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Cultural evolution and archaeology. Historical and current trends

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Abstract
The 10th Nordic TAG conference fell together with the 150th anniversary of the publication of Charles Darwin's seminal On the Origin of Species as well as the 200th anniversary of his birth. Over the last 15 years a new theoretical discourse on the use of evolutionary theory in archaeology has emerged, but this has largely bypassed the Scandinavian countries, despite the fact that Scandinavian archaeology has a solid foundation of empirical work, especially with regards to technology and ecological relations. Both research areas can benefit tremendously from evolutionary insights. This chapter reviews some of the historical and current trends in evolutionary analyses of material culture change. Despite some large difference in epistemology and methodology, substantial overlap in research interests exists between evolutionary and non-evolutionary archaeologists, and integration of the theories and methods advocated by evolutionary archaeologists into more main-stream Scandinavian practice is both possible and desirable.

Introduction

Although some texts on theory in archaeology contain discussion of evolutionary theory (e.g. Hodder 2001), it is not part of the post-processual canon, especially not in Scandinavia. On the contrary, evolutionary theory and evolution in general are given short shrift by post-processualists (e.g. Shanks and Tilley 1993) who generally deny its relevance to human affairs and thus ignore any contributions such evolutionary or Darwinian approaches might have to offer to understanding long-term material culture and social change. We believe they are mistaken (Riede 2005; Apel and Datmark 2009), and we summarise and repeat our position here. Like other bodies of theory, evolutionary theory is extensive, complex, and not easy to grasp. Yet, it is also analytically elegant and powerful in explanatory terms (see Gould 2002; Ridley 2004). This paper is an attempt to jump-start the discussion of evolutionary theory in archaeology, and in relation to the other bodies of theory commonly referenced by archaeologists. In particular, we believe the time is ripe to start a Scandinavian debate on evolutionary issues and archaeology, not least since the year 2009 is the bicentennial of the birth of Darwin as well as the 150th anniversary of the publication of *On the Origin of Species* (Darwin 1859). We welcome the renewed interest in empirical matters among the new generation of archaeologists, but we likewise feel that it is important to maintain vital theoretical discussions. We hope that the following text will spark a debate on the theory, methods and goals of material culture studies at Nordic TAG and elsewhere.

Evolutionary theory has been discussed in American archaeology for some long time, and is gaining ground in European archaeology, particularly in Britain (e.g. Shennan 1989a; 2002, 2008). Many recent archaeological conferences have included sessions devoted to the subject, and at Stockholm University the Centre for the Study of Cultural Evolution has been active since 2007, whilst the Interdisciplinary Evolutionary Studies Research Group at Aarhus University is also tackling cultural issues from an evolutionary point of view. Discussions of evolutionary approaches to archaeology are also finally emerging in print (see Apel and Darmark 2009 and Snekkestad 2011 and comments to these), although they still appear marred by the issues we attempt to address and clarify in this chapter.

However, the discussion about the nature and applicability of evolutionary theory in archaeology has, as yet, not reached Scandinavian mainstream theory discourse. The theoretical climate in Scandinavian archaeology during the last 20 years has been characterized by a contextual and critical approach that has resulted in a fragmented, narrative, and in part an anti-scientific archaeology that is difficult to grasp from outside the discipline (see, for example, Bjerck [2008] for a discussion of some of these trends). In our view an alternative theoretical framework needs to be discussed. The use of evolutionary theory in archaeology and the social sciences is heavily laden with historical baggage, which acts as an obstacle for the acceptance of its basic ideas among social scientists. However, much of this scepticism can be accounted for by vague notions of what modern evolutionary thinking actually is (Riede 2005; Henrich et al. 2008). The aim of this paper is to *a*) present what we see as the fundaments of evolutionary theory, *b*) discuss how studies of material culture can be related to evolutionary theory, and *c*) present

what the advantages of such an evolutionary viewpoint in social studies might be.

