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Symbols, Signals, and the Archaeological Record

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Human social life is very different from that of great apes in many important ways. One is scale: humans now mostly live in enormous social worlds, with specialization and a transformed economic base. But even before our social worlds became so large, they depended on technology, technique, and coordinated cooperation. Great apes are extractive foragers; humans are cooperative extractive foragers, employing and relying on physical and informational resources that have been built over generations (Foley and Lahr 2003; Sterelny 2007; Foley and Gamble 2009). Importantly, the internal lives of human groups are very unlike those of apes. Humans are not just members of groups; they are aware of, and identify with, the groups of which they are a part. And these identities encourage and constrain the behaviors and ideologies of individuals. Like football supporters, humans often advertise these memberships in distinctive styles of dress, language, and behavior (Henshilwood and Marean 2003; Henshilwood and d'Errico 2011). In this way humans invest considerable effort in activities that may appear to be neither functional nor pleasant: erecting monuments, mutilating their bodies and those of their children, avoiding available resources, sacrificing resources in elaborately coordinated displays, and investing labor and material to maintain social connections with the dead. Social life within human groups is structured not merely by regular patterns of action and interaction but by explicit, acknowledged, or if implicit at least apparent, norms. Norms are not always respected, but they help make others' behavior predictable enough for planning, coordination, and investment in the future, and so departures from these expectations are subject to formal and informal sanction and coercion (Ross 2006, 2008).

In short, humans live in symbolically marked worlds, operating within limits constructed by normatively structured groups. How and why did this form of social life begin? One idea is that the answer is revealed in changes in the African archaeological record that began about 100 kya (though smeared in space and time); changes that have been labeled the origins of behavioral modernity (McBrearty and Brooks 2000; Henshilwood and Marean 2003). At about this time, archaeologists claim to recognize an increase in artifact diversity, regional differentiation, expansion of the human range, and a diversification of the habitats and resources humans exploited. Moreover, and of especial importance in this context, dedicated "material symbols" become a highly visible part of the archaeological record. Most archaeologists have read this pattern as showing that before about 100 kya there are no unequivocal signs that hominins lived an ideological life, and no evidence their social interactions were mediated by artificial objects that were signs of identity, social role, status, or authority. The claim is that before this time, there were no cave paintings, statues, or figurines; no jewelry; no musical instruments; no utilitarian objects that are incised and decorated; no burials with grave goods; no sites made or modified for ritual activities. Of course, much of the physical record is lost, and many of these products (cave art, for example) would be especially vulnerable, even if

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they existed. But if, say, figurines were regularly made, if rocks were regularly incised with decorative engravings, if shells were routinely drilled and strung as necklaces, we would expect to find some traces of such activities. It is true that the use of ochre may be significantly older (300 kya, or older; Barham 2002). But ochre also has utilitarian uses. While it may well have been used in mediating social interaction, it is a more equivocal trace, and in any case, it does not change the basic record of later diversification of clear signaling. Very large-brained technically skilled and cooperative hominins (the common ancestor of sapiens, Denosovians, and Neandertals) date back to over 500 kya (Klein 2009). They were large game hunters, technically skilled and cooperative. But if we read the archaeological record literally, they seemed to have experienced a very different social life from us.

Until recently, that was the received account of behavioral modernity. We should indeed read the record literally: it marks the onset of a truly human social life, and depended on a change in the intrinsic cognitive capacities in that ancient human lineage, though opinions varied about the nature of that change. As a consequence of the cognitive upgrade to Sapiens V2, our ancestors built a much richer technical, ecological, and social life, probably enabling/explaining their expansion out of Africa and contributing to the extinction of other hominins (Klein 2008; Klein and Steele 2013). However, there is increasing skepticism about this diagnosis. Supposed signature technologies of behavioral modernity are found tens or hundreds of thousands of years earlier than the supposed cognitive breakthrough, and signature capacities have disappeared from the more recent archaeological record of *Homo sapiens* (Brumm and Moore 2005; Hiscock and O'Conner 2006; McBrearty 2007).

We too are skeptical: no one in this thematic section accepts that neo-saltationist picture of the history of human social life, of symbols and symbol interpretation. The final article in the collection, by Godfrey-Smith (2014), returns to many of the themes we have raised in this introduction, and he too comments on the articles contained herewith. Godfrey-Smith develops the Lewis–Skyrms signaling framework, discusses the general conditions under which various fully or partially informative signaling equilibria evolve and are stable, and shows how to apply that framework to archaeological phenomena. Stiner (2014), Kuhn (2014), and Sterelny (2014) all argue that the appearance of material symbols beginning approximately 100 kya is evidence of an important change in human social life. But it is not one that depended on a change in individual capacity; it is instead a response to increased social and demographic complexity, though the three articles emphasize somewhat different facets of those changes. Stiner explores the pattern of Upper Palaeolithic beads, and observes that their repeated shapes suggest they functioned not so much as signifiers of local group identity but rather signaled participation in shared social networks. She argues that the appearance of uniform-sized beads across vast areas reveals the expansion in geographic scale of interaction systems that could be accessed partly through material signaling. Kuhn argues that the Upper Palaeolithic efflorescence of ornaments was one of several shifts in technologies that reveals the emergence of problems in coordinating activities and resolving conflicts within increasingly large and internally differentiated social units. Sterelny focuses on the likelihood that emerging complexity of cooperative economic activities within human groups, often involving delayed returns and the orchestration of indirect relationships, led to magnified stresses in managing social relationships. He argues that normative, ceremonial, and ideological lives of humans are a predictable response to the growing economic complications in forager lives.

