

Riddle of the Feathered Dragons: Hidden Birds of China.

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regarding their own research projects. For example, should biologists use toe clipping to mark and recapture amphibians? Should assisted migration be used on thermally challenged species that attempt to migrate in light of global climate change? Should we restore degraded landscapes to historical baselines when endangered species are using them as habitat? Here, he calls on the environmental ethicists to provide a collection of moral heuristics to aid their decisionmaking.

In summary, *Refounding Environmental Ethics* is readable, and Minter's challenge to his readers is important. He clearly identifies substantial problems in the way that environmental ethics is practiced, and he presents a powerful and pragmatic alternative that embraces tools from the social sciences, political philosophy, and conflict negotiation in service of this alternative. Two critical points are worth raising, however. First, I would argue that a cognitive division of labor is needed among this new school of philosophers. Distinguish those who are best at thinking about questions on the nature and objectivity of value from those who are best at thinking about how to evaluate novel moral challenges (e.g., assisted migration) in light of our best normative theories and from others who are best at working in interdisciplinary policy contexts and scientific working groups, providing valuable assistance in the articulation and evaluation of moral aspects of environmental decisionmaking. Of course, some philosophers can seamlessly move among all these areas, but we need not all be doing the same thing. Second, one can endorse a more pragmatic approach and still reject Dewey's particularism. Environmental ethics could embody and pursue a policy that is both relevant and independent of the tradition of American pragmatism.

These criticisms notwithstanding, Minter's book is an important defense of environmental pragmatism and deserves a wide readership. Neopragmatist Richard Rorty once wrote, "Truth is what your contemporaries

let you get away with" (1979, p. 176). Minter, in this important work, refuses to let environmental philosophers get away with policy irrelevance.

Reference cited

Rorty R. 1979. *Philosophy and the Mirror of Nature*. Princeton University Press.

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THE DINOSAUR CONSPIRACY

Riddle of the Feathered Dragons: Hidden Birds of China. Alan Feduccia. Yale University Press, 2012. 368 pp., illus. \$55.00 (ISBN 9780300164350 cloth).

Considering that birds are an intrinsic part of modern daily life and culture, it is not surprising that their evolutionary origin has been the topic of significant interest and controversy. A rapidly growing body of evidence supports the hypothesis that birds are evolutionarily nested within theropod dinosaurs—a group that includes the iconic *Tyrannosaurus* and *Velociraptor* (Chiappe 2009). These data derive from osteological studies, as well as from information about sensory capabilities (Witmer and Ridgely 2009), reproductive traits (Zelenitsky 2006), growth patterns (Erickson et al. 2009), integumentary features (Norell and Xu 2005), and genomic size (Organ et al. 2007). Such overwhelming evidence has led to a broad consensus among evolutionary biologists, who today consider birds to be the descendants of Mesozoic dinosaurs. Any well-substantiated new view that allows us to step back and revisit this established hypothesis should stimulate research and be embraced with enthusiasm, but Alan Feduccia's *Riddle of the Feathered Dragons: Hidden Birds of China* does nothing of the sort. Instead, the book

misleads its readers into believing that the theropod hypothesis hinges on scant evidence and is the empirical equivalent to Feduccia's vaguely presented alternatives.

The author begins by building a conspiracy theory in which the main villains are the cladists, who, like computational shamans, reveal what they see in their character matrices. He disdainfully equates dinosaur paleontology—and paleontology in general—with a second-rate scientific discipline more worthy of tabloids than respected journals. Recognized periodicals such as *Nature* and *Science*, together with their editors, are the alleged accomplices of the indoctrinated cladists, and virtually anyone connected with the view that certain theropods are the most immediate predecessors of birds is painted negatively.

Early in the book, Feduccia tells us that the most important issues are "whether birds are living theropods and whether flight evolved from the ground up rather than from trees down" (p. 23). However, for most researchers, and presumably for this audience, the more important questions are *Who are the closest relatives of birds?* and *How did these animals evolve flight?* This difference in scope sets the book's entire tone, because Feduccia is clearly more interested in disproving the theropod hypothesis than in providing support for an alternative.

We learn soon enough about the author's methodological strategy: "The possibility that one key synapomorphy, if falsified, would reduce all the other synapomorphies to the status of parallelism and hence irrelevant to the debate, should be a lesson to the more dogmatic cladists" (p. 21). This and other statements reveal Feduccia's precarious understanding of the methodology he so despises. Astonishingly, he argues that "cladistic approaches tend to group animals as ecological equivalents (ecomorphs) without any necessary regard to actual relatedness" and emphasizes that the "overarching problem in cladistic approaches has

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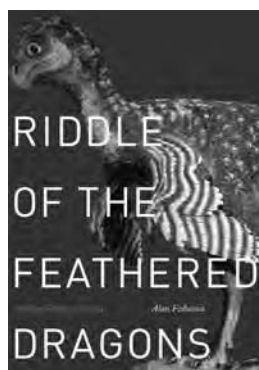
been practitioners' tendency to ignore or dismiss contradictory evidence" (pp. 2–3). Since when has cladistics been a methodology that disregards either relatedness or controversy? Indeed, a fundamental approach of cladistics is the optimization of characters against each other—characters that by nature may provide a contradictory phylogenetic signal!

