence of biconvex cross section, and; a tendency toward a more frequent utilization of lanceolate preforms (Table 3).

Even though Winters' initial characterization requires some modification, his formal description is tentatively confirmed by this subsequent analysis. The discrepancies between his observations and those recorded during this study may be due in part to differing sample sizes, differing methods of observation, or possibly the samples reflect differences in the preparation and utilization of the specimen.

Discussion

Over a large portion of Eastern North America, expanding base point forms occur within approximately the same time period. There has been a tendency to establish different type names which may obscure what are possibly significant similarities. For the Expanding Stem (6), Lowe Flared Base (17), Steuben-stemmed (10), and Chessar Notched (12) point types, there is a greater metrical variation within the types than between them. Morse defined the Steuben-stemmed point type for Middle to Late Woodland occupations in the central Illinois River Valley (9). Freeman (6) noted possible relationships to Illinois River point types, for his Expanding Stem type from the Middle Woodland Millville Site in southwestern Wisconsin. From a Late Woodland phase site in southeastern Ohio, Prufer designated a group of expanding base points as the Chessar Notched type (12). The Bakers Creek point, an expanding base type, has been identified for the Alabama and Tennessee area (4), and Fitting has recently analyzed a sample of expanding base points from a Woodland occupation level in east-central Michigan (5). Thus, agreeing with Winters (15), ". . . we doubt that there would be any possibility of confusing Lowe points with other expanding stem types," if the specimen are found in the central Wabash River Valley.

Functional Analysis

Methods

Ahler's study of point forms and functions provides not only the methodological base but also several specific interpretations of use wear patterns which could be tested against our data. Chipped stone artifacts have received the most concentrated attention in functional (i.e., use wear) studies, and though significant progress has been made (e.g., Ahler [1], Frison [7], Keller [8], Semenov [13], and Wilmsen [15]). Much work remains to be done. It is hoped that the methods of analysis employed are sufficiently explicit and systematic to facilitate comparison with others engaged in similar work.

A total of eighty-six complete points was used in this analysis, fifty-one came from the Remmel Site, twenty-one from the Daugherty-Monroe Site, nine from the Kuester Site, three from the Sandy Ridge Site, and two from the Darwin Site, all located in southwestern Indiana. The majority of these were of blue-gray "Harrison County" flint. For analytical purposes each specimen was divided into two segments: 1) haft element and 2) blade element (Figure 1), with a total of thirteen discrete observations made: six on the haft element and seven on the blade element. In essence these qualitative observations tend to lump wear traces into gross categories and gross areas of occurrence. Six of the observations were recorded simply as either present (P) or absent (X), and six (all referring to edge or facial wear) were recorded as smoothed (S), roughened (R), or absent (X). Smoothed was defined as the result of a fine abrasive action resulting in a worn surface smoother in texture and finish than the natural unworn surface of the raw material, while roughening was defined as coarse abrasive action resulting in a worn surface rougher in texture and finish than the natural unworn surface of the raw material. The final observational attribute (blade edge retouch) was recorded as either slight (SL) or abrupt (A). This was largely intuitive as no parameters were established through objective measurement. A stereo-zoom microscope, with a magnification range of 8X to 40X, was used and it should be noted that no special surface treatment such as staining or powdering was used.

Results

The six specific observations made on the haft element and the results of those observations in terms of relative frequencies are as follows:

1. Basal edge damage:	S= 35%	R= 19%	X= 46%
2. Lateral edge damage:	S= 40%	R= 43%	X= 17%
3. Facial damage:	S= 31%	R= 00	X= 69%
4. Basal thinning:	P= 84%	X= 16%	
5. Basal edge bevel:	P= 21%	X= 79%	
6. Lateral edge bevel:	P= 10%	X= 90%	

Basal thinning, basal edge bevel, and lateral edge bevel were attributes observed by Winters (17). He observed basal thinning in 97%, basal edge bevel in 92%, and lateral edge bevel in 100% of his sample which, except for basal thinning, represents a marked difference from the above percentages. Due to the extreme nature of the differences, the lack of specific definition of terms, and the inability to examine Winters' sample, it seems more reasonable at this time to assume that the differences stem from something other than a real difference between the populations from which the two samples were drawn.

