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A STATISTICAL ANALYSIS OF SOME MISSISSIPPIAN PROJECTILE POINTS[1]

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In a recent paper, David Baerreis and Robert A. Maher of the University of Wisconsin have applied statistical analysis to the study of a series of Mississippian projectile points in an attempt to discern typological differences not apparent in a visual examination of the artifacts (Baerreis and Maher 1958). The projectile points analyzed by Baerreis and Maher are simple un-notched triangular points associated with six Mississippian sites excavated in Wisconsin. The length-breadth ratio was approximately .75 for all of these points. The length and width of each point was measured and a mean length and mean width were determined for the points from each site (See Table 1). To quote these investigators, "These figures were then subjected to a simple analysis of variance, a statistical technique which offers an over-all test for the significance of the differences between several means considered at the same time. The method produces a variance ratio, which is obtained by considering both the variation of values about the group means and the variation of group means about the total mean" (1958:11). The results of their analysis are reproduced in Tables 2 and 3.

Table 1.

Site	Total Measurable Points	Mean Width	Mean Length
Aztalan	200	18.75 mm.	25.82 mm.
Lasley's Point	241	16.92	23.70
Carcajou	28	15.64	24.61
White	48	15.40	23.06
Midway	65	15.37	22.15
Walker-Hooper	136	15.15	21.44

The results of this analysis indicate that the significant statistical differences between projectile point groups reflect cultural differences between the makers of the projectile points. Baerreis and Maher point out, for example, that "While the points of all the sites examined were triangular in form, Oneota artisans held in common a similar

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Table 2.

Group Combinations	Variance Ratio Length	Width
All Groups	11.75***	34.37***
Midway, White, Carcajou, Walker-Hooper, and Aztalan	10.31***	35.39***
Midway, White, Carcajou, Walker-Hooper, and Lasley's Point	6.16***	14.30***
Midway, White, Carcajou, and Walker-Hooper	3.52*	.30
Midway, White, Walker-Hooper	1.88	.22
Midway, White, Carcajou	2.49	.17
Midway, White	.77	.03
Midway, White, Lasley's Point	3.38*	19.83***
Midway, White, Aztalan	13.58***	36.96***
Aztalan, Lasley's Point	16.65***	41.82***

*** difference significant at the .001 level.
** difference significant at the .01 level.
* difference significant at the .05 level.

Table 3.

Cultural Classification	Variance Ratio Length	Width
Mississippi Pattern (Includes all six groups)	11.75***	34.37***
Upper Mississippi Phase (Midway, White, Walker-Hooper, Carcajou, and Lasley's Point)	6.16***	14.30***
Oneota Aspect (Midway, White, Walker-Hooper, and Carcajou)	3.52*	.30
Orr Focus (Midway, White)	.77	.03

*** difference significant at the .001 level.
* difference significant at the .05 level.

idea of point dimensions which differed from that found in the Lasley's Point and Aztalan complexes, and these in turn differed from one another . . ." (1958:13). The results of this analysis conform to the distinctions between these Mississippian complexes based on ceramic analysis. Where visual distinctions are apparent in the ceramics, however, the triangular projectile points show significant variation only when analyzed statistically.

The analysis of similar projectile points in this paper is intended to test the reliability of Baerreis' and Maher's conclusions. The projectile points selected for analysis come from six Mississippian sites excavated in Minnesota by Professor Lloyd A. Wilford (1955) and grouped by him into three homogeneous archaeological units called foci. The sites selected here represent the same Mississippian tradition as those used in the Wisconsin study and exhibit only geographic separation. Further, these projectile points are all simple triangles with a length-breadth ratio approximating .70 for all groups considered. Like the Wisconsin points, they exhibit no significant differ-

ences when examined visually. The proportion of points made of chert as opposed to those made of some other material (quartz or quartzite) is approximately the same in all the series considered, and as such is not a factor in determining differences in group means. Table 4 lists these sites with the sample size, the mean length, mean width, and standard deviation of the projectile points within each group. The inclusion of the standard deviation is intended to give an idea of variability within each group, information unfortunately not included in the paper on the Wisconsin specimens.

Table 4.

Site	Total Measurable Points	Mean Length	S.D.	Mean Width	S.D.
Bartron	18	18.3 mm.	2.27	13.4 mm.	1.44
Sheffield	73	20.1	3.75	15.0	2.24
Vosberg	13	22.7	3.89	15.1	1.66
Humphrey	8	24.5	2.78	16.4	3.18
Bryan	30	21.1	3.86	14.6	1.74
Silvernale	19	20.8	4.12	14.6	1.67

On the basis of ceramic analysis, the Humphrey, Vosberg, Sheffield, and Bartron sites are grouped into the Blue Earth focus – indicative of their homogeneity. Silvernale occupies a separate focus with distinctive ceramic types and the Bryan focus is ceramically intermediate between the Blue Earth and the Silvernale foci.

Examination of Table 5, which reproduces the results of the analysis of the Minnesota points, indicates significant differences *within* the Blue Earth focus, while there is no significant difference indicated between the Bryan and Silvernale foci. The data also indicate no significant differences between the projectile points of the Bryan-Silvernale foci and those of the Humphrey and Vosberg components of the Blue Earth focus.

Table 5.

Group Combinations	Variance Ratio Length	Width
All Groups	9.11***	2.74*
Humphrey, Vosberg	1.23	1.37
Bartron, Sheffield	3.38	7.74**
Blue Earth Focus (Humphrey, Vosberg, Bartron, and Sheffield)	11.82***	4.02**
Silvernale, Bryan	.06	.006
Silvernale, Bryan, Humphrey, and Vosberg	1.97	1.83
Silvernale, Bryan, Bartron, and Sheffield	2.25	2.83*

*** difference significant at the .001 level.
** difference significant at the .01 level.
* difference significant at the .05 level.

The results of this analysis, then, directly contradict the analysis of the total assemblages from the Minnesota sites. These results also contradict the Wisconsin results, for Baerreis and Maher conclude that, "likeness between the proportions of projectile points of the six

sites considered varies directly with the likeness between what is known of the total complexes of these sites" (1953:13).

These writers interpret the statistically verified differences in the Wisconsin points as significant cultural differences. To quote them further, "The analyst must consider closely whether or not the measurement in which he is interested represents phenomena which are actually cultural in nature. The probability of this may be investigated by attempting to control possible non-cultural influences and by examining, as he has been done here, the behavior of the measurements in a cultural sphere. Certainly measurement and its analysis should be of descriptive importance to the archeologist, and wisely employed it could be useful in cultural comparisons and the analysis of particular complexes" (1958:14).

While we agree with this statement, the results of our study directly contradict those of Baerreis and Maher. Thus, while we applaud their attempt to outline cultural differences on the basis of statistical measurements, our data indicate that the variation in length and width of triangular Mississippian projectile points is not culturally significant. We would suggest that the length-breadth ratio is probably the significant cultural factor in these projectile points and that the similarity of this ratio for all groups tested indicates a homogeneous technological pattern for these Mississippian groups.

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