Critics have pointed out that the use of a biological vocabulary in studies of cultural phenomena, including such terms as 'variation', 'selection' and 'drift', has a metaphoric value only, and that there are no methods to scientifically secure the connection between empirical reality and evolution theory (Bamforth 2003; Fracchia and Lewontin 1999, 2005; Gabora 2006). In the current archaeological debate, a contrast is often made between agency perspectives, which stress individual choices and particularistic historicism, and evolutionary and Darwinian explanations (Kristiansen 2004). However, in our view the theory of cultural evolution is a unifying theoretical framework that not only brings together archaeologists working on different levels of explanation (Shennan 2004a), but also researchers from other disciplines (Mesoudi *et al*. 2006; Riede 2010). We do not believe that evolutionary theory is a merely matter of doing traditional archaeology with fashionable and scientific metaphors, but rather that evolutionary perspectives may have a fundamental effect on the questions asked, the taxonomies employed, and the role of archaeology as a discipline in a wider scientific and public landscape. We agree with Runciman (2005) that the goal of archaeologists working within an evolutionary paradigm is to explain how and why particular cultural traits (a certain kind of pot or flint tool, funeral rite or custom) become more common than others over time. Shennan (2004b, 3-4) puts it this way: "the aim of archaeology is to obtain valid knowledge about the past… This does not mean that we are condemned to producing teleological accounts of 'progress' leading to the present, but that we should investigate the past in a way that plays to archaeologists' strengths, which undoubtedly lie in the characterization of long-term patterning in past societies". In this context it is important to stress that the selection of cultural variants among humans in no way is restricted to an adaptation to natural environments. Even if such adaptation might be expected in the long run, studies of individual choices and historical events in prehistory are needed precisely because these are important parts of evolutionary history. This is true since humans are actively creating and modifying the social and physical environments to which they have to adapt. Thus, in relation to other animal species with socially transmitted culture, humans are highly active niche constructors (see, for instance, Bleed 2006; Laland *et al.* 2007; Laland and Brown 2006; Laland *et al*. 2000, 2001; Odling-Smee 2006; Shennan 2006; Smith 2007).

The realisation that Darwinism and action theory exist on different levels is a possible starting-point for a joining the two. Evolutionary theories work on a more general level of explanation than the discourses of action theory conducted within archaeology (Riede 2005), but this does not make either approach more or less important. But, decisively, evolutionary theories contribute basic knowledge concerning certain mechanisms which are fundamental to history and which can be used to put individual historical events and trends in the course of history into a larger picture. In order to do so, close study of individual historical events or processes is required (Apel 2008; Shennan 2000), exactly because it is these micro-processes that in conjunction produce patterns on a macro-scale (Boyd and Richerson 1992). Therefore, there is no opposition between these two perspectives; they simply operate on different temporalities and analytical scales, and consequently answer different kinds of questions. Both levels are needed to create an interesting and relevant archaeology (Shennan, 1989b; 2004a; 2004c).

A brief history of evolutionary theory in cultural research

The use of evolutionary concepts in the social sciences predates Darwin. The colonialism of the 18th and 19th centuries brought Western researchers into close contact with populations living under radically different conditions regarding subsistence, technology and social organization. Empirical observations made by anthropologists from different corners of the world became the foundation upon which to build a frame of reference with an evolutionary touch. The archaic societies encountered were seen as representing different steps on an evolutionary ladder, ranging from technologically and economically simple societies to complex civilizations. An increasing level of complexity was seen as intrinsic to cultural evolution and different classificatory schemes were proposed by, for instance, H. Morgan, E. B. Taylor and others (Tehrani 2010). These schemes were united by a teleological notion where evolution was seen as having a definite goal, making an evolutionary ranking of societies possible. This ranking, it was argued, also had moral dimensions with more 'advanced' societies seen as somehow better than 'primitive' societies. These cultural evolutionary schemes articulated nicely with the colonial project by naturalising the westernisation of peoples in the colonies. The 19th-century school of cultural evolution was an attempt to generalize the empirical record inductively in order to make sense of the substantial differences between the peoples of a shrinking world. This scientific desire might have been combined with political ambitions. It is clear that the point of departure was not a coherent theoretical evolutionary framework, and even after Darwin's publication of *On the Origin of Species* the 19th- and early 20th-century cultural evolutionists maintained a thoroughly non-Darwinian notion of evolution (Bettinger 1991; Persson 1999).

