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Approaching Technology: Three Options

Archaeologists approach the study of technology and technological change in many different ways. A series of papers in *World Archaeology*, written by Steven L. Kuhn, Michael B. Schiffer, and David Killick, addresses three distinct approaches. In their brief joint introduction, the authors stress a few areas of agreement, namely the difference between core beliefs and models (and by extension, the general utility of models, though they do not agree on how to employ them), the conditional and changeable nature of archaeological interpretation, and the need for archaeology to be a pluralistic discipline. Each author then individually outlines his personal approach to technology in a separate paper.

In the first paper, Steven L. Kuhn advocates an evolutionary perspective of technology. Kuhn is most interested in Pleistocene prehistory and long-term processes of technological change. He explains three broad ways in which evolutionary theory has been used in archaeology. First, some scholars have focused on what they believe to be connections between evolutionary and biological changes in hominids and contemporary technological changes, but establishing the specific nature of such changes remains difficult. Second, other scholars have used the principle of cladistics (originally developed to study biological and genetic relationships) to try to trace relationships between technologies and specific human populations. This type of approach has, not unexpectedly, met with resistance, since cultural descent cannot be proven to follow the same rules as genetic descent. However, most archaeologists have used evolutionary approaches and models for other purposes, such as modeling different types of efficiency, and do not directly reference Darwinian processes. Kuhn sees evolutionary models as

a useful comparative tool, a way to examine variation in behavior and culture uniformly across contexts.

I appreciated Kuhn's caution and insistence that we can learn more from models when they fail than when they succeed, however, I think most of his examples did not go far enough in demonstrating the implications of such failures. Kuhn seems to be suggesting that nearly all models fail, and the work of archaeologists consists of explaining why they do so, but several of his examples, for instance the study of Acheulean handaxes, seem rather speculative in the leap from failed model to explanation. Still, I thought that Kuhn made a strong case for the use of evolutionary models under particular circumstances. In periods of scant archaeological evidence, such as those studied by Kuhn, models are an extremely vital part of archaeological investigation. Kuhn even advocates the more frequent use of evolutionary models for more complex societies. While this could be useful in some instances, the simplification required by models is less jarring in the earliest periods of human evolution, because so much of the extreme past is inaccessible anyway. The evidence available in later periods allows other questions to be answered, and I am not convinced that evolutionary models could be as helpful with those periods.

David Killick discusses social constructionist approaches in the series' second paper. As Killick cautions, social constructivism cannot be reduced to a core theory, but instead refers to a number of related approaches, including concerns with style and choice, practice theory, agency, materiality, and ethnoarchaeology, among many others. Social constructivists subscribe to the belief that technological choice can be strongly influenced by factors such as tradition, religious and cosmological beliefs, and social structure and are less concerned with evolutionary factors and "grand narratives," though some do certainly take a comparative approach. Though social

constructivists generally favor interpretation over scientific explanation, Killick stresses that scientific investigation is not antithetical to such an approach. Killick insists that the interpretation conducted by social constructivists must be grounded in appropriately wide range of archaeological material.

Killick's approach includes the consideration of factors such as language and how skills are acquired, the social persona of craftspeople, and the relationship of various types of industries. Because of this, I found his approach most satisfying, particularly when considering the types of evidence available in my own research area, Greece in the Early Iron Age and Archaic Period. However, I do think that a social constructivist approach must be used with caution, given the potential damage ungrounded speculation can cause. All too often, tentative conclusions based on limited evidence become entrenched in archaeological literature and are treated as fact rather than interpretation. I think Killick is reasonably concerned with this prospect, but it bears repeating.

The third paper in this series, by Michael Schiffer, focuses on behavioral archaeology and its application to studies of technology. Schiffer begins with the important observation that, for humans, "virtually every activity" involves interaction with some form of technology, subject to the various 'performance characteristics,' or contextually defined properties which mediate the interaction between human and object (such as factors of strength, or visual properties). He also briefly discusses behavioralists' use of the life-history of technologies, before moving on to his case study, which uses the adoption of electric-arc lamps in 19th century lighthouses to showcase the performance matrix.

While Schiffer's performance matrix certainly could have potentially useful applications, he may be overstating its utility for archaeological research. The way he utilizes it in his lighthouse example highlights this in several important ways. First, although the lighthouse study is certainly materially focused, it is really more historical than archaeological. By that, I mean that the level of detail in the data set upon which he draws would be extremely unusual in most archaeological settings, even those encountered by historical archaeologists working on 19th century material. In nearly all cases, the archaeological record is patchy and incomplete. Yet Schiffer here knows the total number of lighthouses in each country, the type of light used, and copious information about the various needs and preferences of a host of interested parties. It is unlikely that most archaeological projects would have access to similar levels of data, and Schiffer does not explain how the matrix would function if fewer performance characteristics were known. Further, the matrix does not distinguish between the relative importance of the various performance characteristics to the players involved. A single, highly important performance characteristic (or group of characteristics) could dominate technological choices, but the matrix reduces all characteristics to a non-weighted list of seemingly equivalent factors. Sorting out value and importance can be very difficult archaeologically. While his discussion of his results is more nuanced and includes a consideration of factors such as the rivalry between France and Britain, the matrix alone would suggest that the "ability to symbolize modernity" was as important as the "ability to produce the brightest, whitest light" even though the social circumstances of adoption would suggest otherwise. Of course, the utility of models, as the authors state in their introduction, is to provide a testing ground and simplification is a necessary part of model building. However, my rudimentary knowledge of relations between France and Britain in the 19th century (admittedly based primarily on BBC costume dramas) immediately

suggested to me that competition was a factor in the relatively high level of proliferation of electric lighthouses in the two countries. This brings me to my final criticism of the matrix, which is that nearly all of the patterns Schiffer finds would have been apparent without the matrix. Since it must be acknowledged that performance characteristics would have different values in different societies (and to different individuals) and that such variations would need to be considered individually, where is the real role for such a matrix? It may be a useful tool in understanding certain complicated transitions in technology, but it can also be dangerously reductionist. Still, Schiffer's discussion of performance characteristics (especially his inclusion of the sensory properties of objects) and the life history of technologies must certainly have interesting and useful applications beyond matrices.

Perhaps the most important tenant that can be derived from these papers is that the appropriate approach to the study of technology is heavily dependent on the nature of the available archaeological evidence, as well as the nature of the questions asked of it. Killick explicitly states that social constructivism requires a large amount of material evidence and would be inappropriate in the study of most early hunter-gatherer societies. Although Kuhn does advocate for a wider adoption of evolutionary perspectives, he would certainly agree with the idea that the approach must fit the evidence and desired goal. Schiffer is less overt about the limits of a behavioral perspective, but his use of the performance matrix shows that, in at least some cases, this approach may be limited to very particular types of evidence. These scholars all work in the same university department, but their articles prove the need for flexibility in approaches.