



FIG. 1. The "breadth" of Cape fur seal distal humeri in the samples from Elands Bay Cave, Nelson Bay Cave, and successive units at Klasies River (Singer and Wymer excavations). In each plot, the vertical line near the center is the median, the open rectangle encloses the middle half of the data (between the 25th and 75th percentiles), the black bar is the 95% confidence interval for the median, and the vertical lines at the ends mark the range of more or less continuous data. Circles or starbursts indicate outliers. The number of specimens in each sample is given in parentheses. Samples for which the 95% confidence limits do not overlap differ significantly at the 0.05 probability level or below. The hatched bar indicates the range for known 9-month-olds.

would we differentiate the resource-intensification explanation from the neural one? The neural hypothesis could explain the technological advance, does not have to explain why similar resource intensification failed to occur during previous periods of comparable population stress, and depends only on the kind of selectively advantageous genetic change that must underlie much of earlier human evolution.

Henshilwood and Marean invoke taphonomy to explain a difference in fur-seal ages between the Klasies River

Middle Stone Age site and a variety of Later Stone Age sites on the coasts of South Africa. The widely dispersed ages at death of fur seals at the Klasies River site suggest human occupation at all seasons, while tightly packed seal ages in the Later Stone Age sites suggest occupation centered on the August–October interval, when 9–11-month-old individuals are commonly washed ashore exhausted or dead and can literally be harvested. Only Later Stone Age people demonstrably had portable water containers in the form of ostrich eggshell canteens, and I have hypothesized that this allowed them to move away from permanent water when young seals or other local resources became less abundant (Klein, Cruz-Uribe, and Skinner 1999). Henshilwood and Marean counter that "the Middle Stone Age seal sample (from Klasies River) spans 50,000 years of seal exploitation, while all the Later Stone Age samples are drawn from much shorter spans of time, most from just 500 years or less of occupation." However, two key Later Stone Age samples—from Elands Bay Cave and Nelson Bay Cave—span roughly 11,000 years each, and they are on different South African coasts separated by more than 700 km of shoreline. If sampling within large time intervals would be expected to increase variability, so would sampling across such great distances. Yet my figure 1 shows that the Elands Bay and Nelson Bay samples both exhibit the same emphasis on 9–11-month-old seals, while the Klasies River sample exhibits a more dispersed pattern, even when it is subdivided among stratigraphically successive units that probably span about the same amount of time as the Elands Bay and Nelson Bay deposits. In this light, a difference in human seasonal movements is surely more likely than taphonomy to explain the observed contrast.

It is rare that archaeological observations all point the same way, and observers must then decide what is pattern and what is noise. To me, the vast majority of observations suggest that a dramatic behavioral change occurred around 50,000 years ago and it was this change that allowed modern Africans to spread to Eurasia, where they swamped or replaced the Neanderthals and other nonmodern people. The biggest obstacle to this idea is that there are few African sites in the 50,000–40,000-year range, and the postulated behavioral shift is predicated mainly on contrasts between sites older than 60,000 years and ones younger than 25,000 years. There is the additional problem that even if additional 50,000–40,000-year-old sites confirm the shift, the reason for it is not established. My own view, stated above, is that neural (genetic) change provides the most economical explanation, but this needs to be tested in the modern human genome.

SALLY MC BREARTY

Department of Anthropology, U-2176, University of Connecticut, Storrs, Conn. 06269, U.S.A. (mcbreart@uconnvm.uconn.edu). 10 VII 03

This paper, with its critique of the "trait-list" approach, is a welcome addition to the discussion of the origin of

modern human behavior. In our examination of the African Middle Stone Age record (McBrearty and Brooks 2000), Brooks and I adopted a list of diagnostic traits for modern human behavior derived from the late Pleistocene European record because, largely for historical reasons, archaeologists were nearly universally agreed that the Upper Palaeolithic of southwestern France was the archaeological yardstick for behavioral modernity. We discussed some of the historical background to this peculiar situation and in fact argued that it was not really suitable for tropical Africa. But the recommendation of Deacon and Deacon (1999) that the African record be accepted on its own terms is difficult to operationalize and opens one up to the charge of special pleading.

