

inquiry of that kind would demonstrate how the methods of science thus defined can accomplish its goals.

So there is no possibility, in principle, of replacing traditional epistemology with naturalized epistemology. The whole enterprise is rooted in a category mistake. Somewhat more subtle but no less mistaken is the very idea that the empirical study of cognitive processes could be successfully pursued in the absence of the epistemic standards that cognitive systems must instantiate in order to qualify as rational. We cannot know which cognitive processes are rational without an adequate conception of rationality, which presupposes a philosophical defense. Traditional philosophy, like traditional epistemology, has nothing to fear from those who confound philosophy with psychology, or rationality with cognition.

Acknowledgment

It has been my pleasure to co-author with Robert Almeder a glossary, which those who want to pursue these issues may wish to consult (Fetzer & Almeder, 1993).

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Upright: The Evolutionary Key to Becoming Human by Craig Stanford. Houghton Mifflin, 2003. 224 pp. \$24.00 (hardcover). ISBN 0-618-30247-6.

Lowly Origins: When, Where and Why Our Ancestors First Stood Up by Jonathan Kingdon. Princeton University Press, 2003. 408 pp. \$35.00 (hardcover). ISBN 0-691-05086-4.

The relatively singular habit of posturing and parading poised on two feet has long been heralded as the hallmark of humanity. It seems to set apart even a human infant toddler to explore and manipulate its environment in ways that differ from all other organisms. Interest in the evolutionary history of this erect adaptation remains a central theme in the study of human origins and has

recently spawned two new volumes: *Upright: The Evolutionary Key to Becoming Human*, by Craig Stanford, and *Lowly Origins: When, Where and Why Our Ancestors First Stood Up*, by Jonathan Kingdon. Each author approaches the matter from noticeably different perspectives. Overall, one succeeds in providing novel and insightful interpretations about the question, the other falls considerably short of the mark.

Craig Stanford is co-director of the Jane Goodall Primate Research Center and professor of anthropology at the University of Southern California. Best known for his field studies of apes in Africa, he notes that his interest in the origin of bipedalism was initiated by his observations of chimps in the Bwindi Impenetrable Forest in Uganda. Stanford reflects, "I sat down one morning to write a scholarly review paper outlining current thinking about the great ape models of the rise of human walking. As the paper grew toward book length several months later, I realized that *Upright* would be the result." At 178 pages of text in 5.5 X 8.25 inch format it is more a modest booklet, and while it offers sixteen pages of bibliography and further reading, it hardly reflects the outgrowth of a thorough review of the literature on the origin and evolution of bipedalism. In spite of assertions in the publisher's online press release and back cover copy, the book does not offer any novel theories or insights. Instead it tends to perpetuate old clichés and reiterates some new and misleading ones. Furthermore it is riddled throughout with numerous inaccuracies and misconceptions.

On the one hand we are to understand that becoming bipedal made us human, as suggested by the subtitle. Frequently in the book *all* hominids are referred to as "humans." While this may be politically trendy, most anthropologists would restrict that appellation to selected later members of the genus *Homo*. Yet it is also pointed out, and correctly so, that the evidence indicates multiple ways of being bipedal in the hominid fossil record, not all of which lead to humanity. It is the unique synapomorphies that define a clade, in this case humans. Bipedalism *per se* is a symplesiomorphy of humans in the context of a diverse hominid radiation. Even if this were Stanford's intended point, it certainly did not spring to light as a result of his review.

There are perpetuated misrepresentations of history, such as the allegation that human evolutionists focused on the enlargement of the brain. Indeed, many such as Darwin, Huxley, Osborn, Gregory, etc. emphasized the preeminence of bipedalism. There is a shoddy presentation of the principles of evolution. Stanford rejects the possibility that species can undergo evolutionary reversals, characterizing it as "a simplistic understanding of how evolution works," revealing instead his own misconceptions and adding to them by asserting natural selection can act on only one anatomical trait at a time; taking exception to the qualified and common use of the term "transitional" when describing features of the australopithecines (which Stanford himself applies when describing "the transition from them [apes] to us"); invoking indeterminate lag time between behavioral innovations and anatomy; in one breath saying that it cannot be known to what extent a species is molded to its behavior and then in

the next breath asserting that at each evolutionary step the "puzzle" must be fully functional, each piece fully adapted; suggesting that natural selection "experimented" with bipedalism in the case of *Oreopithecus*; and bestowing the status of Law to the frequently misapplied principle of parsimony. In fact, Occam's razor is a heuristic principle that orders the testing of hypotheses, and was never intended as a litmus test of their correctness. Indeed, the increasing recognition of rampant homoplasy and convergence in morphology and molecular data should have driven this message home by now.

There appears an entrenched confusion about the phyletic relationships of monkeys and apes and about the polarity of primitive conditions of their respective locomotor anatomies. Stanford suggests that the earliest apes walked on the flats of their palms and feet as monkeys do (rather than knuckle-walk). Actually the majority of monkeys, particularly Old World monkeys, are to varying degrees accomplished cursors and walk and run in a relatively digitigrade fashion.

Throughout *Upright*, one is confronted with an unbalanced representation of the process and constraints of science and the endeavors of scientists themselves, emphasizing allegations of nationalism, bias, gullibility, rancorous and nasty academic debates, reasonable retrospective guesses, etc. That such distractions exist is an undeniable fact, but to pander to what has become a stereotype of paleoanthropology in the popular press is disappointing.

As too frequently occurs, the preeminence of naturalistic explanations gets overextended to polemic critiques of belief systems regarding the inevitable outcome of human evolution. I find it curious that authors, under the guise of science, feel compelled to browbeat the public with their personal philosophical -isms, which fall squarely outside the purview of science. It is even more annoying when they go to commit their own teleological faux pas, for example, "H. habilis and several close relatives were still quite apelike, but they had taken a small step toward humanity . . .".

