The Cradle of Humanity

How the Changing Landscape of Africa Made Us So Smart

In Mark Maslin's new book, Andrew Robinson discovers a link between Neolithic villages and the average Anglican church congregation, and why *Homo sapiens* should really be called *Homo dominatus*.

The Kenyan palaeoanthropologist and conservationist Richard Leakey, son of the great archaeologists Louis and Mary Leakey, kicks off with a fighting foreword to Mark Maslin's study of the perennially controversial subject of human evolution. 'We humans are indeed the result of biological evolution,' writes Leakey, whose archaeological team famously discovered in 1984 at Kenya's Lake Turkana the so-called Turkana Boy: a nearly complete fossil skeleton of a hominin youth from the species *Homo erectus*—'upright man'—thought to be 1.8 million years old. 'I stress this because even now in this century, countless allegedly learned men and women, active in science, speak of the "theory of human evolution". Surely—and this book fully attests to this—the evidence for evolution such as fossils, dates, archaeology and countless re-evaluations leading to refinements in the data sets are now so comprehensive and consistent that the idea of the "theory" can be discarded entirely and permanently.'

Maslin is not an archaeologist. He is a professor of geography and of climatology and environmental sciences at University College London, the author of *Climate Change: A Very Short Introduction*, a book published in 2013 that is already in its third edition. But he has worked extensively among the mountains and lakes of East Africa's Rift Valley, in which Homo sapiens is generally agreed to have evolved about 200,000 years ago, from there migrated into the Middle East some 120,000 years ago and subsequently spread into Europe, Asia, Australia, and eventually North and South America: hence the title of his book, *The Cradle of Humanity*. Most of it is therefore taken up with discussing possible environmental influences on human evolution, such as ocean currents and rainfall patterns, plate tectonics and mountain building, and also celestial mechanics—that is, the constantly changing orientation of Earth in respect to the Sun that creates the seasons. All this material puts human evolution 'into a larger picture, a context that is increasingly understood but seldom talked about in popular texts', notes Leakey. 'I have found that many of the concerned questions that have been put to me over 40 years of public lecturing are now answered in this one book.'

Challenging read

I am tempted to agree with Leakey. However, it has be said that some parts of Maslin's book will be a challenging read for anyone unfamiliar with earth science, notwithstanding its numerous helpful maps, diagrams, and tables, and its substantial separate boxes explaining, for instance, the complex methods that have to be used for dating human fossils or the El Niño-Southern Oscillation controlling water temperatures in the Pacific Ocean. Moreover, many of the 'answers' hopefully mentioned by Leakey should in reality be termed 'competing hypotheses', as Maslin would surely be the first to admit.

For example, in a passage characteristic of the book's approach, he writes that: 'Different species or, at the very least, different emerging traits within a species, could have evolved through various mechanisms, including the turnover pulse hypothesis, aridity hypothesis, variability selection hypothesis, or allopatric speciation'—all of which the author has earlier introduced to the reader. He then argues that such evolution is exemplified in the case of *Homo erectus*, in the form of its changes in life history (shortened inter-birth intervals, delayed development), pelvic morphology, body size, and dimorphism, as well as its shoulder morphology that enabled the use of projectiles, adaptation to long-distance running, ecological flexibility, social behaviour, and a new stone tool kit that allowed the processing of food. 'Each one of these traits could have been forced by a different evolutionary mechanism operating at a different part of the environmental cycle. So what is emerging from our new understanding of the hominin fossil record and the palaeoenvironment of East Africa is a much more complicated and rich picture of how our species evolved.'

The reasons for the evolution of the large brain in *Homo sapiens*—modern humans—are of course central to the book. Chapter 8, 'The social brain', is perhaps its most easily accessible section, and of particular interest to archaeologists. The reasons are not at all obvious, as Maslin and many others have observed, given that a large brain has a lot of drawbacks. In the first place, giving birth to offspring with a large head is difficult and dangerous for both the mother and her offspring. Unlike in the birth of a chimpanzee, a hominin baby—probably beginning with Homo erectus—undergoes two 90-degree twists in the birth canal as a consequence of its large head and is usually born facing its mother's bottom, with the risk that it may become entangled in its umbilical cord when the mother twists the baby to face her

