Of Old Bones and Young America

The Legacy of the Mastodon: The Golden Age of Fossils in America. Keith Thomson. Yale University Press, New Haven, CT, 2008. 424 pp., illus. $35.00 (ISBN 9780300117042 cloth).

Keith Stewart Thomson, a distinguished vertebrate paleontologist and museum professional, has written extensively on natural history and its development. His latest book presents an engaging account for general audiences of the history of vertebrate paleontology in the United States from the 18th century until 1890, when the US Census Bureau could no longer discern a western frontier, and of the discipline's relationship to the young republic's political and intellectual development. Much of this subject has recently been reviewed elsewhere, but Thomson's account is particularly well-written and accessible.

Thomson's tale begins with a French military party's "discovery" of the teeth and bones of a large, elephant-like mammal, subsequently dubbed the American mastodon, at Big Bone Lick in Kentucky in 1739. (The site had long been known to Native American tribes in the region.) A number of these remains found their way into the hands of American and European scholars and led to animated debates concerning not only the identity of these specimens but also the diversity of life in the New World and even the possibility of species extinction.

President Thomas Jefferson took a personal interest in the mastodon and secured additional material from Kentucky, which, along with other mammalian fossils, was stored for a time in the East Room of the White House. He engaged in a lively polemic with the leading French naturalist of the day, Georges-Louis Leclerc de Buffon, who had denigrated the fauna of the New World as depauperate and in every way inferior to that of the Old World. These assertions rankled the patriotic naturalists of the young republic, who already felt that they were laboring in the shadow of their European colleagues. In his rebuttal, Jefferson drew on the mastodon and his recent discovery of "great-claw" (the giant ground sloth *Megalonyx*) from Virginia. However, Buffon's views prevailed for decades to come.

During the early 19th century, important fossil discoveries in England and continental Europe fostered the development of vertebrate paleontology as a scientific discipline and hinted at a much longer and more complex history of life on Earth than suggested by the biblical narrative. Although this period saw little progress in the study of fossil vertebrates in America, the first geological surveys of the rapidly expanding country offer glimpses of the tremendous potential for paleontological exploration.

Thomson does a wonderful job highlighting how the emergence of American vertebrate paleontology, from its modest beginnings in the shadow of European scholarship to full intellectual maturity, parallels the development of the national identity of the United States.

In 1787, the physician Caspar Wistar and Philadelphia patriot Timothy Matlack reported to the American Philosophical Society on a "large thigh bone found near Woodbury Creek in Glocester County, NJ." The whereabouts of this fossil are unknown, but subsequent discoveries of dinosaurian remains in the same region raise the intriguing possibility that this was the first dinosaur bone ever reported from American soil. The first undisputed dinosaurian finds were published in England in the 1820s. Dinosaurs were recognized as a distinct group of extinct reptiles by Hermann von Meyer in 1832 and Richard Owen, who coined the name "Dinosauria," in 1842.

During the second half of the 19th century, the efforts of three men—Joseph Leidy, Edward Drinker Cope, and Othniel Charles Marsh—made research on fossil vertebrates a predominantly American affair. Leidy was a medical doctor who had an astonishing command of natural history and a distinguished career as a professor of anatomy at the University of Pennsylvania. In the 1850s he described and named the first undisputed dinosaurs from the United States, the duckbilled dinosaur *Hadrosaurus,* on the basis of a partial skeleton from the Upper Cretaceous of Haddonfield in New Jersey, and several genera based on teeth from the Upper Cretaceous of Montana (at that time part of the Nebraska Territory) collected by the geologist-explorer Ferdinand Vandeveer Hayden. Leidy also reported on many other vertebrate fossils supplied by Hayden and others from the western frontier. His work was purely descriptive, and even contemporaries criticized Leidy's reluctance to explore the broader significance of his findings. Thomson notes that Leidy supported Darwin's ideas but may have attracted criticism within the Philadelphia academic establishment for this point of view and refrained from further speculation out of concern for his professional future.