In contrast, a materialistic or instrumental perspective is characteristic of the natural sciences. This perspective works on the supposition that any division of natural or cultural phenomena into types or categories is defined by the scientist (i.e. it is by definition *etic*) and does not necessarily coincide with *emic*, historical categories. As opposed to this way of thinking, 19th-century social evolutionist theories worked on the supposition that the task of the researcher was to discover essential typological categories in the source material. Perhaps the most obvious scientific example of a change from

essentialism to materialism is the introduction of Darwin's theory of evolution in biology during the 19th century. Prior to Darwin, biologists, such as Linnaeus, tended to see different species as fully formed, static, essential categories, which the biologist was to discover, collect and classify. Darwin's emphasis on biological development as a continuous process, where, even within particular species, there is an individual variation constituting the prerequisite for the development of new species, caused a fundamental theoretical change from essentialism to materialism. The shift from a typological view of biological entities towards what is commonly termed 'population thinking' concluded this process and allowed for rapid progress in the understanding of change over time (Hull 1965). This is not a trivial difference, but a major philosophical, epistemological caesura. Mayr (1959) explicitly brought this issue to the attention of archaeologists, but despite the fact that many if not most typologies are long past their analytical due date (Bisson 2000), the vast majority of archaeologists still operate firmly within a largely unquestioned typological framework. The crux of the matter is that "the assumptions of population thinking are diametrically opposed to those of the typologist. The populationist stresses the uniqueness of everything in the organic world… The ultimate conclusions of the population thinker and the typologist are precisely the opposite. For the typologist, the type…is real and the variation an illusion, while for the populationist the type (average) is an abstraction and only the variation is real. *No two ways of looking at nature could be more different*" (Mayr 1959:28-29; our emphasis).

The social and political consequences of early cultural evolutionary thinking, such as eugenics and other atrocities, understandably promoted a reaction, and the social sciences turned towards a thoroughly anti-biological stance: the Standard Social Science Model (Barkow *et al*. 1992). According to this point of view, there are limited, if any, biological constraints on human behaviour. Instead human behaviour has been regarded as exclusively formed by processes of socialization as well as relativization of culture. Within the Standard Social Science Model, culture is selected by free agents making active, unconstrained choices, and there has been a tendency to stress the vast plethora of different cultural practices rather than to look for cultural universals (Workman and Reader 2004). The archaeological counterpart to the model has its roots in Boasian anthropology as well as Collingwood's historicism and is to be found within the different strands of post-processualism (e.g. Shanks and Tilley 1993).

Beginning with the works of authors such as E.O. Wilson, W. Hamilton and R. Dawkins, the socio-biological school of thought was formalised during the late 1970s and early 80s. This constituted a return to biological, reductionist explanations of human behaviour based on Darwinian evolutionary theory. Accordingly, human behaviour, including many cultural manifestations, was regarded largely as a result of genetic inheritance of adaptive variants. Even if it were acknowledged that culture occasionally drifts away from a fitness-maximizing optimum, behaviours that in the long run had important effects on Darwinian fitness would tend to be adaptive (see reviews by Laland and Brown 2002; Sear *et al*. 2007).

This way of thinking is found amongst researchers outside the social sciences and often includes a view of culture that is overly simplified and clearly and understandably unattractive to social scientists. However, the intrusion of 'outsiders' into the realm of culture and the impact of their reasoning on popular thought is to be attributed entirely to the pervasive contextualism and unwillingness on behalf of social science to tackle issues such as the striking cross-cultural similarities between seemingly unrelated groups of people (Bloch 2005). The growing realisation among biologists that many animal species possess socially inherited cultural behaviours has resulted in an interest in the cultural behaviour among humans as well. Cavalli-Sforza (1986) published an early sketch of the relationship between cultural and biological evolution, in which he pointed out many analogies as well as differences. Whereas biological evolution relies on the introduction of genetic variation through such processes as mutation, variants which can subsequently be propagated through genetic parent-to-child transmission, cultural traits – ideas, beliefs, languages – are transmitted in more complex ways, and new variants are also introduced in more complex ways, innovation being the most obvious. He concluded that "the study of culture in humans and animals has only now begun" (Cavalli-Sforza 1986, 855), clearly disregarding the myriad cultural studies conducted by social scientists for centuries. Although regrettable, such disregard cannot be attributed to personal arrogance alone. Rather, the adoption of the Standard Social Science Model of culture, with its emphasis on the contextual importance of thick descriptions, cultural relativism, and its denial of scientific reductionism seems to have resulted in the marginalisation of cultural research in general.

