

## ON THE STUDY OF ARTIFACT ASSEMBLAGES

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### ABSTRACT

The techniques of classification and identification of prehistoric flaked stone artifacts in California are, in many instances, antiquated and fail to serve current research needs. The use of antiquated methods and the assumptions upon which they are founded often undermine well intentioned attempts to design, and accordingly, conduct research programs. It is argued that the study methods and resultant types must be commensurate with proposed research goals. A discussion of how state-of-the-art research techniques can develop serviceable types useful in addressing research questions is offered.

### INTRODUCTION

Most of the tools recovered from most archaeological sites in California are flaked stone. After decades of research almost nothing is known about this most common class of prehistoric tools. It is not known whether or not most stone artifacts were used as tools, let alone how they were used or what they were used on. This situation indicates that little data about flaked stone are recovered by digging up lithic materials. Lithic data are largely generated by analysis of those recovered materials. Artifact types organize and structure the nature and extent of analysis. Therefore, a consideration of the general artifact types to be used is pivotal to the successful conduct of research. The vehicle for this consideration is the research design.

### THE ORIGIN OF TYPES

Five general artifact types currently found in the archaeological literature are reviewed below. These types are the morphological, temporal, cultural, functional, and technological (Table 1). Different types can be and often are used in the same studies, even to interpret the same artifacts. They are reviewed separately for clarity of discussion even though these general types did not develop in isolation from one another. The presentation of a time-line is intended only as a heuristic device.

Table 1. The relationship of general artifact types to flaked stone studies.

General Types	Specific Examples	Uses	Assumptions	Value	Data
Morpho-logical	Amorphous Core	Description	Like Forms Mean Same Artifact	?	General Form
Temporal	Elko C-N	Infer Time Period	Fossil Type Finished & Intended Form	+/-	Temporal Placement
Cultural	Clovis Points	Infer Cultural Group	Fossil Type Finished & Intended Form Style	-	Cultural Label
Func-tional	Knives Choppers	Infer Function	Fossil Type Finished & Intended Form Function	-	Func-tional Label
Techno-logical	Stage Two Biface	Infer Manufacturing Rejuvenation Reworking	System of Manufacture Maintenance Reuse	+/-	Activites of Tool Making, Etc.
Use Wear	Striations Polish	Infer Manner of Use and Materials Worked	Use Wear Diagnostic of Forces & Materials	+/-	Activites of Tool Use & Materials Worked
Residue	Blood Plants	Infer Materials Worked	Residues of Materials are Detectable	+/-	Materials Worked

? May not provide accurate data.

+/- Has value for research design guided studies, but does not provide adequate evaluation of flaked stone assemblages when used alone.

- Does not provide data useful for addressing research questions.

The earliest general artifact type in common use in America appears to have been the morphological type. This descriptive taxonomy arose in the latter part of the 19th century with the organization of museum collections. However, such descriptive types were often organized without regard for geographical, cultural, or temporal differences (Willey and Sabloff 1974:83).

In this discussion the morphological type is seen as the first generation of general artifact types.

The second generation of general artifact types, as applied to flaked stone in California, developed out of the morphological type. These represent a variety of approaches to assigning meanings to the identified forms and, thereby, offer explanations of assemblage variability.

The most successful second generation type, for flaked stone, has been the temporal. It developed via pottery studies and was later applied to flaked stone. This general type arose during the first half of the 20th century during an era concerned with an historical approach to archaeology (Willey and Sabloff 1974). The application of this type to flaked stone has been mainly successful with projectile points. Superposition, radiocarbon dating, and more recently hydration dating have all contributed to the recognition of temporally sensitive forms.

The first half of this century also saw the development of the cultural and functional types. Both were first articulated largely in relation to the study of pottery and later applied to flaked stone. While the intended uses of these second generation types varied according to which part of prehistory they sought to elucidate, they all built upon the general morphological type and, thus, were based on the assumption that the form of the artifact was of primary significance.

The cultural type has been used to infer the past presence of different cultural groups as an explanation for the variability in flaked stone assemblages. Having its origins largely in the typological study of pottery, the identification of culture types for flaked stone has also been based on the concept of style. In this case, differing forms are inferred to represent differing cultural traditions for functionally equivalent tools.

