

of obtaining copyright permissions? In some cases (e.g. figs. 5.11–12) the end result looks downright mangled. Sources are not always cited, and this is a discourtesy to authors and publishers. There are also occasional howlers, such as fig. 6.21, where ‘Temple Wood’ should say ‘the Twelve Apostles’, and fig. 1.1, where ‘England’ is emblazoned across Wales!

Neolithic Scotland could, and should, have been much better. In this reviewer’s opinion, this book has fallen victim to a combination of circumstances: the understandable desire of a recent PhD graduate to publicize his research; the inexorable pressure of the University Research Assessment Exercise to produce publications; and a publisher’s desire to produce an attractive-sounding volume as quickly and as cheaply as possible. While the book contains much that is of interest, it contains little that is genuinely new or that would stand up to rigorous examination, and its presentational and scholarly failings vitiate what should have been an excellent contribution.

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From Tools to Symbols: from Early Hominids to Modern Humans, edited by Francesco d’Errico & Lucinda Backwell, 2005. Johannesburg: Wits University Press; ISBN 1-86814-434-8 hardback £38.94 & US\$59.95; ISBN 1-86814-411-9 paperback £26.49 & US\$39.95; xxxii+574 pp., 140 figs., 33 tables

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There are many books dealing with human evolution; and, when it comes to modern human origins, the meters of shelving needed to house the stream of volumes is taking over the task of winterizing my home. So it was a delightful surprise, when I began working my

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way into yet another addition to this array of tomes, to find it filled with fresh ideas and new looks at old issues. I enjoyed reading *From Tools to Symbols* and I learned a lot in the process. Though reviewers can always find things to quibble about, I think the over-all impact of a book is what really matters and on that score this one does very well. *From Tools to Symbols* began as a conference in 2003 at the University of the Witwatersrand in Johannesburg. The scholarly get-together had two agendas, one to honour Phillip Tobias, the other to celebrate the long history of cooperation and intellectual cross-fertilization between South African and French prehistorians, a scholarly bond fittingly symbolized by the conference organizers and volume editors, one South African (Backwell), the other French (d’Errico).

Doing justice to *From Tools to Symbols* in a brief review is a daunting task, and to keep this endeavour within bounds it will not be possible to delve into each of the 27 contributions. Instead, I explore only a handful of them, and extend my apologies to those whose papers I mention only briefly.

In his opening contribution, Tobias sets the stage by briefly commenting on the long and productive interchange between French and South African scholars. Schlanger, a few pages later, develops these ideas, tracing the impact that early twentieth-century French Palaeolithic prehistory had on the development of the discipline in South Africa, and the reciprocal influence that South African archaeologists, particularly Van Riet Lowe, had on French scholarship. I found it particularly interesting that, according to Schlanger, Van Riet Lowe already in the 1930s shifted away from the predominant focus at the time on stone tool typology to a concern for the way tools were made. Schlanger suggests that Van Riet Lowe’s ideas influenced François Bordes and ultimately intertwined with the trajectory of thought emanating from Leroi-Gourhan to coalesce into the current French interest in *chaînes opératoires*.

For convenience, I have grouped the remaining contributions into three sections, the first with three papers that look at links between intelligence, technology, and culture, the second with eight papers that explore issues related to early hominins, and a final group of thirteen papers that focus on modern human origins. The period between 1.5 and 0.3 million years ago (mya), unfortunately, gets conspicuously short shrift in this book.

In the first group, C.K. Brain raises an interesting question seldom addressed in palaeoanthropological circles — if technology provides such significant benefits to humans and was a driving force in their evolution, why have other animals not evolved in similar fashion? To answer this, he first identifies a set of basic

constraints that he feels must be reckoned with in order for a mammal to become a 'technologically competent animal'. These include a minimum brain size, appropriate appendages, a social system that promotes collective effort, a suitable system of communication, and anatomical changes that permit the birth of large-brained offspring. Aside from the apes, which Brain opts not to discuss, he comments on a number of other animals, including several non-mammals, that make and use tools. Most of these tool users, however, fail to meet one or more of Brain's basic constraints and are unlikely, as a result, ever to achieve the technological competency seen in our own lineage. Interesting as this essay is, it leaves untouched the issue of why human technologies did evolve to such an extent, and so quickly, while our nearest relative — the chimpanzee — stumbled on for five million years with a technology little different from what we suppose was possessed by the common ancestor of chimps and humans. Is this all just historical contingency? We are experts at conjuring up compelling explanations 'after the fact' but our models lack predictive power.