Shaw-Williams (2013), Jeffares (2013), and Hiscock (2014) focus on the deeper history of symbols and symbol use, and of the social and cognitive capacities that allowed hominins to evolve such a distinctive social life. Jeffares and Shaw-Williams, in different ways, return us to bipedality and its importance. Jeffares reminds us how pervasively bipedality changed the temporal and spatial scale of planning and social interaction, and traces some of the cognitive implications of those changes; expanded demands on memory, on capacities to resist distraction, to engage in genuinely goal-oriented behavior, rather than merely responding to stimuli in the here and now. Shaw-Williams ties a distinctive characterization of early hominin environments (he emphasizes the importance of, and special demands on, wetland foraging) to a theory of cognitive evolution that sees trackway reading as driving the early expansion of hominin cognitive capacities. Hiscock focuses on the long period after hominins have become obligately bipedal, and before they have become behaviorally modern, and in particular, he focuses on the social implications of stone artifact making. Central to his article is the demonstration that stone artifact making is both highly skilled, but with intrinsically high learning costs. That sets up two dynamics central to the evolution of distinctively human social worlds. The high intrinsic costs of learning select both for specialization and for cost-reducing forms of social learning and teaching. Since making stone tools well is highly skilled, stone tools and their manufacture are apt to acquire secondary functions as social signals—as honest signals of capacities that are valuable in many contexts. Stone tools were material symbols long before the ochre and jewelry of behavioral modernity.

Together the articles in this issue represent the pursuit of a new understanding of the human past, one that can replace the neo-saltationist view of a human revolution with models

that can account for the complexities of the archaeological record and of human social lives. The articulation of archaeological, philosophical, and biological perspectives seems to offer a strong foundation for exploring available evidence, and this was the rationale for collecting these particular articles. Even at this preliminary stage there is a coherence emerging in proposals: the origin and operation of symbolically rich, complexly signaling human social systems was the consequence of the long-term evolution of multiple components of perceiving and negotiating social interactions, a contingent outcome of myriad adaptive shifts rather than a single event.

References

Barham L (2002) Systematic pigment use in the Middle Pleistocene of South-Central Africa. Curr Anthropol 43:181–190

Brumm A, Moore M (2005) Symbolic revolutions and the Australian archaeological record. Camb Archaeol J 15:157–175

Foley R, Gamble C (2009) The ecology of social transitions in human evolution. Phil Trans R Soc Lond B 364:3267–3279

Foley R, Lahr MM (2003) On stony ground: lithic technology, human evolution and the emergence of culture. Evol Anthropol 12:109–122

Godfrey-Smith P (2014) Signs and symbolic behavior. Biol Theory 9. doi:10.1007/s13752-013-0140-0

Henshilwood C, d'Errico F (eds) (2011) Homo symbolicus: the dawn of language, imagination and spirituality. John Benjamins, Amsterdam

Henshilwood C, Marean C (2003) The origin of modern behavior. Curr Anthropol 44:627–651 (includes peer commentary and author's responses)

Hiscock P (2014) Learning in lithic landscapes: a reconsideration of the hominid "toolmaking" niche. Biol Theory 9. doi:10.1007/s13752-013-0158-3

Hiscock P, O'Conner S (2006) An Australian perspective on modern behaviour and artefact assemblages. Before Farming 2:4

Jeffares B (2013) Back to australopithecus: utilizing new theories of cognition to understand the Pliocene hominins. Biol Theory 9. doi:10.1007/s13752-013-0146-7

Klein R (2008) Out of Africa and the evolution of human behavior. Evol Anthropol 17:267–281

Klein RG (2009) The human career: human biological and cultural origins. University of Chicago Press, Chicago

Klein R, Steele T (2013) Archaeological shellfish size and later human evolution in Africa. Proc Natl Acad Sci USA 110:10910–10915

Kuhn SL (2014) Signaling theory and technologies of communication in the paleolithic. Biol Theory 9. doi:10.1007/s13752-013-0156-5

McBrearty S (2007) Down with the revolution. In: Mellars P, Boyle K, Bar-Yosef O et al (eds) Rethinking the human revolution: new behavioural and biological perspectives on the origin and dispersal of modern humans. McDonald Institute Monographs, Cambridge, pp 133–151

McBrearty S, Brooks A (2000) The revolution that wasn't: a new interpretation of the origin of modern human behavior. J Hum Evol 39:453–563

Ross D (2006) The economic and evolutionary basis of selves. Cogn Syst Res 7:246–258

Ross D (2008) Economics, cognitive science and social cognition. Cogn Syst Res 9:125–135

Shaw-Williams K (2013) The social trackways theory of the evolution of human cognition. Biol Theory 9. doi:10.1007/s13752-013-0144-9

Sterelny K (2007) Social intelligence, human intelligence and niche construction. Proc R Soc Lond B 362:719–730

Sterelny K (2014) A paleolithic reciprocation crisis: symbols, signals, and norms. Biol Theory 9. doi: 10.1007/s13752-013-0143-x

Stiner MC (2014) Finding a common bandwidth: causes of convergence and diversity in paleolithic beads. Biol Theory 9. doi:10.1007/s13752-013-0157-4