The functional type is widely used in California for the analysis of flaked stone tools. The meaning of the term "functional type" has become increasingly blurred by varied usages during the latter half of this century. What is meant here is the traditional type that has its origins early in the century. It has given labels to morphological types such as projectile points, scrapers, knives, and choppers based on the inference that the tool form indicates its intended use.

First of the third generation types was the technological. This type was not widely used until the latter half of this century (Crabtree 1972). This general type, as a concept, has developed out of archaeological analyses of the flaked stone record with support from both experimental (Johnson 1978) and ethnographic studies (e.g., Ellis 1965).

Other third generation general artifact types for flaked

stone appear to be on the horizon. These general types largely remain in their infancy as analytical techniques that can generate functional information. Each of these could form the foundation of a new general artifact type in much the same way as the general technological type has developed out of technological studies. Among research areas that offer significant potential is use wear. One subdivision of use wear is the study of directional use wear elements that suggest how tools were used; a second is polish remnant identification that can indicate what kind of materials were worked by those tools. Residue studies, such as for blood and plant remains, have the potential for more exacting identification of specific flaked stone tool types.

#### UNDERLYING ASSUMPTIONS

The morphological type is premised on the idea that similarity of form is significant. It then assumes that ordering artifacts according to like forms is a useful method of artifact presentation. Morphological ordering and description are the intended products. A review of past literature as well as current reporting will reveal to the reader that use of this general type does not go beyond description, does not provide any explanatory assumptions, or interpretative inferences. Any significance assigned to the forms described are derived by the application of additional artifact types. The morphological type attempts to model flaked stone only in the rudimentary sense of recognizing the existence of like forms.

Use of the temporal type also assumes the importance of like forms, but the concept is further developed. This use also assumes that the artifacts represent discrete entities whose morphology changed only slowly through many generations of users. Seriation is used on this assumption to derive temporal inferences by ordering points according to similarity of form. This assumption is a variation of the paleontological paradigm which views these artifacts as fossil types. It is often assumed that these artifacts represent their pure form as conceived by the mind of the maker. For this to be true, recovered projectile points would have to be found in their intended, finished form. This means that their basic forms did not change during their use lives. Many recovered points provide ample evidence of use damage and rejuvenation that has resulted in greater or lesser degrees of morphological change. As indicated by the Flenniken-Thomas debate, the degree to which use damage and rejuvenation limit the utility of points as time markers remains to be resolved (Bettinger et al. 1991; Wilke and Flenniken 1991).

The cultural type also relies on the paleontological paradigm. For a stylistic tradition to be evident in stone tools, the artifacts must again be fossil types (Rolland and Dibble 1990). The assumption is that these tools are found in their finished, final form, unmodified by subsequent use, maintenance, or reforming as other tools. In California, there

are related assumptions that have been used to generate cultural types. One has been the assumption that certain specific temporal forms also represent specific cultures. [See Flenniken (1985) for the use of projectile points as cultural types in North America.] One underlying idea appears to be that since they represent a distinct time period, they also represent a specific cultural manifestation. Also, different forms of points are sometimes seen as different styles of functionally equivalent tools and, thus, are inferred to represent different cultures.

The assignment of entire assemblages, including, but not limited to flaked stone, as cultural complexes has often been based on like assumptions. Such cultural assignments of assemblages have not only incorporated temporal types, but also functional types to fill out assemblage definitions. Further, some specific artifact forms have been taken as functional equivalents necessary to define cultural types. The resultant "archaeological cultures" and "core areas" have been normative stereotypes. These stereotypes fail to address the variability of the archaeological record which is the key to understanding past lifeways (Simms 1990).

For the functional type the underlying assumption is again that of the fossil type (Rolland and Dibble 1990). The formed tools that are found are assumed to be in finished final form and that they were shaped for specific uses. In some specific cases stone tools were shaped into specific forms for specific uses. However, the assignment of functional labels to most stone tools would mean that variation in form does not occur due to raw material limitations, degrees of rejuvenation, or reworking of tools into other forms. Further, use wear studies have found that both archaeological and ethnographic collections with tool forms of known use, exhibit evidence of having been used for a variety of other tasks and/or on a variety of other materials (Ahler 1971; Siegel 1984).

