

A friendly response to William Whitlow's comments on Thomas Kuhn

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The following commentary is written as a supplement to the article published October 28, 2011 on the World Socialist Web Site, written by William Whitlow, "Thomas S. Kuhn, post-modernism and materialist dialectics."

Let me first state unequivocally that my comments are in no way intended to support a post-modernist view of science. As an archaeologist trained in the U.S., where anthropology encompasses four sub-fields – social/cultural anthropology, physical/biological anthropology, archaeology, and linguistics – I am painfully aware that at least one of these subfields, social/cultural anthropology, has been devastated by the injection of post-modernism. The effects of this theoretical transformation were recently codified by the American Anthropological Association, which declared that anthropology is not a science, reversing its previous position. The effects of the post-modernist onslaught have not been nearly so pronounced in anthropological archaeology, though attempts have certainly been made.

I concur with the rejection of Kuhn's position regarding the impossibility of objectivity. I would add that humans cannot have perfect, god-like knowledge of the material world. Our understanding is always dialectically mediated by the current state of theory/philosophy and of science and technology. Our knowledge of the external world is ever-improving, but will always be partial and imperfect.

The above being said, I would like to argue that we should not discard the baby of scientific revolutions with the Kuhnian bathwater. Just as in other social phenomena, the dialectical process of scientific research results in discontinuities between the theoretical systems which researchers use to organize their understanding of reality and the results of research. These contradictions are at times of such a scale that their resolution fundamentally alters the practice of a scientific field; even to the degree that a significant portion of what was previously considered data is unusable or at least must undergo considerable reworking. I will use my own field of archaeology to illustrate what I mean.

The lesser impact of post-modernism in archaeology is not due to any inherent materialist inclination among archaeologists. Superficially, one might think that since archaeologists' data comes from material culture (artifacts, structural remains, etc.), they would automatically view the world within a materialist theoretical framework. On the contrary, until the 1960s the predominant paradigm, theoretical rubric, or whatever labels you may prefer, was profoundly idealist.

Based on earlier theories of culture developed in social/cultural anthropology, human behavior was seen as the manifestation of a set of ideas or social norms held in common by members of a given social group, the "normative" view. Differences between societies, both across space and through time, were interpreted as the result of gradual shifts in the frequencies of these cultural "traits" via migration, diffusion, stylistic drift, and other such mechanisms. Change was seen as an essentially random process to be measured by the relative increase or decrease in the

appearance of culturally diagnostic traits.

This paradigm had a profound influence on how archaeological research was practiced. Since individual cultures could be defined by the presence or absence of a given constellation of traits and change was marked by the gradual increase or decrease in popularity of such traits, both the range of valid research questions and the way in which field investigations and analyses of the resulting data were carried out were confined largely to the nominal scale in a statistical sense (i.e., qualitative rather than quantitative). The most frequent artifact types, defined in a formal, stylistic way, represented the essence of a culture. Those traits that occurred with lower frequency were effectively seen as random noise. The focus was on identifying the characteristic trait list of any given archaeological site or stratigraphic layer and then comparing this profile to other sites and layers. One might summarize this approach as glorified butterfly collecting.

Beginning in the 1950s and reaching a peak in the late '60s and early '70s, a profound change took place in how archaeologists viewed human culture. I would argue, and this is not original to me, that this transformation constituted a revolution, even if not precisely in the Kuhnian sense. It profoundly transformed how archaeologists both thought about their subject matter and carried out their craft. The revolution was so fundamental that, as Kuhn observes for other fields, much of the "data" that had been collected under the old paradigm was to a large extent unusable under the new, or at least had very limited utility.

This revolution was prompted by an array of factors, both theoretical and practical, which increasingly demonstrated that the old idealist paradigm was completely inadequate to provide a satisfactory understanding of human culture and its change through time, a "crisis" in the Kuhnian sense. The theoretical component of these developments was initiated in part by Marxist and Marxist-influenced researchers as well as others of a generally 'materialist' theoretical bent who had come of age from the 1930s to the 1950s. Most prominent among the first group was V. Gordon Childe, the well-known Australian/British archaeologist who wrote a number of popular books, including *Man Makes Himself*, which presented a Marxist view of human culture. More broadly, the importance of human interaction with the environment, under the rubric of "subsistence economy," became an increasing focus of research. Developments in other fields, such as ecology, also had an effect on archaeologists' thinking.

The other principal factor that drove the growing discontent with the traditional paradigm was innovation in technology. Perhaps the most prominent of these, at least initially, was the development of radiocarbon dating. This gave archaeologists for the first time an "absolute" dating method, independent of the relative dating provided by stylistic change. The latter method gives, to a large degree, circular results when used for dating, since it is based on variation in the same phenomenon it is trying to study. Other new techniques such as palynology, which permitted environmental reconstruction, and increasingly powerful computers and

statistical methods, which permitted the manipulation of much larger data sets, all opened new avenues for research which had been completely invisible previously.