Tobias discusses Mather's paradox, the idea that adaptedness and adaptability in evolution were inversely proportional to each other. In other words the more highly adapted an animal is to its present environment, the less evolutionary plasticity it has retained for adaptation to a new environment should conditions change (p. 91).

In wondering why hominins have undergone so much encephalization, he suggests that culture offered the critical means by which our ancestors overcame the constraints posed by the paradox. This of course raises the same question that I alluded to above: why just us?

Joulian starts with a semiotic question: in tool-using primates, do actions and their results acquire meaning that is independent of the functional nature of the activity itself, as is typical in modern humans? After exploring the nature of chimpanzee tool-using 'traditions', Joulian concludes that the supposed symbolic gulf separating humans and chimpanzees may be much less clearly demarcated than many anthropologists have traditionally maintained.

Joulian also notes (p. 66) that

Nothing proves ... the common belief among prehistorians that working with stone implies a higher level of cognitive skills than chimpanzees' use of complicated tools or their transforming wood sticks into tools.

This same point should be considered when discussing the merits of bone over stone or wood in the context of modern human origins.

The second group of papers deals with early hominins — the timing of hominin origins (Pickford & Se-

nut; Senut); palaeoenvironment (Bamford); taxonomic status of the genus *Homo* (Prat); new South African hominin localities and possible stone tool associations (Berger; Thackeray & Braga); bipedalism and tool use (Gommery); and the making and use of bone tools (Backwell & d'Errico).

The two papers by Pickford and Senut offer tantalizing, though meagre, evidence that the chimpanzee-human split occurred much earlier than is conventionally assumed. These papers bring to mind the debate not too many years ago between fossil hunters and geneticists over the status of *Ramapithecus* and its implications for the timing of hominin origins. That debate was finally won by the geneticists. Only time, and more fossils, will tell us whether today's chronology for the split will stand or fall.

Many of the most compelling ideas about hominin origins give primacy to the role played by palaeoenvironment. Bamford's contribution summarizes what we know about palaeovegetation as seen through plant macrofossils at Laetoli, Olduvai, Sterkfontein and Florisbad. Despite the importance of the topic, this paper is disappointing, offering little insight into the links between plant remains and bigger questions about hominin origins or evolution.

Prat discusses the various fossils from East and South Africa that have been assigned to early *Homo*, reviewing the history of their discovery and their taxonomic status. She concludes that *Homo habilis* and *Homo rudolfensis* are legitimate taxa; neither should be abandoned or collapsed into another genus, such as *Australopithecus* or *Kenyanthropus*.

Both Berger and Thackeray & Braga discuss recent work in South Africa. Berger briefly reports on Coopers D, Gladysvale and Plovers Lake 2 which have produced hominin remains and artefacts. Thackeray & Braga discuss finds of tools at Kromdraai B, likely the product of *Homo* but conceivably made instead by robust australopithecines.

Gommery tackles the issue of bipedalism, raising two points often neglected in discussions of hominin origins. First, there may have been more than one pathway to bipedalism, judging by anatomical differences in the postcranial skeletons of *Australopithecus* and *Paranthropus*. Second, tool use is not as closely linked to bipedalism as often assumed, since chimpanzees employ tools most often while seated. Bipedalism offered advantages to early hominins but perhaps related more to transport than to tool use.

The paper by Backwell & d'Errico does four things. It shows that by 1.5 mya in South Africa, and 1.8 mya at Olduvai, hominins used bones as tools. Second, the authors show that early hominins at Swartkrans deliberately shaped bones by grinding, not just by

percussion. Third, the bone tools suggest that robust australopithecines, not just *Homo*, may have been tool-makers. Finally, the bone tools from South and East Africa were made and used in different ways, reflecting either different cultural traditions or the work of two different hominins. The paper shows clearly that bone working is not a hallmark of modernity.

