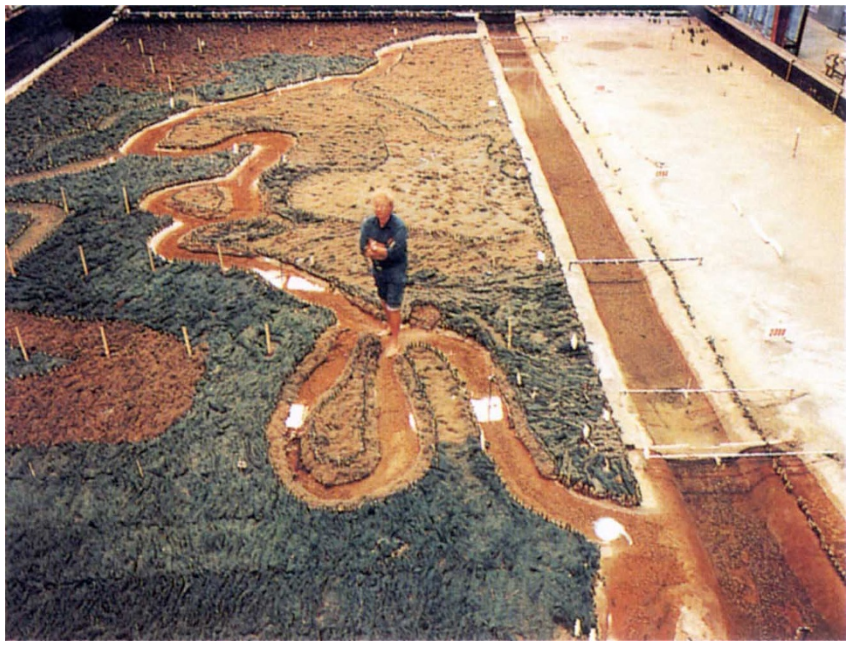
Humans and climate

Ian Tattersall

Children of the Ice Age. By Steven M. Stanley. *Harmony: 1996. Pp. 278. $24.95.*

Paleoclimate and Evolution, with Emphasis on Human Origins. By Elisabeth S. Vrba, George H. Denton, Timothy C. Partridge and Lloyd H. Burckle. *Yale University Press: 1995. Pp. 547. $85, £60.*



MODEL of the Kissimmee River, South Florida, as used by engineers and ecologists at the University of California at Berkeley to simulate restoration of this river–floodplain ecosystem. From *Humanature*, a collection of evocative photographs reflecting our relationship with nature. University of Texas Press, $60 (hbk), $29.95 (pbk).

ARE modern humans the chance result of vagaries in climate that afflicted the African continent more than 2 million years ago? This question has long been debated by palaeoanthropologists, especially during the 20 or so years since Elisabeth Vrba, the principal editor of *Paleoclimate and Evolution*, first linked events in early human evolution to an episode of arid climate that she saw reflected in bovid fossil assemblages from early hominid sites in South Africa.

Vrba and her co-editors have now assembled a huge team of contributors, ranging from palaeoceanographers through glacial geologists to palaeoanthropologists, to examine the evidence for climate change following the early Miocene and its putative relationship to evolutionary events. The result is a mine of authoritative information, some of it new, which will certainly become a primary reference for everyone concerned with palaeoclimatology and evolution in the period addressed. Virtually all of the records that can be used as proxies of past climate are discussed, although the volume has a distinct African bias and tilts towards marine microfossils and especially terrestrial macrofossils, most notably hominids. There is also some interesting repetition, as different authors weigh more general information in relation to their pet systems.

Virtually all lines of evidence point to a stepwise deterioration in climate since the mid-Pliocene (and even earlier); and it seems fairly well established that, even at its coldest, world climate before about 2.5 million years ago (Myr) was warmer than that of today. Around that time there was a cooling event. This had a significant influence on the more cold-intolerant elements of the world's biota; so significant, indeed, that although the next major climate downturn at about 1.8 Myr was more severe in absolute terms, its biotic effects were far more muted because faunas had already been 'winterized'. Even so, the contributors to this volume are far from unanimous about the exact size, timing and effects of the ±2.5 Myr event (for which the record is particularly spotty on the African continent); and they agree even less about whether or not it provides conclusive evidence for Vrba's faunal "turnover pulse" hypothesis, which she fine-tunes in this volume.

One who has no doubts whatever about the relevance of this event to human evolution is the invertebrate palaeontologist Steven Stanley, whose *Children of the Ice Age*, aimed at the general reader, is constructed around the notion that early "ape-men" were awoken from long evolutionary stagnation by the shrinking of the African forests that this episode of cooling and aridity entailed. Forced out on to the expanding open savannas, these unfortunate creatures gave "catastrophic birth" to our own genus, *Homo*. Although Stanley starts out a little smugly, he soon moves on to a smoothly flowing if perhaps overconfident account of the climate record and associated topics, and to a discussion of savanna ecology, the dangers that awaited early *Homo* in its new habitat, and the various components of what he identifies as the "adaptive complex" of this genus. As a result, his book, if questionable in the odd detail, makes a fine supplement to more conventional popular accounts of human evolution.

To discuss the origins of the genus *Homo*, of course, one has to know what *Homo* is. It has been clear for a long time that the fossils generally attributed to the early species *Homo habilis* are an oddly assorted lot, combining a variety of brain sizes and cranial and postcranial forms. Clearly, more than one hominid species is represented; yet palaeoanthropologists have been unable to agree how the fossils involved should be divided up. Both Stanley and Philip Rightmire (in Vrba's tome) indicate a way out of this impasse.

Stanley rejects classical *homo habilis* from Olduvai Gorge outright, choosing *Homo rudolfensis* from Kenya's East Turkana (notably the famous cranium ER 1470, and putatively associated 'advanced' postcranial bones) as the ancestor of later hominids. Rightmire goes even further, agreeing with Ron Clarke, who has independently concluded that the fairly large-brained type specimen of *homo habilis* from Olduvai Gorge should be associated with 1470 *et al.* In that case, *Homo ergaster* from East Turkana, the first hominid definitely known to be of substantially modern body form, did not spring fully fledged from a primitive-bodied ancestor exemplified by the bulk of the '*habilis*' specimens from Olduvai. Instead, it evolved (more satisfyingly) from a modestly brained hominid whose postcranial skeleton is poorly known but evidently showed advances in our own direction. The appropriate name for this species is *Homo habilis*, whose earliest representative may be a mandible from Malawi (provisionally) dated to 2.4 Myr.

This is an exciting possibility indeed, and, if correct, will inevitably re-concentrate attention on the ±2.5 Myr event and its possible role in the origin of our own lineage. In this fast-moving field, both of these books, dissimilar as they may be, are important progress reports. □

Ian Tattersall is in the Department of Anthropology, American Museum of Natural History, New York, New York 10024, USA.