BOOKS: SCIENCE AND CULTURE

Terrible Lizards—Impure Science?

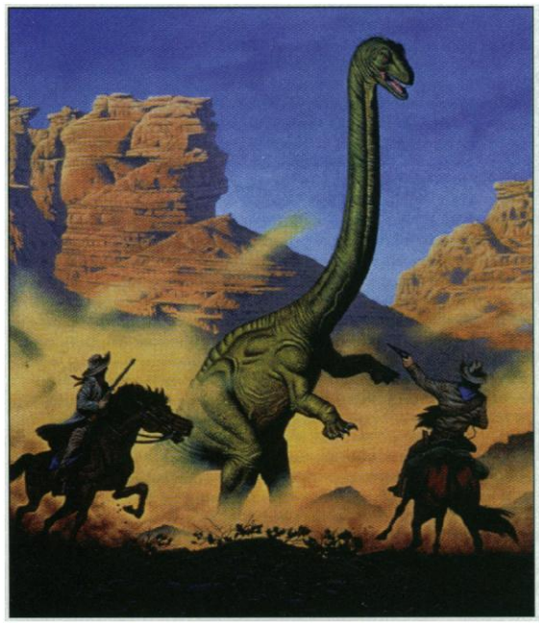
Peter Dodson

Years ago as an unsuspecting undergraduate at a Canadian university, I was enrolled in a faculty of Pure and Applied Science, innocent of the understanding that there is no such thing as "pure science." For anyone who has not yet been exposed to a social critique of science, W. J. T. Mitchell's lively and entertaining treatise is as good a way to begin as any. This is not a book about dinosaurs. (Mitchell makes it clear that he is not a great fan of dinosaurs. He was bored by them as a child and reveals ambivalent feelings about them today—are they "a curable disease, a self-limiting epidemic, or a symptom of an irreversible catastrophe"?) Instead, it is a book about dinosaurs in popular culture, past and present.

The Last Dinosaur Book
The Life and Times of a Cultural Icon
by W. J. T. Mitchell
University of Chicago Press, Chicago, 1998. 333 pp. $35. ISBN 0-226-53204-6.

Mitchell plumbs the now-familiar story of how in 1842 Richard Owen, Britain's premier 19th-century paleontologist, "invented" the dinosaur, a tribe of extinct reptiles, on the basis of a mere handful of fragments. He finds Thomas Jefferson a major role in the narrative. Jefferson was a natural historian who devoted the East Room of the original White House to fossils, one resource in which young America outshone ancient Europe. He took delight in sending bones of the "great incognitum" (mammoth) to Paris in 1808, noting that France was "not very copious" in such remains. In Mitchell's interpretation, the great fossils of America's past were to Jefferson symbols of the Constitution itself, an allegory for the ever-expanding continental empire of the United States. (Supporting this view of the politicized nature of the president's fossils is Mitchell's observation that when Jefferson left the presidency in 1808, he also left his interest in fossils behind.) America's fossils were "a model for the way in which science and art, commerce and politics could be brought together to form a potent symbol of a nation's natural constitution." Mitchell sees in Owen's dinosaur a European response to America's fossils. With additional discoveries and the attention attracted by Waterhouse Hawkins's models for the 1854 Crystal Palace exhibition, dinosaurs reestablished the primacy of Europe's extinct vertebrates. They would hold center stage until the late 1870s, when spectacular finds in the Jurassic Morrison formation drew the spotlight to western North America.

Fossils in general and dinosaurs in particular quickly acquired extra-scientific, iconographic significance. For Mitchell, the dinosaur is the totem animal of modern culture, by which he means "first, that it is a symbolic animal that comes into existence for the first time in the modern era; second, that it epitomizes a modern time sense—both the geological 'deep time' of paleontology and the temporal cycles of innovation and obsolescence endemic to modern capitalism; and third, that it functions in a number of rituals that introduce individuals to modern life and help societies to produce modern citizens." All of this, eh? Totems are social symbols (the french fry is the "totem vegetable of modernity"). Did I mention that Mitchell is an iconologist, concerned with interpreting the images that people produce and consume?



Dinosaur at home on the range. Illustration from Sharon Farber's short story, "The Last Thunder Horse West of the Mississippi," in which the hirelings of O. C. Cope and E. D. Marsh fight over and kill a real, live dinosaur.