Theories on human culture have in other words been highly dichotomized and divided into seemingly incompatible camps. It is obvious to us that biology is not everything and that culture has played a significant role for humans in an adaptive sense. However, human culture itself is an evolved trait, and clearly has not liberated human beings from their biological constraints. The remarkable adaptability of humans cannot just be attributed to some great genetic variation from which favourable qualities have been selected according to the principle of natural selection. Instead, this adaptation has taken place mainly as a result of the ability to make use of material culture. By making warm clothes, making instruments, weapons and facilities, as well as through logistic organization, which included the storage of food, the knowledge of fire and preparation of hides, a typically tropical species succeeded in adapting to temperate climate zones, and in some cases even to arctic conditions (Gräslund 1981). Consequently, on a fundamental level, material culture can be seen as an expression of man's non-physical adaptation to his

surroundings (White 1959) and must be incorporated into any theory of human evolution.

Dual inheritance theory as proposed by Boyd and Richerson (1985) and modern cultural evolution is an attempt at finding a common middle ground between the extreme positions outlined above. Dual inheritance is the idea that, even though the human capacity for culture is evolved and has biological roots, cultural evolution develops its own rules and is an inheritance system independent of genetic inheritance. Of importance is that culture is defined as an inheritance system where different cultural variants are selectively transmitted both within and across generations, which means that the components necessary for Darwinian principles to act are present. While Boyd and Richerson focus on mathematical models and use primarily data from the present and recent past (Boyd and Richerson, 2005). Yet, this framework has provided an invaluable bridge between biology and culture and is beginning to have a real impact on archaeological reasoning (Eerkens and Lipo 2005, 2007; Marwick 2006).

Modern evolutionary theory and material culture studies

Biological evolution can be summarized most fundamentally as 'descent with modification'. Genes are inherited through generations, and mutations create diversity, which, through natural selection, adjusts species to the environment in which they live. Finally, drift – that is chance events – adds or reduces diversity and lead to change even in the absence of selection. Change is constant. Stripped to its basic information-systemic constituents and divorced from the notion of genes of which Darwin himself was not aware, the theory of evolution is characterised by three features: (1) information is passed on from parent to child, (2) the individuals in a population are not identical, and (3) there is a connection between the hereditary traits (phenotype) of an individual and his/her ability to survive and reproduce. An important distinction between the Darwinian theory of evolution and other evolutionary theories is that Darwinian evolution is *not* teleological; it has no ultimate goal (Dunnell 1988).

It has been pointed out that biological evolution may be just one of several special cases of a more general evolutionary theory (Campbell 1974; Runciman 2005) and according to this idea evolution is not constricted to living organisms. The evolution of any phenomenon can from this point of view be regarded as a temporal change in an ensemble of elements. The individual elements in the ensemble can be physical objects like organisms or different elements of artefacts or properties like size or chemical composition or syntactic structure (Fracchia and Lewontin 1999). Whether or not we are talking about physical objects or attributes of artefacts (or packages of technologies and behaviours), it is not any one individual element but the composition of the ensembles that is at the centre of interest. A gradual change in the frequency of elements over time within a defined ensemble (a technology, an artefact type) constitutes an evolutionary process. Accordingly, the notion that temporal changes in material culture may be the result of a process of descent with modification is hardly controversial for any archaeologist who recognizes the variation of material culture in time and space (Wenke 1989; see also Montelius 1903). Consider, for instance, the variety of relative chronologies that have been designed by archaeologists to capture how different artefact traditions evolve over time. The find-combination method and the different seriation methods in archaeology were specifically constructed to demonstrate changes over time in the compositions of elements, for instance stylistic elements of pottery (Gräslund 1987).

However, it has been realised that many of the traditional typological taxonomies are not well suited to study temporal change from the perspective of descent with modification, since they tend to mask rather than reveal variation within a given sample of artefacts. Thus, many, if not all, traditional archaeological typologies are essentialist in that they are intended to reveal intrinsic, prehistorically relevant categories (Lyman *et al*. 1997). While we believe that the question of essentialism and culture might have to be explored further in future research, we argue that typologies based on essential categories are problematic for many reasons, and that attribute- or morphometry-based taxonomies are better suited to shed light on such continuous variation (Riede 2011). A major challenge in archaeology is to rework our taxonomies so that they take variation into account; by doing so we can utilize powerful statistical approaches developed in biology, such as phylogenetics and the comparative method, which are used to analyze how different taxa (e.g. in biology, species; in culture, artefacts) relate to each other in evolutionary time. This project has begun (see Lipo *et al*. 2006; Mace *et al*. 2005; Shennan, 2008, 2009), but much work remains to be done. The resulting material culture phylogenies are focused on revealing historical relationships among different artefact forms and not, as with many of the traditional typologies, mere chronological relationships. Remarkably, Montelius understood this, at least to some degree, already in the late 19th century, even though his theoretical intentions were downplayed in later research (Riede 2006; 2010). In the following section, we take a close look at whether evolutionary terms such as ' heredity' 'variation', and 'selection' are applicable to culture as well, which in turn would imply that culture is a suitable subject for a Darwinian analysis (Mesoudi *et al*. 2004; Collard et al. 2006).