The last section of the book addresses modern human origins. The paper by Kuman and colleagues briefly discusses late Early Stone Age sites in northern South Africa. While these sites are important for discussions of local culture history, this paper would have been more appropriate in a regional journal.

Genetic issues surrounding modern human origins are reviewed by Soodyall and Jenkins. One issue that is slowly 'heating up', but is not touched upon by these authors, concerns the role of mutation and gene drift versus natural selection in determining mtDNA diversity. Most palaeoanthropologists believe that natural selection plays no role, despite a growing number of papers arguing the contrary. Perhaps the most forceful of these appeared recently with a provocative title in *Science* (Bazin *et al.* 2006). Only time will tell whether the foundations of the 'Eve hypothesis' rest on sandstone or sand.

Conard's paper shifts the discussion from genetics to archaeology. He shows that many of the traits of the African Middle Stone Age (MSA) that are touted as early evidence for behavioural 'modernity' also occur in the European Middle Palaeolithic (MP), often in contexts that predate the presence of modern humans.

Both Soressi and Wurz examine stone tool assemblages from the MP/MSA. Soressi focuses on two quasi-contemporary European assemblages – the Mousterian of Acheulian Tradition and the Micoquian, both dating to the late MP but predating the appearance of modern humans. She shows that the technology was innovative and involved advanced planning. Thus, in these regards at least, European Neanderthals display behaviour often reserved for modern humans. Similarly, Wurz shows that the MSA assemblages from Klasies River Mouth are anything but static over time, again suggesting that 'pre-modern' hominins display more innovativeness in their technologies than many of us would grant them.

Marean asks how it is that a species adapted to the African tropics could out-compete a hominin that had survived successfully for millennia in glaciated Europe. Marean's conclusion (p. 355):

Neanderthals evolved ... a bio-behavioural faunal exploitation strategy that was high risk, high return and more focused on pursuit of larger mammals than later-appearing modern humans. Modern humans evolved in Africa a strategy that was more general-

ised and based on technological flexibility coupled to knowledge transmission through language. When these populations came into contact, [Neanderthal] ... behavioural flexibility was simply insufficient to adapt this new system of behaviour in its entirety. Because of that, they failed to compete effectively for food and went extinct.

What is interesting about this model, and others like it, is that Neanderthal extinction is envisioned not as the result of a superior being sweeping across Europe exterminating the dim-witted natives but as the outcome of socioeconomic competition between two successful adaptations that differed in terms of their efficiencies or levels of risk.

Marean also points to an interesting issue that he dubs 'the Neanderthal paradox'. How did Neanderthals cope with the hardships of winter in glaciated Europe, lacking the technology to render grease from bones? Modern Arctic foragers gain vital non-protein calories from bone grease. In the absence of pots, these peoples depended heavily on hot-rock boiling, a technique that produces vast amounts of fire-cracked rock. But fire-cracked rock is rare to non-existent in European MP sites. Marean suggests an answer to the paradox: Neanderthals ate pulverized bone to obtain needed lipids, in the process offsetting the calcium deficiency that likely accompanied a high-protein diet. Indeed, there is a major paradox here. Either Neanderthals had a metabolic system unlike that of modern Arctic foragers or they had to obtain at least 65 per cent of their calories from non-protein sources (fat or carbohydrates). During winter in the Arctic this can be difficult. Extended consumption of protein above 35 per cent of calories is debilitating, often lethal. Eating brains and marrow are effective ways used by modern foragers to obtain fat. However, these sources are often inadequate and grease-rendering is a major supplemental source. Hunting marine mammals is another, trading with coastal groups for blubber and oil yet another. None of these were options available to Neanderthals. Thus, Marean's suggested alternative, consuming pulverized bone, is worth considering. But perhaps there is another alternative; eating stomach contents of reindeer and other terrestrial mammals. This practice was common among modern circumpolar foragers (Eidlitz 1969). Rumen contents are an abundant source of partly predigested carbohydrates. Unfortunately, we lack quantitative data on the practice. The suggestion runs counter to the nitrogen-isotope signatures of Neanderthals which point to a strongly carnivorous diet (Lee-Thorp & Sponheimer 2006). Curiously, recent maize-dependent Pueblo Indian farmers from the Southwestern USA yield nitrogen values that overlap those of Neanderthals (Schoeninger 1995, 91). Is this an