The blade element of each specimen was divided into proximal and distal halves, in relation to proximity to the haft element, in order to more precisely specify the area of particular kinds of wear damage. The result of this procedure was a list of seven blade element observations, four of which were specific to either the proximal or distal halves and three of which were not. These observations and the results were as follows:

1. Proximal edge damage:	S= 36%	R= 45%	X= 19%
2. Proximal facial damage:	S= 27%	R= 00	X= 73%
3. Distal edge damage:	S= 52%	R= 30%	X= 17%
4. Distal facial damage:	S= 29%	R= 00	X= 71%
5. Edge retouch:	SL= 70%	A= 30%	
6. Point impact fracture:	P= 26%	X= 74%	
7. Blade cross section:	BCV= 67%	HX= 16%	R= 03%
	PLCV= 13%		

A one sample chi-square test was applied to each of the above thirteen variables with the result that in every case the value obtained was significant at the .01 confidence level or greater.

Given the above characterization of localized wear damages and other attributes thought to have functional significance the next step was to see how if at all, the various attributes were associated. Unfortunately, the necessary computer facilities for such a cross correlation were not available and therefore this portion of the research remains largely incomplete. Despite this, some initial headway has been made. Both the haft element and the blade element were investigated in terms of edge damage patterning under the assumption that edge damage is of prime functional significance. The results of correlating haft element edge damage (i.e., basal edge damage with lateral edge damage) showed that 17% exhibited smoothing of both basal and lateral edges; 15% exhibited smoothing of the basal edge with roughening of the lateral edges; 2% showed smoothing of basal edge with no lateral edge damage; 12% showed roughening of the basal edge combined with smoothing of the lateral edges; 6% exhibited the combination of roughening of both basal and lateral edges; 1% had basal edge roughening and no damage to lateral edges; in 10% no damage to the basal edge was combined with smoothing of the lateral edges; 22% exhibited no damage to the basal edge combined with roughening of the lateral edges; and finally 14% exhibited no damage to either basal or lateral edges. Though little more can be said at this time, there appear to be four patterns represented and indeed a chi-square test of these data yielded a value significant at between the .01 and .001 confidence level.

Correlation of proximal with distal blade edge confidence yielded the following results (the first letter designates proximal damage type, the second distal): SS= 34%, SR= 01%, SX= 01%, RS= 15%, RR= 29%, RX= 01%, XS= 03%, XR= 00, XX= 15%. Although it would be tempting to interpret these data as indicative of three or four distinct functional classes (e.g., a class of heavy duty scraping and cutting implements, another of light duty slicing and cutting implements, and another representing actual projectile points) such interpretations must await the results of other studies. A chi-square test applied to the combinations of proximal and blade edge damage yielded a value significant at the .001 confidence level.

Finally, experimental studies completed by Ahler (1) seemed to indicate that specimens used specifically as projectiles might tend to show a consistent association of point impact fractures, distal blade edge smoothing and little or no damage to the proximal blade areas. Correlation of these attributes within this sample however did not suggest any such association, indeed only one specimen in the entire sample exhibited this particular combination of attributes. Interestingly enough though, the combination of blade edge attributes on specimen showing point impact fractures seemed to indicate again the possibility of the existence of three or four distinct classes: 23% of point impact fracture specimen exhibited smoothing on both proximal and distal blade edges, 27% showed roughening of both proximal and distal blade edges, and 18% exhibited roughening of the proximal bladge edge with smoothing of the distal, while 23% exhibited no damage to either proximal or distal blade edges. This also suggests that "point impact" fractures may be produced on specimens that were used for purposes other than projectiles.

Discussion

Although this report has considered only a few of the possible manipulations of data and the possibilities of patterning in wear damage attributes, it has shown a strong probability that patterns do exist. Admittedly little has been said in the way of interpretation, yet until a more thorough cross correlation of attributes can be completed and until adequately controlled experimental studies are completed, we are hardly in a position to offer anything more than a strictly subjective interpretation.

