

## PALEONTOLOGY

# Much Hype and Many Errors

Richard F. Kay

Provocative and entertaining, *The Link* tells the story of a remarkably preserved fossil primate named *Darwinius masillae* and nicknamed “Ida.” The account is related by natural history writer Colin Tudge with Josh Young (who also coauthored *Pure Imagination: The Making of Willy Wonka and the Chocolate Factory*). Tudge and Young describe how Ida became entombed in an ancient lakebed and how it came to light 47 million years later. Apparently unearthed in 1983 near Messel, Germany, the specimen was cleaved in two and each part sold separately. The first part (now called Slab B) went to a Wyoming collector and was illustrated in 1994 (1). The second, more complete mirror-image half (Slab A) recently was sold for a stunning \$750,000 to the University of Oslo’s Natural History Museum, a deal brokered by paleontologist Jørn H. Hurum. Hurum then assembled what he refers to in the book as a “dream team” of other scientists to describe the reunited fossil (2). The specimen is claimed to be the most complete fossil primate ever found—and that is true at least in two dimensions, for it is crushed nearly flat. If we take the third dimension into consideration, other fossil primate skeletons, including some of *Darwinius*’s North American adapoid relatives, are as well or better preserved and have been in the literature since the 1920s (3).

As the title suggests, the authors claim that *Darwinius* is our ancestor and represents a linking form between lemurlike primates and anthropoids (the group to which monkeys, apes, and humans belong). As quoted by Tudge, paleontologists Jens Franzen and Philip Gingerich, two authors of the scientific paper (2), liken Ida’s impact on the world of paleontology to the equivalent of an “asteroid falling down to Earth” (Franzen) and a “Rosetta Stone” for primate evolution (Gingerich).

Indeed, Ida has had the public impact of an asteroid. The debut of *Darwinius* was a media juggernaut: the scientific paper, a public unveil-

ing by New York City’s Mayor Bloomberg, a Web site (4), coverage in *People* magazine, a television special, and the book all appeared within a week. On the day of the announcement, the traffic at the Web site exceeded that for www.sciencemag.org (5). But has this fossil rocked our understanding of primate evolution?

Of the book’s nine chapters, the first three and final are written by Young in a sensational style: “Hurum pulled out one final key card and opened the door... Geffen was stunned.” These parts are the most entertaining or, depending on one’s point of view, disturbing. Ida is a reprise of the seamier side of paleontology: the exploitation, with the complicity of major museums, of our natural heritage for profit. The rising commercial value of fossils in recent years (first “*Tyrannosaurus Sue*”) has dampened scientists’ efforts to find more and better fossils. For the record, most paleontologists obtain their specimens by groveling around on the ground, not by purchasing them at fossil fairs.



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## The Link Uncovering Our Earliest Ancestor

by Colin Tudge,  
with Josh Young

Little, Brown, New York, 2009.  
304 pp. \$25.99, C\$28.99.  
ISBN 9780316070089.

Four of the chapters written by Tudge provide the natural historical context for the fossil. He reviews how the Messel coals formed in an anoxic lake that periodically farted CO<sub>2</sub>, killing the teeming life that inhabited its waters and shores. He provides an accessible, although inaccurate, discussion of the causes and consequences of Eocene greenhouse climates. He attributes much of the decline of worldwide temperatures at

the end of the Eocene to the massive death of aquatic ferns in the Arctic and changing oceanic circulation attendant on the collision between India and southern Asia. But the timing is wrong: those two events occurred some 15 and 20 million years before the onset of our modern “icehouse” world at about 34 million years ago (Ma) (6, 7).

Tudge also offers a tour of primate ecology, behavior, and evolution that is often inaccurate and at times misleading. (For example, he misstates the age of the earliest New World monkey by 6 million years and that of the African anthropoid fossil *Apidium* by 10 million years.) Why are there so many errors? Perhaps because the book had no scientific editor to check facts or demand reviews that would have uncovered these inaccuracies. The book was rushed out, and the whole project from purchase of the fossil up to the media blitz was cloaked in secrecy.

In the chapter “Who and what is Ida?” we get to the heart of the book: where does *Darwinius* fit on the primate family tree? It belongs to an extinct Eocene primate group, Adapoidea (also called Adapiforms). Tudge reports: “Ida reinforces Gingerich’s idea of primate evolution that anthropoids descended from adapiforms. ... tarsiers, so long thought to be the closest living relatives of anthropoids, now are thought to belong on a quite different branch; and so are omomyids, which are clearly related to the tarsiers.”