Following the pattern described by Kuhn, the revolution was brought to fruition by new researchers, who in this case came to academic maturity during the 1960s. This change was marked, at least symbolically, by the publication of *New Perspectives in Archeology* in 1968. This collection of articles by many of the advocates of the “New Archaeology,” also known as processual archaeology, signaled the triumph of the new paradigm over the old. From then on, the old paradigm was considered invalid by the new generation of archaeologists and its practitioners either attempted to adapt, usually with limited success, or were replaced.

Research questions now could be formulated which had no meaning under the old paradigm. Previously, for example, as described above, archaeologists had sought out only the largest, most artifact-rich sites for excavation because that was thought to be where the most complete representation of the artifact trait list for a given culture could be found.

Now a whole diversity of site types suddenly came into view, from small hunting camps, to raw material procurement sites, to seasonal encampments. Not that these other types of sites had not previously been known to exist, but rather they were seen as unimportant under the old paradigm. They were not worth spending time on. They had no scientific significance. Under the new paradigm, the concept of settlement systems was developed which saw societies as composed of a variety of different activities, both within and between sites, which were spatially located based on a range of variables, including resource distribution on the landscape, trade routes, technological capabilities, and the like.

Artifacts were no longer simply stylistic markers. They were tools, manufacturing debris, food waste, etc. Each of which could provide information about the daily lives of their makers. Whereas previously the recovery of artifacts was subject to relatively loose control, now meticulous, detailed excavation and recording were essential to generate statistically valid samples. The proportions of different tools and manufacturing debris could be quantitatively analyzed to characterize different activities and identify such things as craft specialization and even social differentiation. Many other such examples could be cited.

Attempts could now be made to understand in detail how and why the transition from hunting and gathering to agriculture took place rather than simply describing it as a “good idea.” The complex interaction between plant and animal genetics, human population density, technological capabilities, climate change, etc., all had to be understood and weighed.

Culture was now viewed as a dynamic, interacting system in which components both acted upon and were influenced by other components. While most archaeologists have not yet taken the next step to understand these as dialectical processes, the adoption of systems theory by many researchers demonstrated that they were searching in this direction.

Theoretical developments have certainly not ceased since the triumph of the New Archaeology more than four decades ago. I agree that the rigid view of “normal science” propounded by Kuhn is invalid. Nevertheless, I think it is also true that the New Archaeology constitutes a revolution in that it profoundly altered how archaeologists think about and investigate human culture.

Examples from the fields of geology and biology can also be cited to illustrate the profound implications of a paradigm shift in a scientific field. The discovery of plate tectonics (i.e., continental drift) has revolutionized the understanding of biogeography and paleontology. When I was an undergraduate during the early 1970s I remember reading older geological textbooks that talked about notable similarities in terrestrial animal and plant species between the western and eastern hemispheres. These distributions were paradoxical in that such distributions should only occur within contiguous land masses. The problem was that the Atlantic Ocean separated these two land masses and would have been impassible for these

species.

At a time when the continents were thought to be immobile, researchers postulated fantastical “land bridges,” which mysteriously appeared and disappeared, and for which there was no physical evidence, in an attempt to overcome this obvious paradox. This may be compared with the extreme theoretical and mathematical contortions into which astronomers were forced in order to explain celestial motion when operating under the pre-Copernican paradigm. One may say that biogeography and paleontology experienced a prolonged theoretical crisis from which they could not escape. However, once deep sea drilling provided the evidence that the Atlantic sea floor was actually spreading and that the eastern and western hemispheres were once united the paradox vanished and a whole new understanding of plant and animal distributions and evolution was opened up.

Even more profoundly, the impact of the Darwinian theory of evolution, later coupled with Mendelian genetics into the modern “synthetic theory,” completely transformed biology. While the basic form of Linnaean classification of plant and animal species remained, the old content, based on a static, typological categorization using morphological attributes was thoroughly reinterpreted on the basis of a dynamic, evolutionary model.

My fundamental point is that, using whatever term you choose, scientific research is constrained by over-arching theoretical formulations, which greatly influence what research questions are valid and even what constitutes “data.” As contradictions develop both in theoretical and observational spheres between the predictions generated under the paradigm and new evidence and understandings, a crisis point is reached which can only be resolved by a fundamental reworking of the theoretical framework, the paradigm, under which a particular scientific field operates.

This is not something that happens merely “in the heads” of scientists. Rather, it is the product of the dialectic between theory and practice, which is influenced by factors both internal and external to the given field. Certain individuals may embody the new understandings and play key roles in their development, but they are ultimately only expressions of larger social processes. This dialectic does not operate in a smooth, linear fashion, but rather produces periods of discontinuity and theoretical crises which are resolved by new syntheses only to create yet newer contradictions. Nevertheless, each such cycle produces a richer and more profound understanding of the objective, material world.

One can quite correctly reject Kuhn’s post-modernist views but, nevertheless, accept that some of the general patterns he describes (growing contradiction between theory and research results, crisis, and revolutionary resolution) have at least descriptive, if not interpretive, validity.



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