Conclusions

This paper has reported the analysis of formal and functional characteristics of a sample of Lowe Flared Base projectile points from five Allison and LaMotte occupations in the lower half of the Wabash River Valley. It largely confirms Winters' initial characterization of the point type; suggests the possibility of significant similarities among regionally established point types, and; shows the strong probability that distinct classes of wear damage patterns exist, resulting from multiple uses made of the single tool type.

Literature Cited

1. AHLER, S. A. 1970. Projectile Point form and Function at Rodgers Shelter, Missouri. Missouri Archaeological Society Series, No. 8. Univ. of Missouri-Columbia. 146 pp.

2. APFELSTADT, G. A. 1973. Preliminary Investigations at Kuester Site. Proceedings, Indiana Academy of Science. 84:86-90.

3. BINFORD, L. R. 1963. A Proposed Attribute List for the Description of Projectile Points. *In* White, A. M., et. al. (eds.). Miscellaneous Studies in Typology and Classification. Anthropological Papers, No. 19. Mus. of Anth., Univ. of Mich. Ann Arbor. pp. 193-221.

4. FAULKNER, C. H. and J. B. GRAHAM. 1966. Highway Salvage in the Nickajack Reservoir. Misc. Paper No. 12. Tenn. Arch. Society. Knoxville. 96 pp.

5. FITTING, J. E. 1972. Lithic Industries of the Schultz Site. *In* Fitting, J. E. (ed.). The Schultz Site of Green Point, A Stratified Occupation Area in the Saginaw Valley of Michigan. Memoirs of the Mus. of Anth., No. 4. Univ. of Mich. Ann Arbor. pp. 191-224.

6. FREEMAN, J. E. 1969. The Millville Site, A Middle Woodland Village in Grant County Wisconsin. *In* The Wisconsin Archeologist (New Series). 50, 2:37-87.

7. FRISON, G. 1968. A Functional Analysis of Certain Chipped Stone Tools. American Antiquity. 33:149-155.

8. KELLER, C. M. 1966. The Development of Edge Damage Patterns on Stone Tools. Man. 1:501-511.

9. MORSE, D. F. 1963. The Steuben Village and Mounds, A Multi-Component Late Hopewell Site in Illinois. Anthropological Papers, No. 21. Mus. of Anth., Univ. of Mich. Ann Arbor. 134 pp.

10. MONTET-WHITE, A. 1968. Lithic Industries of the Illinois Valley in the Eearly and Middle Woodland Period. Anthropological Papers, No. 35. Mus. of Anth., Univ. of Mich. Ann Arbor. 200 pp.

11. PACE, R. E. 1973. Archaeological Salvage, Daugherty-Monroe Site: Island Levee Protection Project, Sullivan County, Indiana. *In* fulfillment of Contract No. CX-4000-3-00-65 and Contract No. CX-4000-4-0028, 1974-75. Northeast Region, Nat. Park Service, U.S. Dept. of Interior. 55 pp.

12. PRUFER, O. H. 1967. Chessar Cave: A Late Woodland Phase in Southeastern Ohio. *In* Prufer, O. H. and D. H. McKenzie, (eds.). Studies in Ohio Archaeology. Western Reserve Univ. Press. Cleveland. pp. 1-12.

13. SEMENOV, S. A. 1964. Prehistoric Technology. Barnes and Knoble, Inc. London. 206 pp.

14. STEPHENS, D. n.d. personal communication.

15. WILMSEN, E. M. 1970. Lithic Analysis and Cultural Inference: A Paleo-Indian Case. Anth. Papers, No. 16. Univ. of Arizona. Tucson.

16. WINTERS, H. D. 1963. An Archaeological Survey of the Wabash Valley in Illinois. Reports of Investigations, No. 10. Illinois State Museum Publication. Springfield. 95 pp.

17. WINTERS, H. D. 1963. Appendix IV: Lowe Flared Base Projectile Points of the Tamms Type Cluster. *In* Winters, H. D. 1963. An Archaeological Survey of the Wabash River Valley in Illinois. Reports of Investigations, No. 10. Illinois State Museum Publication. Springfield. 95 pp.