Heredity

In contrast to the transmission mechanisms of biological evolution, which basically is vertical transmission of genes between parents and children, the mechanisms of the transmission of cultural knowledge are more complex (Cavalli-Sforza 1986). Cultural information can be transmitted vertically between the generations from older relatives to children, horizontally between unrelated individuals, from one person to many by teaching, or from

many to one by peer pressure. An important distinction is also that an individual can observe behaviours of peers around him and choose among them (Boyd and Richerson 1987). An ability to imitate behaviour, probably related to a well-developed understanding of the intentions of our peers, separates humans from other species. Human cumulative cultural reproduction is dependent not only on the ability to emulate or imitate behaviour but also on inherent pedagogical resources that enable humans to make long-term educational investments in their children (Tehrani and Riede 2008; Csirba and Gergely 2011).

Variation

Cultural variation may occur randomly through mistakes, experimentations, unforeseen raw material variations and the like. These variation-generating processes are independently of subsequent selective processes (Boyd and Richerson 1985; Mesoudi 2008). Cultural information is then passed on from individual to individual via social interaction. Together, this means that there is an analogy to biological mutations in cultural transmission. The degree to which cultural information is subject to random changes of this kind is affected by social factors such as the content, context and mode of transmission (Eerkens and Lipo 2007; Mesoudi and Whiten 2004). For example, repeated instructions on a simple issue from a respected person versus an overheard conversation in a noisy setting will have very different outcomes regarding the probability of random errors. Indeed, many aspects of human culture are extremely cognitively opaque, making them very difficult to learn without instruction and repeated practice. As a consequence, random variation occurs over time when, for example, a craft tradition is passed down through generations. This variation will eventually form the basis of selection. Variation will also appear through cultural drift. In small populations, random variation may cause some cultural technical elements to be forgotten and may change the frequency of other features. For instance, picture a small group of people moving to a remote island for some reason, and losing contact with the ancestral population. The cultural knowledge of these pioneers will only be a sample of the knowledge in the original population and there is also a chance that this sample is biased: it is not representative of the average cultural skills. Depending on the scenario, over time it is likely that their craft will show marked differences from the original craft, due to cultural drift. This is not a new thought in archaeology. It is likely that such ideas, more or less implicitly, have been behind many cultural-historical interpretations of archaeological materials (e.g. Koerper and Stickel 1980; Pitt Rivers 1875). For example, it is plausible that a craft tradition shared by a large geographical area – such as the making of a certain kind of flint projectile point – will eventually, due to an increase in population or changed rules of marriage resulting in a loss of contact between the groups, produce regional or local varieties of points with a common origin in an older tradition (Bergsvik, 2010, Henrich and Boyd 1998; McElreath et al. 2003).

Both random variation and drift are biological concepts. Many opponents of evolutionary approaches to studies of culture have argued that human inventiveness, because it lacks a counterpart in biological evolutionary theory, makes evolutionary approaches superfluous in cultural research. Central to Darwinian evolution is the insight that the creation of variants is a process that is independent of their selection, which intuitively seems to be very different from what is the case with culture. Major criticisms of the idea of a Darwinian cultural evolution stem from this dichotomy between blind and random biological evolution and a purposeful, non-random, cultural evolution. If humans can accurately foresee future conditions he will be able to modify his behaviour in order to adapt to these conditions, in which case a Darwinian perspective would be superfluous. However, as Mesoudi (2008) points out, the presence of human foresight is not to be confused with clairvoyance. Even though the human brain is an effective simulator of future events, and we are able to use our imagination to obtain educated guesses concerning the future, it remains just that – guesswork, and even human adaptations fail on occasion (Laland and Brown, 2006). The history of innovations also clearly shows that our notion of the heroic inventor, who perceives a need and then designs a solution, is flawed and romanticized. Rather, scientific breakthroughs often are the result of considerable trial and error, often random and conducted by several people (see Ziman 2000). Mesoudi (2008) also discusses what he calls biological foresight. Under stressful conditions bacteria will produce an enzyme that increases mutation rates, potentially leading to the rise of beneficial genetic variants and an adaptation to the changing environment. Such behaviour has its counterpart in human technological adaptation, for example to Arctic climates (Fitzhugh 2001). Yet, it is obvious that human decision-making is not as goal-oriented as we might like to believe.