Largely because *Homo sapiens* and Upper Palaeolithic technology appear in Europe at the same time, it is possible to assign the different technologies with some confidence to their correct makers: Neanderthals made the Middle Palaeolithic artifacts and *H. sapiens* made the Upper Palaeolithic artifacts. Unfortunately, in Africa the presence of multiple species in the late Middle Pleistocene renders attribution more complex. Recent finds from the Upper Herto Member of the Bouri Formation in the Middle Awash region of Ethiopia (White et al. 2003) show that *H. sapiens* was present there by 160,000 years ago. The Bouri evidence also shows that Acheulian artifacts, usually thought to have been made by *H. erectus*, persisted there until 160,000 years ago (Clark et al. 2003). Redating of the Kapthurin Formation in Kenya (Deino and McBrearty 2001) shows that Middle Stone Age artifacts, usually attributed to *H. sapiens*, appeared there before 285,000 years ago. There is therefore a temporal overlap of 125,000 years between the two traditions. Furthermore, Acheulian and Middle Stone Age occurrences in the Kapthurin Formation are interstratified (Tryon and McBrearty 2001). Chronological control for this period in Africa needs improvement, but *H. helmei* and perhaps late survivors of the more archaic *H. rhodesiensis* may have shared the Middle Pleistocene East African landscape with early *H. sapiens*. We do not really know whether the artifact arrays at the Kapthurin sites represent different aspects of a single, flexible technological tradition or were made by separate hominid groups, each with its own distinct technology, occupying the region intermittently.

How might we decide which, if any, Middle Pleistocene hominid group was behaviorally modern? The two features that Henshilwood and Marean favor as telltale signs of modern behavior are external symbolic storage and the use of style to negotiate group identity. As with most of the thorniest problems in archaeology, the difficulty is in linking theoretical criteria with observational data. External symbolic storage may be the easier to recognize. The best examples so far in the Middle Stone Age are Henshilwood's own find of incised ochre at Blombos, South Africa (Henshilwood et al. 2002), and the elaborately carved bone points from Katanda, Zaire (Brooks et al. 1995), both dated to > 70,000 years ago. Watts (2002) has argued for a symbolic rather than a utilitarian function for red ochre, and if we accept that, sym-

bolic behavior mediated through the use of red ochre was present in Africa as early as 285,000 years ago and certainly by 230,000 years ago (McBrearty and Brooks 2000, Barham 1998, Barham and Smart 1996). The presence of style is a tougher nut to crack. Does the presence of different styles of projectile points in the African Middle Stone Age signify regional ethnic identities or simply independent technological trajectories in widely separated human groups? Here the problem of the long time span of the Middle Stone Age and the relatively small number of well-dated examples is particularly acute.

My own belief is that the cognitive capacity for modern behavior was present in earliest *H. sapiens* but that it took a few hundred thousand years to put together the package that we now recognize as modern behavior. How and why the speciation event leading to *H. sapiens*, with its accompanying cognitive change, occurred is a question that has yet to be addressed by paleoanthropologists. In contrast to Henshilwood and Marean, I believe that technological complexity itself is an indicator of modern behavior because it implies the presence of social learning. As Henrich and McElreath (2003:124) put it, "Foraging, as it is known ethnographically, would be impossible without technologies such as kayaks, blow-guns, bone tools, boomerangs, and bows. These technological examples embody skills and know-how that no single individual could figure out in his lifetime." The body of knowledge that a society accumulates over its history, combined with an ability to adapt to novel situations if required, allows one generation to build upon the experience of its precursors (Alvard 2003, Tomasello 1999, Boyd and Richerson 1985). The transmission of complex knowledge across generations and the spread of innovations are seen as key to modern human culture (Laland and Hoppitt 2003), but we must develop appropriate criteria and accumulate sufficient field data to recognize innovation and to determine when the behavior we observe is complex enough to be deemed "modern." That is the task ahead.

JOÃO ZILHÃO

*Departamento de História, Faculdade de Letras de Lisboa, 1600-214 Lisboa, Portugal (jzilhao@netcabo.pt). 6 VII 03*

Human societies 30,000 years ago were clearly different from those of ca. 100,000 B.P. Thus, it is appropriate to refer to the changes that occurred across the intervening time period as a "revolution." In the framework of the mitochondrial-Eve paradigm, this revolution came to be explained as a by-product of the emergence of anatomically modern humans. Henshilwood and Marean accept this framework and seek to show how the difficulties encountered by the various biologically based models of the origins of "behavioral modernity" relate to the use of Eurocentric trait lists. Their observations are all pertinent but fall short of recognizing that the real problem is that (1) archeologically visible behavioral criteria designed to include under the umbrella of "modernity" all

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