Throughout *Riddle of the Feathered Dragons*, Feduccia mistakenly equates the origin of birds with the origin of flight and associates the theropod hypothesis with the ground-up view of flight origins. He leads his charge by arguing that a corollary of the current consensus is that "all avian flight adaptations and sophisticated anatomical aerodynamic architecture evolved in a context other than flight" (p. 1). Such a claim, however, ignores abundant arguments that view the evolution of flight-correlated structures as a series of transformations that unfolded over millions of years and spanned the evolutionary transition from nonavian theropods to modern birds (Gatesy 2002). Furthermore, by arguing that the theropod hypothesis presumes that flight originated from the ground up, Feduccia ignores the research that endorses a trees-down interpretation within the phylogenetic context of the theropod hypothesis (Zhang et al. 2002, Xu et al. 2003).

What is basic to the author's argument—and what inspires the book's subtitle—is the claim that certain nonavian theropod lineages (dromaeosaurids, troodontids, oviraptorosaurs, and therizinosaurids) should be reclassified as birds. In this context, regardless of whether these "hidden birds" were flighted like the "four-winged" *Microraptor* or secondarily flightless, Feduccia interprets them as evolutionary divergences between *Archaeopteryx* and living birds. In doing so, he brushes off three decades of phylogenetic analyses (naturally, conducted by cladists!) indicating that these dinosaurs lie outside the clade that includes *Archaeopteryx* and all other birds. The author also dismisses studies indicating that the external integumentary

filaments of a number of Chinese nonavian theropods should be most parsimoniously interpreted as homologous to feathers (Norell and Xu 2005, Zhang et al. 2010).

In addition, resting on Dollo's law of irreversibility, Feduccia questions whether it is "biologically possible to reevolve the already greatly foreshortened forelimbs" of a number of nonavian theropods into the elongate wings of birds. He details well-known exceptions to Dollo's law, but ends by proclaiming, "Certainly 'compsognathid' arms could not reelongate into *Archaeopteryx* wings" (p. 224). No modern study has hypothesized a direct ancestor–descendant relationship between compsognathid theropods and *Archaeopteryx*, but the book is filled with equally unreasonable statements about the limits of evolutionary change.



Riddle of the Feathered Dragons is also strangely infused with lectures on the morality of science. Feduccia scolds editors about how "scandals are sensational, but uncritical editing that permits careless and flawed articles to appear in esteemed journals is more troubling" (p. 10). He warns paleontologists that "if the science of dinosaur paleontology does not embrace a more self-critical ethos, it will degenerate into endless speculations and tabloid sensationalism" (p. 19). Reacting to what he considers to be ideological and unsubstantiated claims that the integumentary coverings of many nonavian theropods are feather homologues, Feduccia quotes Carl Sagan: "Extraordinary claims require extraordinary evidence." But

given the number of publications supporting the theropod origin of birds, a claim to the contrary is what is extraordinary; however, *Riddle of the Feathered Dragons* provides nothing remotely close to the required extraordinary evidence. Ultimately, Feduccia's entire oration about the ethics of science feels empty, in light of how poorly the book applies these moral teachings to its own agenda.

When the book comes to the discussion about the closest relatives of birds (for most of us, the core question), Feduccia presents a vague alternative: Their ancestry can be traced back to either a basal archosaur or a dinosauromorph. Such a hypothesis is so wide ranging that it tells us nothing. Does he think the closest relative is an animal like *Longisquama*? (He remarks on the "birdlike" appearance of this poorly known diapsid reptile, which he considers to be an archosaur.) Or does he think one of the disparate lineages of basal archosaurs (aetosaurs, phytosaurs, and rauisuchians, to mention a few) is actually more closely related to birds? Or are the small bipedal dinosauromorphs, such as *Marasuchus*, those that he concludes to be the bird's next of kin? All of these very different organisms fall within the basal archosaur–dinosauromorph hypothesis that the author so cursorily endorses.

After 358 pages, *Riddle of the Feathered Dragons* fails to support a clear alternative hypothesis of bird origins that counters the consensus of their being the living descendants of theropod dinosaurs. Amid a profusion of unfounded and rhetorical statements that, at times, sound more like divine revelations, Feduccia quotes T. H. Huxley—Darwin's famous "bulldog" and staunch defender of the theropod hypothesis—saying, "a good book is comparable to a piece of meat." If Huxley were alive, I think he would agree that *Riddle of the Feathered Dragons* tastes more like cabbage.

References cited

- Chiappe LM. 2009. Downsized dinosaurs: The evolutionary transition to modern birds. *Evolution: Education and Outreach* 2: 248–256.