artefact of differences in nitrogen metabolism between cold glacial environments and hot arid ones, or were Neanderthals less carnivorous than the isotope data seem to suggest?

Four of the papers deal with the dating and stratigraphic integrity of South African MSA sites that contain Howieson's Poort and Stillbay (Still Bay) artefacts thought by many to denote the emergence of modern human behaviour. Henshilwood, Jacobs and Tribolo and colleagues present detailed arguments that place Howieson's Poort and Stillbay on firm chronological footings. And based on their work there seems little doubt that the artefacts in question from Blombos (incised red ochre, shell ornaments, bone tools) are *in situ*. Parkington and colleagues discuss the site of Diepkloof, noting the presence of incised ostrich eggshell, including one fragment of a water bottle not unlike those used by recent Kalahari hunter-gatherers.

Williamson looks at subsistence practices of MSA foragers, inferred from residues of plants (starch grains, fibrous tissues), animals (collagen) and ochre on stone tools from Sibudu Cave (South Africa). The potential of these methods is enormous, but the article is too brief, leaving me wondering about the taphonomic complexities that might confound her seemingly direct interpretations. Also missing is a clear link between her results and the larger evolutionary questions addressed in the volume.

Ornaments play a prominent role in our attempts to pinpoint the emergence of symbolic capacities in MSA hominins. Vanhaeren, focusing on the evolutionary significance of ornaments, illustrates an interesting approach to this: she looks to ethnography to grasp the range of contexts and functions served by beads. She concludes by noting that African beads are commonly of the disc-shell variety, and often standardized, whereas European beads are diverse in types and distribution. These broad differences suggest to her that the former served as media of exchange in contexts of gift-giving, while the latter may have been markers of corporate or individual identity. These are interesting ideas that I hope Vanhaeren will pursue in the ethnographic realm, in order to see if there are statistically robust cross-cultural regularities in the use of beads that might serve as a basis for modelling ornament use in the past.

Finally, Lewis-Williams offers a neuropsychological model to account for the fact that cave art flourished among modern humans in Europe 40,000–35,000 years ago while contemporary Neanderthals selectively borrowed certain traits from their 'neighbours' yet failed to borrow or emulate others, particularly cave art, but also elaborately carved bone, antler and ivory, and ornate burials. At the heart of Lewis-Williams's argument is

the view that the two hominins had different types of consciousness, Neanderthals only 'primary' consciousness, modern humans 'higher-order' consciousness. Lacking the requisite mental faculties, Neanderthals had no spirit realm, no belief in an afterlife. They were intelligent but not human. What Lewis-Williams offers is a counterpoint to the many papers that explain Neanderthal demise as an economic or demographic phenomenon, in which moderns out-compete intelligent archaics by dint of better technology or organization. Aside from the obvious problems of testing Lewis-Williams's model, it worries me to condemn Neanderthals to such a dim-witted lot in life on the basis of so little hard evidence. Using that logic, one should conclude that much of the Old World during the Upper Palaeolithic was occupied by dim-wits who lacked the mental hardware needed to qualify them as human. Before I sign on to such a view, I would like to see a model that accounts for the *absence* of cave art, elaborately carved bone and ornate burials in much of the Late Pleistocene Old World, not to mention the absence of art and elaborate burials in much of North America prior to the mid-Holocene. Something else is at work to turn these sorts of behaviours on and off that has nothing to do with mental faculties.

There is much to think about in this book. Despite a few disappointments and a few omissions, the collection is excellent, adding on many fronts to our understanding of human evolution. The editors, the authors and the press all deserve congratulations for a valuable and timely contribution.

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