

Astronomy and Empire in the Ancient Andes: The Cultural Origins of Inca Sky Watching

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REVIEW

that it is still customary for new publications in this field to cite, or even to quote verbatim, from Darwin's principal works *On the Origin of Species* and *The Descent of Man*. For more than 100 years Darwin's account of the mechanism of biological evolution through natural selection has required little revision: the deciphering of the genetic basis for inheritance and the recent shift in emphasis away from group selection to focus on the determinants of individual reproductive success are among the few substantive developments to have occurred this century. It is curious, then, that Robert Foley in *Humans before humanity* devotes considerable resources (both of the intellectual kind, and of the 'dead tree' variety) to an extended apologia for Darwinism. A possible solution to this conundrum is offered below, but first to the puzzle of the book's title.

The children's riddle 'Which came first, the chicken or the egg?' is answered, perhaps pedantically, by 'A different kind of chicken'. Foley's 'humans before humanity' are the several different kinds of human-like fossil species, some of which are ancestral to and others close cousins of the surviving human species *Homo sapiens*. Foley defines three hierarchically nested levels or grades of human-ness: the hominoids (a category that includes all apes and humans), hominids (the bipedal apes — the so-called 'humans before humanity') and the real or true humans, who alone possess humanity. I am here giving very short shrift to what is an extended account, for it is not until a third of the way through the book that the author reveals the true identity of his 'humans with humanity'. Initially I dismissed this academic equivalent of the strip-tease as a narrative device: it recalled for me the moment in Jerome K. Jerome's *Three Men in a Boat* when the reader belatedly realizes that Montmorency, the unaccountably fourth member of the expedition, is in fact a dog. However, Foley's intent is more serious, as he seeks carefully to discern in the mosaic that is human evolution, certain key adaptations that can be used to characterize and explain first the initial emergence of hominoids and then the relatively late appearance of modern humans.

The key anatomical adaptation shared by early hominids was the ability to walk bipedally, while that of modern humans is a large and powerful brain. Foley reviews several alternative hypotheses before favouring an ecological explanation for the origin of bipedalism as an efficient and less thermally stressed mode of locomotion for apes that need to traverse the equatorial grassland habitat. The pivotal innovation of increased brain size, or encephalization, illustrates a concept that is a major theme of the book, that both costs and benefits must be considered when explaining adaptations. That there is no such thing as a free lunch in evolution is demonstrated starkly if one considers the energetic cost of developing and maintaining a large and

complex organ like the human brain, which consumes prodigious amounts of energy regardless of whether its owner is at work, rest or play. In the penultimate chapter of the book Foley investigates the complex inter-relationships between ecology, sociality and intelligence. Only humans, it seems, have been able to find and sustain the unique combination of heightened cognitive ability, complex and intense sociality and the exploitation of food resources of sufficiently high nutritional value to fuel the metabolic requirements of a big brain.

Foley dodges the thorny problem of culture until the last chapter. It is possible, as Foley and many writers before him have done, to give an account of the biological evolution of humans that parallels but does not interact with the history of human cultures. From the perspective of some anthropologists, natural selection ends when culture begins, but Foley explicitly disavows the fashionable and Eurocentric belief that language and cultural complexity emerged in a symbolic explosion 40,000 years ago. Foley argues that Darwinian evolution extends to the abilities and propensities that underly such behaviours as symbolic communication, technological innovation and the capacity for teaching and learning and he suggests that the humans before humanity possessed culture. Although Foley does not elaborate on this theme, his enthusiasm for the nascent disciplines of human behavioural ecology and evolutionary psychology may explain why so much of the first part of the book is devoted to the exegesis of the central tenets of Darwinian thought.

For the archaeologist whose interests are focussed on material culture there will be little of familiarity and even less of comfort in the ideas expressed in this book. But for those whose business is the study of the human species, and for anyone who has ever wondered how it was that an average sized African mammal ever reached the point where it could name itself *Homo sapiens*, there is much food for thought to be found in its pages.

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Andean civilization is best known for the Inca empire and from descriptions that Spanish chroniclers

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