

**Comments on Sullivan and Rozen's "Debitage Analysis and Archaeological Interpretation"**



Daniel S. Amick; Raymond P. Mauldin

*American Antiquity*, Vol. 54, No. 1 (Jan., 1989), 166-168.

Stable URL:

<http://links.jstor.org/sici?sici=0002-7316%28198901%2954%3A1%3C166%3ACOSAR%22%3E2.0.CO%3B2-9>

*American Antiquity* is currently published by Society for American Archaeology.

---

Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at <http://www.jstor.org/about/terms.html>. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Please contact the publisher regarding any further use of this work. Publisher contact information may be obtained at <http://www.jstor.org/journals/sam.html>.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

---

JSTOR is an independent not-for-profit organization dedicated to creating and preserving a digital archive of scholarly journals. For more information regarding JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

## COMMENTS ON SULLIVAN AND ROZEN'S "DEBITAGE ANALYSIS AND ARCHAEOLOGICAL INTERPRETATION"

Daniel S. Amick and Raymond P. Mauldin

*Sullivan and Rozen (1985) suggest that inadequate typologies limit the interpretation of chipped-stone debitage. We contend that the methodology of inference rather than typological structure is limiting debitage analyses. Inferences about the meaning of archaeological data must be derived from sources that are independent of the archaeological record.*

In a recent *American Antiquity*, Sullivan and Rozen (1985:755–779) present an innovative and refreshing assessment of problems faced in debitage analysis. Some fundamental problems in current approaches to typology and interpretation are suggested. They correctly observe that ambiguity surrounds the interpretive statements attached to traditional typological categories used in debitage analysis. However, they argue that “the categories employed in debitage analysis should not be linked a priori to specific conclusions about technology. Rather, debitage analysis should be conducted with interpretation-free categories to enhance objectivity and replicability” (1985:758). This call for the implementation of a typological system that is not tied to specific interpretations is unproductive. What is required is research which will allow us to recognize and reduce the ambiguity associated with specific measurements. To propose a typology that is free of interpretation will not increase our knowledge concerning either the typologies we use or the archaeological record.

The typology outlined by Sullivan and Rozen as an alternative to traditional schemes appears to be a mutually exclusive classification. It is used to classify assemblages from a series of sites in east-central Arizona into two main groups. These groups are interpreted as reflecting different loci of reduction. For example, a group of assemblages that has a low percentage of complete flakes and cores and a high percentage of broken flakes is interpreted as reflecting the by-products of tool production. These assemblages are contrasted with another group, which is characterized by cores and complete flakes, that is interpreted as reflecting core reduction (Sullivan and Rozen 1985:762).

Sullivan and Rozen simply stipulate what the presence of these assemblage characteristics mean. Their major support for the inferences noted above is provided by Jelinek (1976:21):

Manufacturing sites yield quantities of exhausted and unsuitable partially worked cores, broken or misshapen flakes and preforms, and great quantities of debris resulting from the reduction of cores. . . . In contrast, sites at which little or no manufacturing debris is present yield primarily exhausted or broken tools and larger flakes.

Note that, unlike Sullivan and Rozen, Jelinek principally is concerned with differences between production and maintenance sites, not with tool production and core-reduction locations. More critically, neither Jelinek (1976) nor Sullivan and Rozen (1985) provide an empirical support for the connection between behavior or organizational aspects and specific debitage attributes. This is precisely the ambiguous interpretive linkage that Sullivan and Rozen criticize in their review of traditional analysis. It is noted that their interpretive statements regarding the meaning of their assemblage groups are compared to additional variables, such as flake form and percent of cortex present. However, the meaning assigned to the attributes used for this “independent test” are equally ambiguous and supported only by reference to the archaeological record.

---

*Daniel S. Amick and Raymond P. Mauldin, Department of Anthropology, University of New Mexico, Albuquerque, NM 87131*

American Antiquity, 54(1), 1989, pp. 166–168.  
Copyright © 1989 by the Society for American Archaeology

The linkage between ideas and observations must be evaluated by objective means (Binford 1982: 127–128). It is not the classificatory device that must be logically independent of the inference, but the methodology of inference. The methodology suggested by Sullivan and Rozen is sterile because the two frames of reference that are compared are both derived from the archaeological record and therefore not logically independent. Sullivan and Rozen suggest that by comparing “interpretation-free” debitage classifications to technological classifications, inferences are being tested.

It is possible to select from the complete set of conventional technological variables, including flake size, platform characteristics, and cortical variation, to *test inferences* advanced on the basis of differences in debitage category proportions; this step is rarely taken in contemporary lithic analysis. The point is that employing variables and attributes that define units of analysis would not constitute an independent test and would be, therefore, methodologically invalid [Sullivan and Rozen 1985:759, emphasis in original].

Both classification schemes are based on archaeological material and the relation of either classification system to the lithic-reduction sequence has not been addressed. Comparison of different typologies defines additional patterning in the record, but it does not test inferences about the meaning of that patterning. The testing procedure can occur only in a controlled situation. Rather than testing the reliability of the inferences employed, Sullivan and Rozen simply shift the burden of stipulated meaning to an “interpretation-free” typology based on flake-fragment types.

The approach may indicate similarities and differences in assemblage structure, but it does not evaluate the inferences drawn. While we agree that ambiguity in inference is hindering debitage analysis, developing classificatory schemes that are unrelated to the phenomena we seek to measure is counterproductive. Typologies should be refined through research so as to measure unambiguously specific phenomena.