CREDIT: ROBERT F. WALTERS/*THE LAST DINOSAUR BOOK*

He launches analyses of various cultural expressions of dinosaurs, especially dinosaurs in cinema, on television, and in the comics. One of his major theses is that dinosaurs are primarily for children—indeed, principally for children ages 4 to 7. Thus, he deems dinosaurs "transitional objects": "Between the thumb and the teddy bear, the breast and *Brontosaurus*, a whole set of objects play crucial roles in the maturation process." Transitional objects are soon put aside without regret. Parents are "dutifully impressed by the pompous little pedant at the breakfast table who gleefully corrects their mistakes in dinosaur taxonomy." Between his zingers Mitchell does make some important points, one of which is the ambivalence of children's feelings about dinosaurs, vacillating between admiration and anxiety; another is that love of dinosaurs is not innate (any more, I suppose, than fondness for stereochemistry or neurophysiology), but acquired as part of a complex cultural ritual.

Mitchell gores many oxen, but I refuse to be baited, for I found much to ponder. I am disappointed, however, at the superficiality of his efforts. Forty lavishly illustrated chapters plus a coda and two appendices in 284 pages do not allow much space for subtlety of thought. Mitchell's interest in contemporary paleontology does not go beyond the marquee players (such as Jack Horner, Bob Bakker, Paul Sereno, and Stephen Jay Gould), who clearly are by conscious intent part of popular culture. Then again, this is a book that looks upon dinosaurs not as serious objects of scientific study, but only as cultural icons.

Mitchell occasionally exhibits a disturbing tendency towards sloppiness. He sometimes employs loose dates (Owen coined the term dinosaur "in the 1840s"), stakes questionable claims (characterizing newts as reptiles, insisting that the term "dinosaur" is itself a dinosaur because the central concept is "incoherent" and "arbitrary"), or just plain errs (believing the Age of Reptiles extended "from the Devonian to the Triassic"). Although I found him better at raising questions than answering them, I can think of many that he did not ask. (For example, do all dinosaur paleontologists go through a "Godzilla stage" of preferring fantasy to reality as their interests mature?)

Fortunately for dinosaur scientists, this

The author is at the School of Veterinary Medicine, University of Pennsylvania, Philadelphia, PA 19104–6045, USA. E-mail: dodsonp@vet.upenn.edu

is Mitchell's last dinosaur book (and we will hold him to the implied promise). Hopefully, however, this will not be the last analysis of dinosaurs, and their students and fans, as interesting intellectual phenomena. Perhaps the next book will be written not only with passionate insight but also with a scholar's patience and empathy, both for dinosaurs and for those who study them.

BOOKS: ARCHAEOLOGY

Confirming Antiquity in the Americas

Donald K. Grayson

The significance of this volume, and of the archeological site described within it, is grounded in the long-standing debates over the antiquity of human presence in the New World. In 1778, the French natural historian Georges Buffon argued that Earth had a long and dynamic history, but that people had not appeared until it had become modern in form. By the early 19th century, Georges Cuvier had demonstrated the relatively recent extinctions of huge mammals, such as ground sloths in the New World and mammoths in the Old. For Cuvier and those who followed, these extinctions became the great divide between pre-modern and modern worlds. "There are no fossil human bones" Cuvier observed in 1812, meaning people had not walked the earth with his now-extinct mammals.

Monte Verde
A Late Pleistocene Settlement in Chile, Vol. 2: The Archaeological Context and Interpretation
by Tom D. Dillehay
Smithsonian Institution Press, Washington, DC, 1997. 1071 pp. $155. ISBN 1-56098-680-8.

Of course, there were fossil human bones, and before long people were reporting their discovery. In Europe, cave after cave was argued to contain ancient human bones or artifacts. Under the lead of British geologist Charles Lyell, a set of criteria for evaluating these claims was soon developed. To be accepted, a site had to have undoubted human bones or artifacts, unequivocal evidence of great antiquity, and a geological context of unimpeachable integrity.