To recapitulate, understanding of the fossil type assumption is pivotal to understanding the use and limits of second generation artifact types. Being based on the paleontological paradigm means that these artifacts are interpreted as if they were found in their one and only final form, like each species is found in its final adult form (Rolland and Dibble 1990). While this works in certain ways for pottery, the frequent mutability of form for many flaked stone tools during their use lives precludes assuming the general applicability of this concept. The result of applying the fossil type assumption has been the assignment of individual artifacts to normative stereotypes. Recognition of the variability in artifacts, assemblages, and the behaviors that they represent, is limited and often precluded by this stereotypical perception of flaked stone. It is the data on behavioral variability that broadens our understanding of prehistory.

The technological type has an underlying assumption that

there was a system to the manufacture, maintenance and reuse of stone tools (Crabtree 1972, 1975; Collins 1975). This assumption implies that the makers and users of stone tools had, in some cases, a fairly flexible mental template that allowed a single artifact to be technologically processed, perhaps a number of times, potentially into a number of different forms, and potentially by a variety of different techniques. The technological approach sometimes results in a classification of specific artifact types that is at variance with the labels inferred using second generation types.

The development of use wear types providing important functional data can be based on analytical techniques already in existence. The assumptions of these studies could become the rationale for new general artifact types: that tool use results in tool attrition and that the forms of attrition can be diagnostic of the manner in which the tools were used and what they were used on (Keeley 1980; Semenov 1964). Likewise, the finding that tools sometimes retain residue of the materials which they worked is the underlying basis for the analytical techniques that promise to support a general residue type. Blood residue studies have shown particular promise (Hyland et al. 1990). [See Wylie (1974) for a discussion of the variety of plant residues that may also be identified on stone tools.]

#### DATA CONTRIBUTIONS

The description of artifacts is accomplished by the use of the morphological type. No behavioral data are generated by the application of this type. This is why reports that limit lithic analysis to general morphological descriptions cannot address questions regarding past activities like those found in current research designs. Further, purely morphological description may not be reliable or useful, since "artifacts may be identical morphologically, but made by entirely different techniques" (Crabtree 1972:3).

The temporal type, through temporal controls, provides important data necessary in assemblage analysis. However, the value of temporal placements based on unexplained morphological variations are open to dispute since the degree of variation that should separate one form from another is not established by the use of this type. The assignment of specific specimens to certain point types in CRM reports has occasionally been disputed. The uncertainty of placement of variable forms continues to detract from the utility of this general type.

These disputes are seldom resolved since the nature and, therefore, meaning of these variations in point form cannot be determined by the application of this general type. Thus, there is a limitation in determining the temporally diagnostic value of some point specimens. Data are not generated that could be useful in addressing other questions such as: why are so many

whole points found on sites, or, why is there variability in form of a specific point type? While the temporal type provides some useful data on timing of use, it provides no behavioral data. This also limits the value of the temporal assignment of those artifacts.

The use of the cultural type does not generate data to establish functional or temporal equivalency for differing tool forms. Without the demonstration of functional and temporal equivalency, stylistic variability cannot be established. Further, application of this general type does not generate data to rule out other sources of tool form variation. For studies in California, the application of this general artifact type has mainly been an inferring of tool types based on an assumption of stylistic differences. Behavioral data to support such artifact assignments are not produced.

It is not to be claimed here that cultural types do not exist for flaked stone, but data are needed to support such interpretations. The ethnographic record may provide information, but there is a need to make archaeological correlates explicit for these forms. Archaeological analysis may also identify cultural types through production of temporal, technological (Flenniken 1985), and use wear data.

Use of the functional type does not, by itself, provide data to support that these tools were even finished, that their form is not the result of rejuvenation, that they were used, how they were used, or on what. Use of this general type does not generate functional or other behavioral kinds of data, but again, represents an inferential labeling exercise based on assumptions about the presumed significance of artifact morphology. Ethnographic, use wear, and residue data might all be marshaled to help identify those artifacts that functioned as tools.

Numerical taxonomy can be an important form of artifact data. However, the development of numerical taxonomies has largely been an attempt to refine morphological descriptions for first and second generation types. Examples include projectile points (Thomas 1981) and flake tool edge angles (Wilmsen 1970). Numerical description, because it quantifies morphologies, still relies on the fossil type assumption. With the use of numerical description the reasons for the morphologies described remain unknown (e.g., technological and functional activities) and the validity of these forms as numerical types remains unclear. Metric data can help to explain flaked stone forms when used in conjunction with other analytical techniques (Burton 1990).