- Erickson GM, Rauhut OWM, Zhou Z, Turner AH, Inouye BD, Hu D, Norell MA. 2009. Was dinosaurian physiology inherited by birds? Reconciling slow growth in *Archaeopteryx*. PLoS ONE 4 (10, art. e7390). doi:10.1371/journal.pone.0007390
- Gatesy SM. 2002. Locomotor evolution on the line to modern birds. Pages 432–447 in Chiappe LM, Witmer LM, eds. *Mesozoic Birds: Above the Heads of Dinosaurs*. University of California Press.
- Norell MA, Xu X. 2005. Feathered dinosaurs. *Annual Review of Earth and Planetary Sciences* 33: 277–299.
- Organ CL, Shedlock AM, Meade A, Pagel M, Edwards SV. 2007. Origin of avian genome size and structure in non-avian dinosaurs. *Nature* 446: 180–184.
- Witmer LM, Ridgely RC. 2009. New insights into the brain, braincase, and ear region of Tyrannosaurs (Dinosauria, Theropoda), with implications for sensory organization and behavior. *Anatomical Record* 292: 1266–1296.
- Xu X, Zhou Z, Wang X, Kuang X, Zhang F, Du X. 2003. Four-winged dinosaurs from China. *Nature* 421: 335–340.
- Zelenitsky DK. 2006. Reproductive traits of non-avian theropods. *Journal of the Paleontological Society of Korea* 22: 209–216.
- Zhang F, Zhou Z, Xu X, Wang X. 2002. A juvenile coelurosaurian theropod from China indicates arboreal habits. *Naturwissenschaften* 89: 394–398. doi:10.1007/s00114-002-0353-8
- Zhang F, Kearns SL, Orr PJ, Benton MJ, Zhou Z, Johnson D, Xu X, Wang X. 2010. Fossilized melanosomes and the colour of Cretaceous dinosaurs and birds. *Nature* 463: 1075–1078.

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MASTERING NATURAL SELECTION TO SHAPE A HUMAN SUPERORGANISM

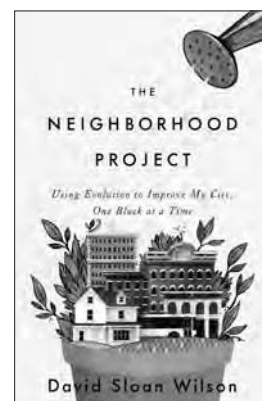
The Neighborhood Project: Using Evolution to Improve My City, One Block at a Time. David Sloan Wilson. Little, Brown and Company, 2011. 448 pp. \$25.99 (ISBN 9780316037679 cloth).

David Sloan Wilson's latest book, *The Neighborhood Project: Using Evolution to Improve My City, One Block at a Time*, is many things. It is

an account of the genesis and early development of the ongoing Binghamton Neighborhood Project (BNP), offered as an inspirational metaphor and a model for academics who want to engage in improving the neighborhoods and cities where they live. It is a personal offering of an evolutionary biologist's efforts to make his own work relevant to his city and the world. It is a collection of stories illustrating the diverse life pathways of people engaged in science (evolutionary or otherwise) and in other ways of making a difference in our world. The book also contains a set of parables drawn from evolutionary studies of the lives of other organisms in an attempt to illuminate our own social lives and culminates in actual "commandments" designed to initiate new behavioral norms. These reformed behaviors are supposed to let us take control of our own evolutionary processes and guide us toward becoming more "virtuous" prosocial group organisms exhibiting cooperation on a planetary scale. In the midst of these ambitious goals, *The Neighborhood Project* is also a curious revival of the long-forgotten and abandoned ideas of the spiritual biologist Teilhard de Chardin and of B. F. Skinner's radical behaviorism. Ultimately, this volume is another brick in Wilson's ongoing project to build an alternative understanding of human social evolution through his particular lens of group-level selection as a driving force of evolution that overrides individual-level selection.

Thus, *The Neighborhood Project* is an ambitious mix of many elements pulled together to service a grand vision. It contains an anthology of well-told stories arranged on a scaffolding that is meant to support nothing short of an inspirational shining city on a hill, where evolutionary biology gives us the tools to control our collective destiny. Wilson is an unusual scientist in that he professes his own humanistic atheism but does not shy away from assuming the mantle of leading us on this spiritual—even religious—quest. He would take us down a new path that is informed by the religion of

naturalistic science in order to transform human society from its current state of disparate groups of individuals engaged in the struggle for existence into a superorganism engaged in planetary cooperation. That is what his vision of evolutionary biology has revealed to him about human nature.



Psychologist Abraham Maslow (1966) famously observed, "I suppose it is tempting, if the only tool you have is a hammer, to treat everything as if it were a nail." In similar fashion, Wilson repeatedly invokes evolutionary biology in order to understand everything in the realm of human society. Is this the only tool we have to examine our world? No, but Wilson is convinced that it can—and must—transform the thinking of everyone from every discipline who aims to understand humanity and solve its problems. More important, this conviction has motivated him to initiate a number of practical efforts that will put the idea to the test in the real world. This application of evolutionary thinking to solving practical problems is the biggest strength of the BNP itself—and therefore, of this book—but the zeal for pushing just one vision is also its greatest weakness.

The impetus for writing *The Neighborhood Project* began when Wilson created the Evolutionary Studies Program (EvoS) at the Binghamton University's New York campus to impart evolutionary thinking to students and scholars from all departments and, in the process, to bridge

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