

tion age structure at water hole and hunting death sites. From these actualistic studies, Haynes develops models for interpreting patterns of mastodont and mammoth mortality. However, these actualistic studies only provide useful models if mastodonts and mammoths had behaviors and social structures similar to modern elephants, a contention for which Haynes presents little strong evidence. Though a case can be made for similarity between mammoths and living elephants, due to their close phylogenetic relationship, mastodonts are more distantly related to living elephants, and they might have had very different behaviors and social structures. Ultimately, mastodont and mammoth behavior must be reconstructed not by mere analogy to modern elephants but through rigorous study of evidence from the fossils themselves, including biochemical, geochemical, and structural attributes.

With data in hand from modern elephants, Haynes turns to the fossil record, broadly surveying global patterns in elephant, mastodont, and mammoth sites. This review is iconoclastic and, I believe, overly biased by the author's experiences with butchery practices at the Hwange mass kill sites. Yet the survey highlights the fact that

unambiguous, well-studied butcher sites are very rare. It also offers an important English-language overview of the many spectacular Eurasian mammoth sites excavated over the past century.

The book closes with a discussion of climatic and hunting hypotheses for the late Pleistocene extinction in North America. Given the uncertainties about mastodont behavior and the lack of butcher sites with multiple individuals, mastodonts do not figure into Haynes's discussion. The dozen or so Clovis sites with multiple butchered mammoths present a paradox. Most sites are located near water sources and have age structures similar to those of African elephant die-offs during droughts. And though these mammoths were clearly butchered, they show no evidence of thorough carcass utilization, as is seen in African butcher sites. Haynes proposes that at the end of the Pleistocene, mammoths were clustering around water holes during a period of extreme environmental stress caused by the shift to a post-glacial climate. They were in poor physical condition and thus were easy targets for opportunistic human hunters. However, because of their poor condition and their abundance, humans did not carefully extract all available resources from each

carcass. Environmental stress set mammoths up for extinction, but it was human predation that ultimately pushed them over the brink.

The book is well written, with illustrations and tables provided to support important conclusions. The bibliography alone is an excellent resource, and many researchers will use the information on growth patterns and age determination provided in the appendix. This book does not purport to solve the mystery of late Pleistocene extinction. It does offer a reasonable scenario for mammoth extinction that is consistent with the wealth of new information provided concerning modern elephant behavior and mortality.

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Vignettes: Our Universities

One of the things that concerns me is the persistent tendency to emphasize too heavily . . . the importance of relationships between universities and industry as a means of getting ahead competitively. The validity of this linkage is far from clear. If universities are really the key . . . , why did we grow faster than other countries during the late nineteenth and early twentieth centuries when our universities were mediocre, and why is our productivity lagging behind other nations now that our universities and their scientific achievements lead the world?

—Derek Bok, in *The Changing University* (Dorothy S. Zinberg, Ed.; Kluwer Academic Publishers)

The university . . . like most other organizations, . . . wants first of all to survive. The university has become adept at survival, to the point that it is not always clear whether the great range of activities in which many universities are engaged today represents a deep ideological commitment or simply a manifestation of the need to survive.

—George Bugliarello, in *The Changing University*

Structures and guidelines have been built by universities; but more importantly, the visceral fears that outside commercial interests would distort the search for truth, would taint academic freedom, have all but disappeared. It is not that those fears and conflicts do not exist; but in a world where there is constant interchange of manpower and money between academia and commerce, no one much protests publicly anymore.

—Robert Teitelman, in *The Business of Biotechnology: From the Bench to the Street* (R. Dana Ono, Ed.; Butterworth-Heinemann)

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