For assemblage analysis, the technological type can provide data on a number of elements of assemblage variability. These include various unfinished forms, forms resulting from rejuvenation or maintenance, forms created by reshaping into other tools, and reuse of tools as a source of raw material.

However, this general type does not generate data that speak to which artifacts were used as tools, how they were used, or on what. While the use of this general type can produce a wealth of data addressing a variety of activities, it is also a necessary baseline for establishing control over numerous elements of assemblage variability. It does not, for example, indicate whether or not unfinished bifaces were also used as tools. Other third generation flaked stone types are needed to identify the tools present, in terms of how and on what they were used.

The generation of true functional data by use wear types and residue types appear to be a future course for archaeological studies. If research designs are to propose behavioral research questions and follow through with realistic attempts to address those questions, then the development of data that identify used tools, how they were used, and on what they were used, cannot be avoided.

#### REPORTING RESEARCH RESULTS

Reports on CRM excavated collections sometimes use the morphological type to order flaked stone collections. The implication of using just this general artifact type is that the author did not know what specific artifact types are in the collection. Sole use of this general type to report on flaked stone can be identified by the lack of any attempt to identify the nature of the tools described or explain how they came to be.

Use of the temporal type in reporting is indicated with the assignment of time periods according to forms. These temporal assignments may be supported by references to similarly formed specimens depicted in other reports. Other times, these assignments are made by assertion that lack supporting citations. Numerous California studies document that the use of projectile points as time markers recurrently suffers from the assignment of widely disparate forms to the same specific temporal types. Numerous challenges and disagreements regarding such assignments have resulted, usually with little or no resolution.

Reports that limit the lithic analysis of recovered projectile points to the placement of amenable specimens into established point types often relegate other specimens, especially those that were heavily rejuvenated or highly fragmentary, to the general morphological type. This relegation is sometimes done with the use of such terminology as "aberrant forms". The degree to which the temporal assignment might be further confirmed or expanded by these unidentified specimens is not explored.

Reports using the cultural type are often identified by unsupported assertions that certain differences in tool forms are stylistic. No data are offered as support for the functional equivalency of differing tool forms, the assertions that certain

forms are finished tools, or that these artifacts were even used as tools. Presentation of this type in the literature is indicated by artifact, assemblage, and/or culture labels that are offered as interpretations without supporting data. This follows from the underlying assumption that it is the morphology that is culturally diagnostic.

The use of the functional type is common in archaeological reports from California and has resulted in some misleading interpretations that have appeared with some frequency in the literature. These interpretations include the assignment of unfinished bifaces as projectile points, knives, and choppers with no attempt to provide supporting evidence such as use wear or ethnographic analogy. Problems stemming from the use of the general functional type have been discussed elsewhere:

It is common for some archeologists to name artifacts after their presumed use, even though there is no way to check the guess. This practice has resulted in a great deal of misunderstanding by uncritical readers. Furthermore, giving an artifact a name carries the implication that it served a particular use; this kind of attributed function often leads to inaccurate comparison...The greatest pressure for giving functional names to artifacts comes from people who know the material the least (Hole and Heizer 1969:167, 168).

The use of this type in reporting is evident when functional names are given to specific artifact forms without supporting data. This use, like that of the morphological type, suggests that the kinds of tools present in the collection remain undetermined. The artifacts are labeled, but no reliable data regarding the activities they reflect are forthcoming since it has been assumed that it is their form that is functionally diagnostic.

Reports claiming to use the technological type can be identified by the presence of specific artifact types labeled by manufacturing and rejuvenation terminology. Examples include bifaces labeled by reduction stage or cores identified by the flaking technology (e.g., bipolar). However, data must be provided on how these specific artifact types were identified if the report is to document to the reader that this general type has actually been applied. Unfortunately, technological labels have been tacked onto morphological types much in the same manner as the traditional functional types were labeled without documenting their validity.

Few reports on California archaeology contain use wear types. Even a basic identification of tools as having been used is rare. Even fewer studies report on directional use wear evidence or polish findings. Residue studies on flaked stone have only begun to appear within the last several years.

Research designs cannot justify themselves unless they propose not only substantive research goals, but the means to address those goals. Research designs are the appropriate tool for justifying the needed to reveal the past activities represented in the flaked stone record. If research designs do not justify and act upon this need, many will continue to fail to contribute to the summaries and conclusions of resultant excavation reports.

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