Individual learning combined with cultural transmission results in what Boyd and Richerson call a Lamarckian effect. Kronfeldner (2007) distinguishes between variational (Darwinian) and transformational evolution (Lamarckian). In transformational evolution variation is not required, but is rather a disturbance. Instead, innate forces towards increasing complexity and adaptation drive transformational evolution. She suggests that these evolutionary models need not be mutually exclusive. Even though culture includes elements of guided variation (i.e. directed against anticipated circumstances) this variation can be regarded as only one of the sources of variation in the population; Darwinian principles will still act to sort the variation through selective mechanisms.

Selection

So, cultural variation is created and maintained in different ways. Variants are then inherited along different social pathways, although the null model in most prehistoric societies likely was vertical or quasi-vertical transmission. Not all variants have the same fitness or, in the words of

Leonard and Jones (1987, 199), "replicative success". There are different sorting processes that act to increase the frequencies of certain cultural traits and sort out others. Selection in biology is usually attributed to environmental forces. Regarding human evolution, it is necessary to take account of the fact that human selective environment is not only a matter of the physical environment; the social environment is a major factor as well. This applies to the evolution of biological traits as well as cultural traits. For example, the existence of altruistic behaviour among humans, the fact that we are nice to our fellow man without consciously calculating on receiving rewards, could be explained by the impact of our past social environment. In the past, most people lived in small-scale societies in which the maintenance of a good reputation was of essence, in order not to be ostracized and also in order to keep reaping the benefits of cooperative enterprise with one's peers. Even though our social circumstances are radically different today, we still maintain the instincts imprinted in us. If social environment affects our genetic composition in this way, it is not surprising that it will also influence the selective mechanisms in cultural evolution.

Often we employ rather rough heuristic devices, rules of thumb, in order to choose between different behavioural variants. Boyd and Richerson (1985) summarise those common rules of thumb that, though rational in the face of the risky process of individual learning, can be significantly flawed in relation to the adaptive circumstances. In short, our choice of cultural role models is based on how common they are in our social environment, on how close they are to us, or how we perceive their overall success, rather than on detailed and accurate analysis of the behaviour of the models in relation to our perception of present or anticipated environmental circumstances. In conclusion, our seemingly purposeful and planned behaviour does not award us a position beyond the grasp of Darwinian processes.

Conclusion

Evolutionary approaches in archaeology focus on providing a framework for interpreting general processes of long-term stability and change in the archaeological record with reference to evolved human psychological propensities, social learning strategies, and the built and natural environment. Contextual information is vital in this undertaking but decidedly not used to argue for the uniqueness of the culture. Deliberately reductionist and materialist, an evolutionary archaeology first and foremost focuses on comparable traits, through which long-term historical relationships may be uncovered – it is there, we argue, the strength of archaeology lies.

We also believe that an evolutionary perspective on humans and their cultural expressions will rest on a view of humans as both cultural and biological beings. As a consequence of this, researchers of culture may avoid an unnecessary mind/body dualism that still seems to permeate much humanistic research. The fact that humans are talented niche-constructors has not lifted them beyond the reach of evolutionary forces (Laland and Brown 2006). An archaeology that rests on evolutionary foundation demands multi-disciplinary research strategies, and this is something that we regard as an advantage. When the goal is to clarify the selective mechanisms that gave rise to certain cultural variants/representations and not others, traditional archaeological tools often have to be complemented with extensive knowledge in other sciences such as biology, psychology, economy and so forth. Several recent publications usefully chart such territory (e.g., Cochrane and Gardner 2011; O'Brien 2008; Roberts and Vander Linden 2011; Stark et al. 2008), and we agree with Henry Plotkin (2003, 16) who argues that "culture is awesomely complex. But it must be – it simply must be – within the scope of understanding of the natural sciences". Evolutionary archaeology is a conceptually roomy framework that extends its hand to both the natural sciences as well as those social and humanistic sciences ready to engage in productive dialogue.

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