

BOOKS & ARTS

Showcasing the evidence for evolution

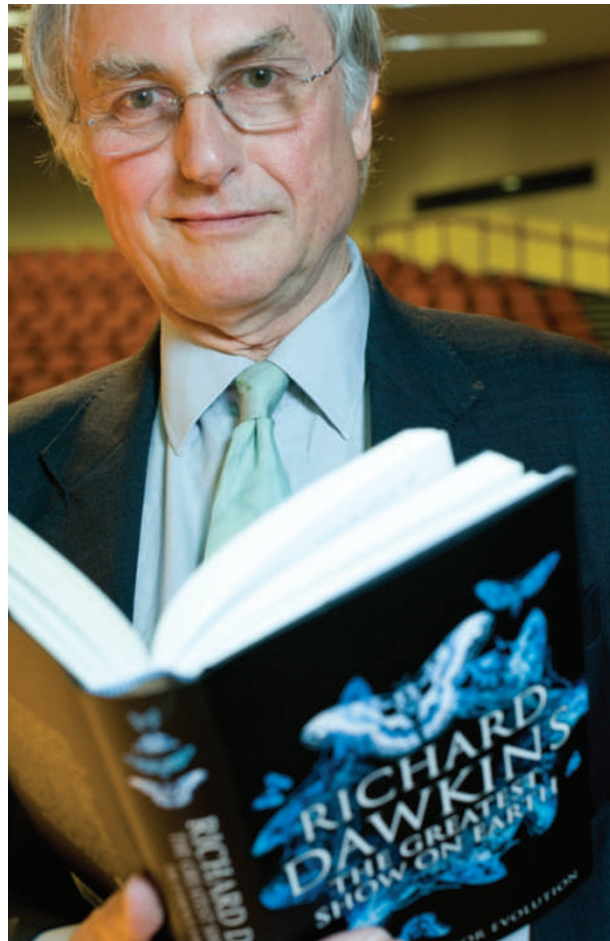
Laurence D. Hurst compares two seasoned authors' strategies for explaining the difference between evolution fact and fantasy — Richard Dawkins's thunder and Carl Zimmer's poise.

I am usually reluctant to claim anything to be a 'fact'. Likewise, I shy away from the word 'proof' beyond the certainties of mathematics. But, as Richard Dawkins makes plain in *The Greatest Show on Earth*, cautious scientists like me should get off the fence. Our enterprise has established facts and we should have the confidence to say so. Evolution is one such fact, and the evidence for it is laid out in two new books by Dawkins and Carl Zimmer.

The Greatest Show on Earth is Dawkins on top form: unambiguous, beautifully argued, with prose flowing like quicksilver. He starts, as Charles Darwin did in *On the Origin of Species*, by coaxing the reader down a logical path, from artificial selection and domestication, through the ubiquity of the heritability of traits, to the inevitability of evolution by natural selection. Unlike many of his previous books, the logic of evolution plays second fiddle to the evidence for it and how that evidence is obtained. He explains what we have learnt from studying the relatedness between species (phylogenetics) and the way organisms develop (embryology), from the fossil record (palaeontology) and from the geographical distribution of species (biogeography). He is especially good on the unintelligent design of organisms.

As Dawkins makes clear, evolution is testable and has survived every test. Sometimes we need, he says, to be a detective, uncovering the incriminating evidence of an unseen event. We can also, through genetics and through experimental evolution in the laboratory and field, witness evolution directly and in real-time. Darwin surely would have been thrilled to read of *in vitro* evolution of new complex traits, such as citrate metabolism in bacteria.

The Greatest Show on Earth is not just about



Richard Dawkins's latest work is about more than just the theory.

**The Greatest Show on Earth:
The Evidence for Evolution**

by Richard Dawkins
Free Press/Bantam Press: 2009.
480 pp/406 pp. \$30/£20

**The Tangled Bank:
An Introduction to Evolution**

by Carl Zimmer
Roberts: 2009. 394 pp. \$59.95/£29.99

the facts. Dawkins asserts that his book is not anti-religious, although he hardly hides his opinions. He never wastes an opportunity to knock what he sees in creationists as intellectually corrupt. Some will criticize him for being uncompromising, but I applaud him for taking such a categorical — and entertaining — stance. Dawkins emerges like a prize-fighter, knocking out of the ring all objections.

Carl Zimmer's approach to explaining evolution in *The Tangled Bank* is rather different. In a non-confrontational way, he lays out

the evidence for all to see. His prose, while authoritative and easy to read, is poised rather than animated. Dense with facts, the book is billed as the first textbook on evolution for the general reader, and in that framework it excels. Zimmer doesn't counterpoint the facts of evolution with creationist assertions but biblical literalism stalks the pages like the elephant in the room.

By necessity both authors cut corners. Both, for example, fail to explain why proteins accumulate changes at a steady rate regardless of an organism's lifespan, by using the same simplified explanation that predicts more rapid changes in short-lived species. While arguing that changes can accumulate in genomes by chance and irrespective of selection, Dawkins argues that 95% of our genome is effectively useless. This ignores unexpected recent findings that the majority of our genome is active making RNA transcripts, even though only a few of these go on to specify proteins.

A greater weakness is that neither book offers much perspective on unanswered questions. A reader could be forgiven for thinking that evolutionary biologists today are doing little more than dotting the proverbial 'i's. Although the fact of evolution is beyond doubt, the recent explosion of genetic sequence data means that the skills of evolutionists are needed now more than ever.

So which is the better strategy for explaining the difference between fact and fantasy: that of the quiet American or that of the British Rotweiler? Zimmer makes the facts palatable but Dawkins reminds us that some people persist in their beliefs even if they are profoundly contradicted by observation and logic. He relates his interview with a creationist who, when asked whether she had seen hominid skulls in the museum, asserts that such skulls simply do not exist. Such blithe disrespect for scientific evidence and for historical fact should concern us all. ■

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