

PALAEOLOGY

Giants unearthed

Xu Xing revels in an enthusiast's tour of the Mesozoic era and its denizens.

Brian Switek is a science writer with a deep understanding and broad knowledge of evolution. His books offer a compelling mixture of reliable information, personal experiences and thoughts, anecdotes about palaeontological research and even science philosophy, delivered in a breezy and engaging style.

In *My Beloved Brontosaurus*, Switek — a fan of dinosaurs since childhood — describes his tours of famous excavation sites, selected museums and high-tech research laboratories across the United States. He meets and talks to a host of palaeontologists, including fossil-bone expert Mark Goodwin at the University of California Museum of Paleontology at Berkeley. By getting close to the people and the science that they move forward, Switek paints a comprehensive picture of how our understanding of dinosaur evolution gradually advances. Along the way, he shows how dinosaur palaeontology is a cultural touchstone in the United States and many other countries.

Switek touches on widely discussed topics, such as how dinosaurs rose to dominance early in the Mesozoic era (250 million to 65 million years ago) and why all of them — except the strange feathered ones we know as birds — died out when the era ended. But his focus is on how dinosaurs lived.

Switek picks through recently discovered fossils such as the carnivorous feathered dinosaur *Sciurumimus albersdoerferi* found in Germany in 2011. And he discusses cutting-edge methods such as the use of computed tomography scanning to investigate fossils' nasal passages, brain cavities and other internal cranial features. A recurring theme of the book is that new specimens, technologies and thinking are making it possible to investigate how dinosaurs mated, matured and became gigantic; to study their social life and the diseases that afflicted some individuals; and even, as in the case of the small, bird-like *Anchiornis*, to reconstruct aspects of their coloration.

Some of Switek's best palaeontological stories come from the history of the



My Beloved Brontosaurus: On the Road with Old Bones, New Science, and Our Favorite Dinosaurs
BRIAN SWITEK
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Sculptor Brian Cooley's reconstruction of a *Tyrannosaurus rex*.

discipline. He explains how his favourite dinosaur when he was a child was popularly known as brontosaurus, but had in fact been known scientifically as *Apatosaurus* since 1903, when it was reclassified as a species of the latter genus. Eventually, the new name filtered through to museum exhibits and popular books, and although brontosaurus may not have disappeared entirely, the current generation of dinosaur-savvy children are aware of its obsolescence.

More often, Switek focuses on recent advances. The rediscovery of an animal called *Effigia* in an old collection of fossils at the American Museum of Natural History in New York helped researchers to show that some early relatives of crocodylians were similar to many dinosaurs — not only did they have a near-vertical rather than sprawling

hindlimb posture, but they were also bipedal. A reluctant field decision to break the thigh bone of a *Tyrannosaurus rex* for ease of transport exposed a type of bone tissue seen today in female birds that are about to lay eggs, revealing the dinosaur's gender. And a graduate student's thesis research on the ink sacs of a fossil squid led to a method for partially reconstructing the colours of some extinct animals, including dinosaurs.

I have a few quibbles. In some instances, Switek recounts a conversation he had with a scientist to lend authority to an account of a discovery, but the details on how inferences were made and hypotheses tested are left out. The phylogeny-based definitions given for some animal groups are slightly inaccurate, and there are occasional lapses in the reliability of the scientific storytelling. For example, in discussing the importance of *Effigia*, Switek glosses over the fact that near-vertical hindlimb posture (although not bipedality) was already known to be widespread among early members of the crocodylian lineage.

The book largely revolves around the dinosaur stars from the early days of North American palaeontology, and space for recent discoveries made by researchers elsewhere is limited. Similarly, some fascinating new research directions are discussed briefly or not at all.

Switek does not mention the 34 juveniles of the small, parrot-beaked dinosaur *Psittacosaurus* that were found preserved with an adult in Chinese strata — a fossil that is among the best evidence to support the existence of parenting in dinosaurs. He also omits the use of isotopic analysis to reconstruct the lifestyle of the mysterious spinosaurs — massive carnivorous dinosaurs with vaguely crocodile-like heads. Nor is there anything about molecular studies on the development of feathers, fingers and toes in modern taxa, which have contributed greatly to our understanding of the morphological evolution of birds.

Of course, not even a brontosaurus-sized book could include everything. Switek has succeeded in covering a wide range of interesting topics in dinosaur palaeontology with infectious enthusiasm. ■

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