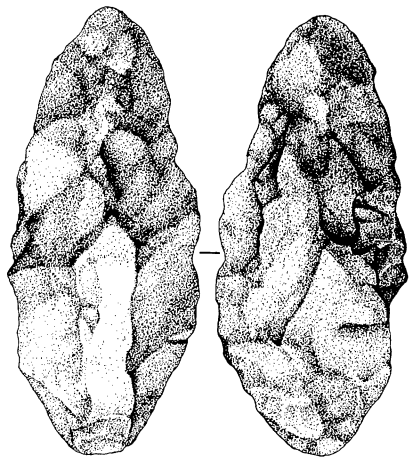
Until 1858, these criteria allowed the rejection of every potentially ancient cave site. That year, extraordinarily careful excavations at Brixham Cave, southwestern England, uncovered stone tools associated with the remains of extinct mammals. Even though cave deposits were not to be trusted, this particular cave had been excavated under the direction of some of Britain's finest geologists (including Lyell) and provided such strong evidence for unexpected human antiquity that it led scientists to a series of open-air sites in northern France's Somme River valley from which Jacques Boucher de Perthes had reported an identical association. There Lyell's criteria were satisfied, and all who visited the sites came away convinced that people and the now-extinct mammals had coexisted.

Once the critical time barrier had been broken, there was every expectation that even older human remains would be found. These expectations were shared by advocates and opponents of Darwin's views on the history of life on Earth. By the end of the century, artifacts of Tertiary age had been reported in both New World and Old (*1*).

In reaction, during the late 19th and early 20th centuries, criteria were again developed for evaluating such claims; in the Western Hemisphere, these were most forcefully advocated by William Henry Holmes and Aleš Hrdlička. To be accepted as documenting great human antiquity, a site had to have undoubted artifacts or human bones, clear and undisturbed stratigraphy, and compelling evidence of deep antiquity. One by one, all claims for Tertiary sites were rejected. Only after 1927 did a Pleistocene human presence in the New World become widely accepted, as the result of discoveries made at Folsom, New Mexico—a site that met all of the evaluative criteria that had been redeveloped during the preceding decades (*2*).

Remarkably enough, the process then began anew. By the mid-1960s, there were dozens of reports of New World sites from deep within the Pleistocene. During the 1960s and 1970s, explicit criteria for evaluating such claims—undoubted human remains, unimpeachable stratigraphy, unquestionable evidence of great antiquity (*3*)—were once again advanced, with geoarchaeologist C. Vance Haynes playing the critical role. By the late 1970s, it was almost universally acknowledged that the earliest archaeological sites in the New World, called Clovis and marked by a distinctive projectile point, dated to about 11,500 radiocarbon years ago.

It is this background that makes the Monte Verde site in south-central Chile so significant. Located in terrace deposits adjacent to a small creek between the Andes and the Pacific, Monte Verde was excavated from 1977 to 1985 by an international team led by Tom D. Dillehay of the University of Kentucky. The excavations recovered a remarkably diverse set of archaeological materials from what is called the MV-II occupation. These include stone tools, cut wood, quids (the chewed and expectorated fibrous remains of plants), bones of extinct mammal, plants that had been transported from afar, a human footprint, and a series of features that Dillehay interprets as the remains of huts. What makes the MV-II discoveries truly momentous, however, are the radiocarbon dates. They range from 11,790 ± 200 years before the present (years BP) to 13,565 ± 250 years BP, and average about 12,500 years BP.



Chipped stone. A large (143 mm by 62 mm by 40 mm) lanceolate biface of quartzite, skillfully made with well-controlled flaking, one of 90 artificially shaped stones collected from MV-II.

CREDIT: ELLEN ATHA/*MONTE VERDE*, VOL. 2

Reactions to Dillehay's initial publications on Monte Verde varied from sheer disbelief through careful neutrality to full acceptance by those who had already accepted a pre-Clovis human presence in the New World on other grounds. The debates over the site picked up steam in 1989, when Dillehay published a major monograph presenting the stratigraphy of the site and the paleoenvironmental information it had provided (*4*).

It is the current volume, however, that presents the critical archaeological information from Monte Verde. And what a volume it is—over 1000 pages of description and analysis by a team of 33 authors led by Dillehay. Among many other accomplishments, the contributors recount the site's setting and stratigraphy, present and analyze the radiocarbon data, describe and interpret the artifacts, and map and discuss the possible structures.

To those of us interested in the peopling of the New World, the work on Monte

The author is at the Department of Anthropology and the Burke Museum of Natural History and Culture, Box 353010, University of Washington, Seattle, WA 98195, USA. E-mail: grayson@u.washington.edu