This is the lemur-anthropoid theory, according to which living lemurs and anthropoids arose in the Eocene from different adapoid lineages whereas living tarsiers are a side group that arose from another Eocene group, the omomyids (8). Insofar as the theory posits an adapoid origin for lemurs and lorises, it is unobjectionable. There is evidence that adapoids are stem members of the lemurloris radiation (9). The theory cannot be true, however, if tarsiers are more closely related to anthropoids than either is to lemurs. And the evidence for a tarsier-anthropoid clade is very strong. Long-known anatomical and develop-

mental evidence has been convincingly reinforced by DNA sequence data and the sharing of SINEs, short segments of DNA inserted into the genome at apparently random positions (10–14). Support for a lemur-loris clade is equally strong; it forms a side branch to the tarsier-anthropoid group (10, 11, 13, 14).

In short, the interpretation favored by Gingerich and described by Tudge is incompatible with a basal split of anthropoids from lemurs and lorises. Adapoids cannot simultaneously be the source of lemurs, lorises, and anthropoids to the exclusion of tarsiers because tarsiers and anthropoids form a clade. So *Darwinius* cannot be both an adapoid and a monkey ancestor.

As to the search for our ancestors, a growing body of evidence suggests that the earliest anthropoids belong to the Eosimiidae, another Eocene group that was contemporaneous with adapoids. Eosimiids are known from jaws, teeth, a partial skull, and limb bones. They appear in Asia as early as 54 Ma and may have some African members (15, 16).

So, *Link's* premise, that *Ida* is our ancestor, is fallacious. *Ida* is a lemur. While the search for anthropoid origins goes on, we shouldn't look for human ancestors in *Darwinius* or its close relatives. Interested readers who want to become better informed about early primate evolution should turn to K. C. Beard's *The Hunt for the Dawn Monkey* (17), an accessible, authoritative alternative.

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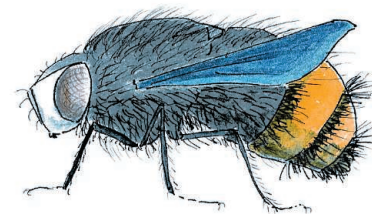
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## BROWSINGS

**Summer World: A Season of Bounty.** Bernd Heinrich. Ecco (HarperCollins), New York, 2009. 277 pp. \$26.99. ISBN 9780060742171.

This enticing account draws on two summers Heinrich spent “actively observant” at his rural Vermont home and his cabin in the Maine woods. He weaves the narrative of ecology, behavior, and physiology from his own sightings and simple experiments, working in research findings from the primary literature. The book follows the arc of the season from the first nodding heads of snowdrops through to the last autumnal cheeps and chirps of spring peepers and wood frogs. Although a few parts address the challenges posed by higher temperatures and limited water, Heinrich focuses on interactions among animals and plants—especially strategies used in feeding or reproduction. He supplements the often lyrical discussions with his own sketches and paintings, such as the illustration (above) of the tachinid *Belvosia bifasciata*, a large, striking fly that parasitizes silk-moth caterpillars.



## RISK ANALYSIS

### Five “Easy” Questions

Garry D. Brewer

**R**isk assessment is a commendable collection of efforts by varied scientists and numerous technologists to make complex human choices understandable. *Science and Decisions* acknowledges this even as it begins: “Virtually every aspect of life involves risk. How we deal with risk depends largely on how well we understand it.” Most of the book focuses on the theories, methods, and practices of risk assessment in public health, specifically as these evolved through the years at the U.S. Environmental Protection Agency (EPA). This National Research Council (NRC) report was commissioned by EPA and prepared by a special committee chaired by Thomas A. Burke (School of Public Health, Johns Hopkins University) working with the NRC’s Board on Environmental Studies and Toxicology.

Encyclopedic, *Science and Decisions* will be a standard reference and textbook for many years to come. Indeed, it may become this decade’s equivalent to the path-breaking

“Red Book” of 1983, *Risk Assessment in the Federal Government* (1), and to three following milestones from the 1990s (2–4). Well organized and carefully written, *Science and Decisions* leaves scarcely a technical risk assessment topic uncovered within its 421 pages. (There is no index, alas.)

The history, practice, and current state of risk assessment are covered succinctly in the opening three chapters. For anyone new to the field, this is essential reading. For everyone else, these chapters remind one of a quarter century of accomplishments and highlight numerous challenges remaining. These challenges are identified and considered carefully, especially in four chapters that deal with human, institutional, and even “irrational” aspects of risk assessment.

One chapter is devoted to uncertainty and variability. These are explored along with many other concepts and practices of technical risk assessment so as to expose lingering problems—most of which are decidedly non-technical: “The question is not often about better ways to do these analyses, but about developing a better understanding of when to do these analyses.” The important practice of

**Science and Decisions**  
Advancing Risk Assessment

by the National Research Council  
Committee on Improving Risk Analysis  
Approaches Used by the U.S. EPA

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ISBN 9780309120463. [www.nap.edu/catalog.php?record\\_id=12209](http://www.nap.edu/catalog.php?record_id=12209)

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