Evaluations of inferences must focus on the linkage between the observable archaeological record and the dynamic conditions that produced those remains. In order to strengthen inferences, we need to develop reliable and operationally independent measures of these linkages. Such a procedure necessarily involves utilizing existing knowledge to isolate and investigate ambiguity. This is the topic that has been referred to as “middle range research” by Binford (1981:21–34).

Two lines of investigation appear exceptionally useful in reducing the ambiguity of inferences in debitage analysis. These are the use of mechanical principles of force which are applicable to lithic reduction and an emphasis on experimental research. Both allow relevant aspects of relations between behavior and material remains to be observed.

Speth (1972, 1981), Tsirk (1975), and others (e.g., Cotterell and Kamminga 1979; Faulkner 1972) have undertaken considerable work in the area of cryptocrystalline fracture mechanics. While these studies have identified several predictable relations between technological vectors and flake attributes, the highly controlled nature of these experiments make them somewhat inaccessible for most archaeological inference at present. Nonetheless, these data are contributing to a growing body of knowledge about flake morphology that is independent of the archaeological record. Being grounded in physics and fracture mechanics, such relations will not change through time.

Controlled lithic-reduction experiments promise to provide a foundation for inferring the type of manufacturing activities represented by a given debitage sample. Common approaches include stage reduction and debitage analysis by size-graded fractions (Ahler 1975; Ahler and Christensen 1983; Stahle and Dunn 1982) or attribute analysis (Magne and Pokotylo 1981). Similarly, flake morphology and its relation to mode of production have been investigated (Dibble and Whittaker 1981; Ohnuma and Bergman 1983). This body of middle-range research concerning debitage production currently is diverse and not well integrated. As experimentation continues, these data may be synthesized into an observational language for debitage analysis (see Binford 1982).

Developing an independent set of linking arguments is a necessary first step in debitage interpretation. Basic relations between knapping behavior and the resulting debris serve as uniformitarian propositions. As such, they can provide a frame of reference against which variations in archaeological data may be compared. For example, if the actualistic studies discussed previously eventually allow us unambiguously to recognize trajectories of reduction for various tool types, archaeological material then can be contrasted with these expectations. Variations from this baseline will be informing us about our ignorance, and identifying areas where further research will be necessary.

We agree that "the structure of typologies fundamentally affects debitage analysis" (Sullivan and Rozen 1985:774). However, we argue that typologies should not be insensitive to the relevant variables. Rather, typologies should be based on relevant variables warranted through controlled middle-range research. Such research should employ existing knowledge to isolate and investigate ambiguity in the measurement techniques used for interpreting the archaeological record. Understanding does not come self-evidently from the material remains.

*Acknowledgments.* Thanks to Drs. Lewis Binford, Richard Chapman, Jeremy Sabloff, Lawrence Straus, and an anonymous reviewer for *American Antiquity* for helpful comments on earlier drafts of this manuscript.

#### REFERENCES CITED

- Ahler, S. A.  
1975 *Patterning and Variability in Extended Coalescent Lithic Technology*. Ph.D. dissertation, University of Missouri. University Microfilms, Ann Arbor, Michigan.
- Ahler, S. A., and R. C. Christensen  
1983 *A Pilot Study of Knife River Flint Procurement and Reduction at Site 32DU508, A Quarry and Workshop Location in Dunn County, North Dakota*. Contribution No. 186. Department of Anthropology and Archaeology, University of North Dakota, Grand Forks.
- Binford, L. R.  
1981 *Bones: Ancient Men and Modern Myths*. Academic Press, New York.  
1982 Objectivity, Explanation, and Archaeology 1981. In *Theory and Explanations in Archaeology*, edited by C. Renfrew, M. J. Rowlands, and B. Segraves, pp. 125–138. Academic Press, New York.
- Cotterell, B., and J. Kamminga  
1979 The Mechanics of Flaking. In *Lithic Use-Wear Analysis*, edited by B. Hayden, pp. 97–112. Academic Press, New York.
- Dibble, H. L., and J. C. Whittaker  
1981 New Experimental Evidence on the Relation Between Percussion Flaking and Flake Variation. *Journal of Archaeological Science* 8:283–296.
- Faulkner, A.  
1972 *Mechanical Principles of Flintworking*. Unpublished Ph.D. dissertation, Department of Anthropology, Washington State University, Pullman.
- Jelinek, A. J.  
1976 Form, Function, and Style in Lithic Analysis. In *Cultural Change and Continuity*, edited by C. L. Cleland, pp. 15–33. Academic Press, New York.
- Magne, M., and D. Pokotylo  
1981 A Pilot Study in Bifacial Lithic Reduction Sequences. *Lithic Technology* 10(2–3):34–47.
- Ohnuma, K., and C. Bergman  
1983 Experimental Studies in the Determination of Flaking Mode. *Bulletin of the Institute of Archaeology* 19:161–170. University of London.
- Speth, J. D.  
1972 Mechanical Basis of Percussion Flaking. *American Antiquity* 37:34–60.  
1981 The Role of Platform Angle and Core Size in Hard-Hammer Percussion Flaking. *Lithic Technology* 10(1):16–21.
- Stahle, D. W., and J. E. Dunn  
1982 An Analysis and Application of the Size Distribution of Waste Flakes from the Manufacture of Bifacial Stone Tools. *World Archaeology* 14:84–97.
- Sullivan, A. P. III, and K. C. Rozen  
1985 Debitage Analysis and Archaeological Interpretation. *American Antiquity* 50:755–779.
- Tsirk, A.  
1975 The Mechanical Basis of Percussion Flaking: Some Comments. *American Antiquity* 39:128–130.