Leidy's paleontological fortunes declined when Cope and Marsh entered the field. A fellow Philadelphian, Cope came from a wealthy Quaker merchant family, and even as a child he was deeply interested in natural history. Marsh came from a humble background in upstate New York, but he attracted the attention of his maternal uncle, financier George Peabody, who bankrolled his education. Later, Peabody's patronage provided Marsh with a lifelong base of

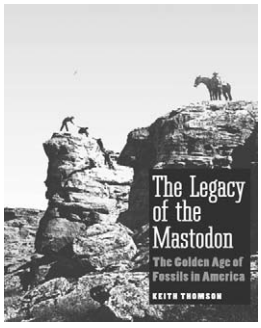
doi:10.1525/bio.2009.59.2.11

operations, the Peabody Museum of Natural History at Yale. Cope and Marsh started on friendly terms but soon became bitter rivals who would stop at nothing to obtain and name specimens of fossil vertebrates. Leidy, a retiring man without comparable means, could not compete with these driven youngsters. Cope and Marsh recruited and worked with teams of collectors to explore the vast territories along the rapidly expanding western frontier, and each assumed control of a scientific journal to ensure rapid publication of their latest discoveries. Thomson paints vivid portraits of these two men. Intense and impatient, Cope had a brilliant, wide-ranging mind and was a prolific writer. His published work comprises some 1400 articles, monographs, and books, with subjects ranging from ichthyology and herpetology to paleontology and evolutionary theory. By contrast, Thomson likens Marsh to a corporate executive. Marsh was politically astute, carefully cultivating contacts at the highest levels to serve his interests. A less capable researcher than Cope, he allegedly had assistants, without acknowledgment, do much of the research and writing for his major monographic studies.

Eventually, the relentless pursuit of paleontological riches ruined both men financially. Cope's predicament was further exacerbated when he lost much of his inherited wealth through bad investments, and he and Marsh were both forced to seek paid faculty appointments to support them in their waning years. Furthermore, their bitter feud became national news when a reporter from the *New York Herald,* encouraged by Cope, started publishing a series of articles on Marsh and his alleged misdeeds. Marsh quickly responded with attacks on Cope's conduct and integrity. This public controversy ultimately led to Marsh's loss of his privileged status with the United States Geological Survey and having (I am pleased to say) to turn over large collections made with the Survey's support to the Smithsonian.

While the feud between Cope and Marsh discredited paleontology in the eyes of many of their contemporaries, the wealth of discoveries made by these men represents a lasting testimony to their extraordinary efforts. Marsh's discoveries of the remarkably complete fossil record of the evolutionary lineage of horses and of Cretaceous birds with teeth had a profound and lasting impact on the acceptance of Darwin's views about evolution. Other finds revealed scores of previously unknown lineages of extinct vertebrates, including most of the major dinosaurian groups still recognized today, and laid the foundation for all subsequent work on the evolution of vertebrates.

In their single-minded quests, Cope and Marsh mirrored the financiers and industrialists in 19th-century America



whose ruthless drive and determination helped build this country. Thomson does a wonderful job highlighting how the emergence of American vertebrate paleontology, from its modest beginnings in the shadow of European scholarship to full intellectual maturity, parallels the development of the national identity of the United States.

HANS-DIETER SUES
Hans-Dieter Sues (e-mail: suesh@si.edu) is associate director for research and collections at the National Museum of Natural History of the Smithsonian Institution, Washington, DC.

FORAGING ISN'T DEPLETED

Foraging: Behavior and Ecology. David W. Stephens, Joel S. Brown, and Ronald C. Ydenberg, eds. University of Chicago Press, Chicago, 2007. 576 pp., illus. $99.00 (ISBN 9780226772639 cloth).

Foraging: Behavior and Ecology provides a unique and up-to-date reference covering an astonishingly diverse set of topics ranging from neuron molecular biology and brain structures to population dynamics and community structure—quite an impressive sweep. This book, intended for graduate students looking for a research project, is ideal for use in graduate seminars or advanced undergraduate reading courses. It is also addressed to researchers who want to get the current picture of the area of foraging behavior.

The three editors are established players in foraging research. David W. Stephens, professor of ecology, evolution, and behavior at the University of Minnesota, coauthored (with John Krebs) *Foraging Theory* (Princeton University Press, 1986), which became the ninth most cited book in evolution and ecology. He is also known for his work on the cognitive processes of blue jay foraging decisions. Joel S. Brown, a biology professor at the University of Illinois at Chicago, is a coauthor (with Thomas L. Vincent) of *Evolutionary Game Theory, Natural Selection, and Darwinian Dynamics* (Cambridge University Press, 2005); he is well known for having introduced the concept of giving-up density as a means of measuring the costs that animals experience while exploiting diverse habitat types. Ronald C. Ydenberg is a professor in the Behavioral Ecology Research Group and director of the Center for Wildlife Ecology at Simon Fraser University in British Columbia. He is well known for his research on provisioning and the application of behavioral ecology to phenomena such as avian diving,

doi:10.1525/bio.2009.59.2.12