A common trap that is fallen into repeatedly throughout *Upright* is the assumption that early hominids are intermediate on a direct line between chimps and humans. This fails to recognize that chimps have experienced five to seven million years of evolution and are themselves derived relative to the last common ancestor of chimps and humans. In this regard, for example, the discussion of evolution of the hip is confused and inaccurate in both its treatment of anatomy and function and its implication that the human hip came into being by simply remodeling the existing chimp pelvis.

Another fallacy is the notion that hominids set out on intentional migrations due to their newly innovated mobility. Phrases like "long hike" and "voyages" are plainly and simply misleading. The use of the word "migrate" conjures images of an intentional trudging over the horizon to occupy unexplored regions in some predetermined destination, when over the timeframes involved it much more likely represents a gradual expansion of a species home range throughout a contiguous habitat. *Homo erectus* is characterized as a "highly practiced

long-distance walker" due to its dispersal throughout the warmer regions of the Old World. When it is recalled that this expansion of range may have been accomplished over a period of many tens of thousands of years, if not hundreds of thousands of years, it is perhaps premature to label these early hominids as marathon walkers/runners on the basis of narrow hips and long legs. In the absence of all but a single element from the foot skeleton, there is little support for a modern human-like endurance running and walking gait in this hominid.

This misconception likely stems from the pat acceptance of the interpretation of the much older Laetoli footprints as being "obviously human." If a human is any bipedal hominid as Stanford initially implies, then, yes, the Laetoli hominid footprints are "human," i.e. left by a bipedal hominid. However, they do not show a fixed arch. Stanford fails to make the distinction between a series of footprints that occasionally show an arch and a foot possessed of a fixed arch. A chimp foot may transiently exhibit an arched posture and leave its signature in a selected footprint, but there is a lack of consistency from print to print, some being patently flat or even exhibiting signs of midtarsal flexibility.

Of personal interest is a passing reference to legends of Bigfoot, which are cavalierly dismissed as cultural memories of encounters with *Gigantopithecus* by earlier generations of modern people eons ago. Despite broaching the topic, no effort is expended to explain how such recollections account for the persistent eyewitness, trace evidence, and physical evidence that suggest the contemporary existence of such a giant ape.

Jonathan Kingdon is a renowned biologist and artist, probably best known for his acclaimed *Atlas of Evolution in Africa* and for his colorful renderings of the masked monkeys, the guenons. He is a senior research associate at the Institute of Biological Anthropology and the Department of Zoology at Oxford University. *Lowly Origins* captures and conveys the enchantment of scientific exploration and interpretation with grace and insight frequently uncharacteristic of popular treatments of human origins. If that representation is too idealistic it is nevertheless refreshingly so.

Kingdon echos a touted theme of Upright—the recognition that continuing discoveries reveal a hominid tree much bushier than historically conceived. But Kingdon goes further and roots the bush within the context of the evolving habitats of African geology and ecology in a manner I have not seen accomplished previously. He crafts a so-called self-portrait by successively considering the landmark innovations that shaped our lineage to the present, that have left their historical trace on our person, as we have left our lasting imprint upon the landscape. He deftly and reasonably speculates on the scenarios of natural selection acting upon distinct species of apes, including emerging humans, seen as part of a biological community rather than apart from it. Diversifying in isolated basins, the ground apes usurp available niches and expand from their coastal cradles along discrete river drainages into the interior of Africa.

Kingdon by and large avoids the pitfalls of oversimplification and outright misconception that ensnare numerous attempts to portray to an unspecialized

audience the complex pathways traced by these lineages. For example, he is much clearer on the phyletic relationship between monkeys and apes, rather than portraying them as sequential rungs on a linear scale of nature. He avoids losing sight of the obvious, a condition too often suffered by the polemicists. For example he remarks, "It is also very unlikely that bipedal walking induced an instantaneous incompetence for climbing. If modern humans living in forests and with totally inappropriate anatomies can become deft climbers, the protohominines, with their short legs, long arms, and strong hands and feet (and also forest dwellers), had no incentive or need to abandon such a useful skill." He does not routinely accept pat conventional interpretations of fossil hominid specimens or archeological artifacts—credibility is lent to the innovative "killer Frisbee" hypothesis and its proposed explanation of the enigmatic "handaxes" of *Homo erectus*. However, his assessments of aspects of hominid anatomy are inconsistent and sometimes quite unfounded, ranging from the characterization of apes as "four-legged" and an asserted distinction between a straight-legged gait in Lucies and a bow-legged gait in *Australopithecus africanus*. He portrays the foot of *Homo habilis* as less derived, while accepting that the foot of the Lucies resembles modern humans.

There are occasional flirtations with just so stories concerning loss of hair, hygiene, and eyebrows. A sexist streak surfaces in remarks about the "celebrated female taste for a 'neat' male butt" and the "female predilection for play." A closing criticism takes a poke at slavish reliance on religious traditions, but tempers it by coupling educational traditions as well. At least these professions are not those of dogmatic scientism, but do perhaps betray undue trust in science and technology for solutions to human survival.

Upright is a rough hewn, if updated, rehash that contributes minimally to the refinement of dialogue on human locomotor evolution. *Lowly Origins* spawns new thoughts for consideration by integrating fossil hominids (albeit sometimes distorted facsimiles) with innovative perspectives of their contextual landscapes and communities.

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Raincoast Sasquatch by J. Robert Alley. Hancock House, 2003. 359 pp. \$14.95 (paper). ISBN 0-88839-508-6.

Actively curious members of the Society For Scientific Exploration (SSE) should be willing and able to share their working hypothesis and three