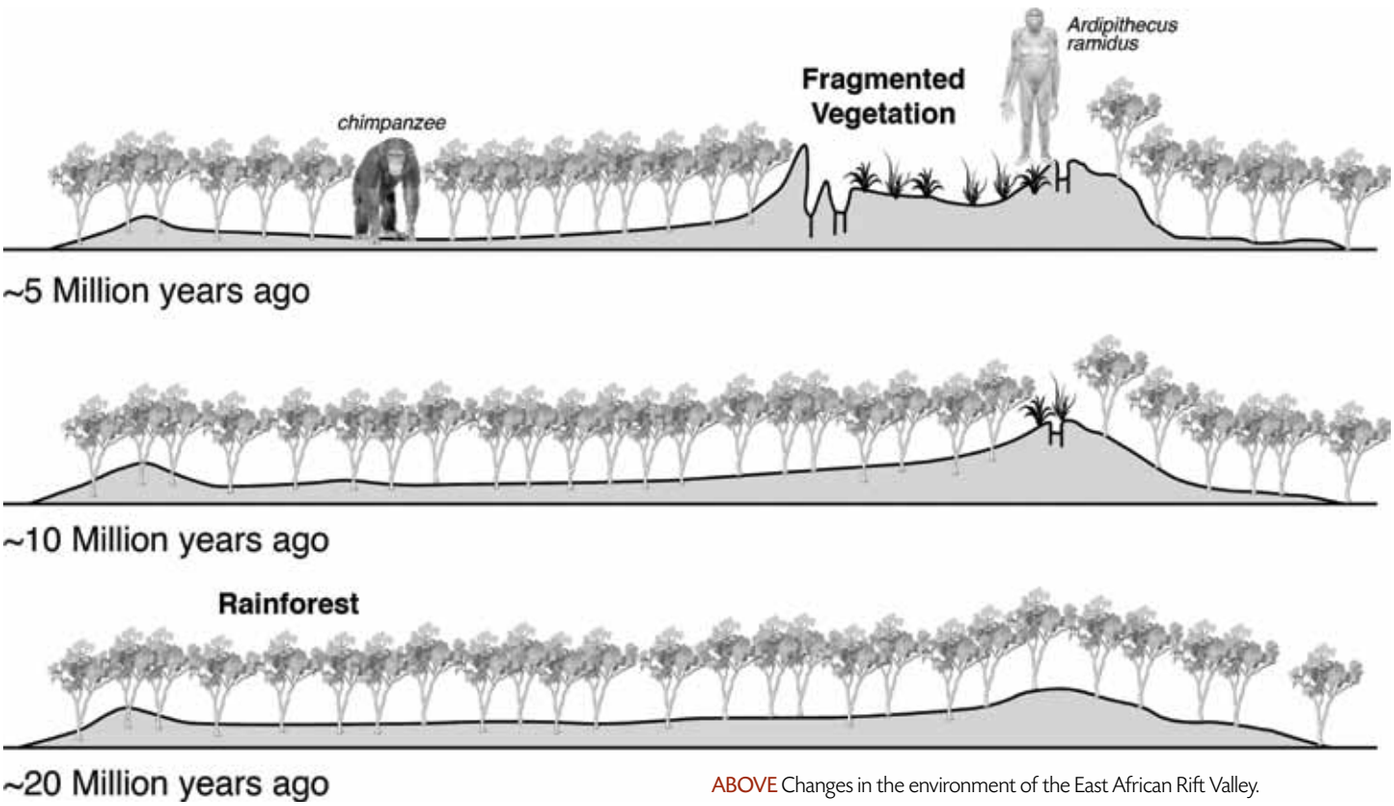

IMAGE Oxford University Press

ABOVE Changes in the environment of the East African Rift Valley.

breast for suckling. Secondly, a large brain uses more energy than a small one and therefore requires a large amount of food. Thirdly, it frequently malfunctions.

A social brain

The main argument in favour of the large brain used to be that it was believed to be essential for the making and employment of tools—until it became clear to scientists that many animals make and employ tools, and must have done so at a date much earlier than the Homo genus. So the tool-making argument has now been replaced by the so-called social brain hypothesis, particularly advocated by the anthropologist Robin Dunbar and his Oxford University colleagues, and embraced by Maslin. As he puts it, this hypothesis 'suggests that enhanced cognitive ability would provide the ability strongly to influence groups or tribes of hominins, and hence control the distribution of resources, and thus it would be strongly selected for, driving brain expansion in hominins.' According to Dunbar's research, the typical number of members in a hominin social group or tribe has proved to be remarkably constant: about 150 in, for example, Neolithic villages (6500-5500 BC), villages in the Domesday Book (AD 1085), modern hunter-gatherer societies, Anglican church congregations, or Christmas card distribution lists.

To get the social brain hypothesis across to his first-year UCL undergraduates, Maslin asks a set of simple—admittedly 'very mean'—questions to individuals who repeatedly come late to his lectures, deliberately putting them on the spot in front of the entire class of 130 students. How are you? Do you like my class? Do you like this person sitting in the second row? Do you think he or she would go out with your friend sitting next to you? The last question is obviously the most challenging, because the latecomer has to work out an answer based on his/her relationship with the lecturer, his/her friend, the person sitting in the second row and all the other students—all within milliseconds. Nine times out of ten, the individual resorts to humour to survive the discomforting situation. 'So social groups are complex, with high stress levels, because the rewards are high', comments Maslin.

In the final chapter, 'The future of humanity', he argues, after dwelling on the meaning of the Anthropocene and the evidence for human-induced climate change, that humanity has not only become a 'geological superpower' but has actually taken control of evolution by becoming progressively smarter, using its large social brain. 'We have named ourselves Homo sapiens', meaning 'wise person', he remarks with heavy irony. 'Maybe *Homo dominatus*', meaning 'tyrannical person', would be more suitable, he proposes. Only if we now learn to take our environmental impacts on the Earth seriously, can we earn our self-selected cognomen. But whatever the future holds for us, 'we have come a long way from our cradle in East Africa', the book concludes. Anyone who reads *The Cradle of Humanity* will certainly be enlightened about this awe-inspiring journey. ◘

Andrew Robinson is the editor of The Scientists, Thames & Hudson, 2012

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