In Quest of Great Lakes Ice Age Vertebrates

By J. Alan Holman. 2001. Michigan State University Press, East Lansing, Michigan 48823-5202. ix + 230 pages.

J. Alan Holman has published four previous books, more than 240 papers, and numerous popular articles during a distinguished pursuit for evidence of Pleistocene vertebrates, particularly amphibians and reptiles (see review of his scholarly *Pleistocene Amphibians and Reptiles in North America*, 1997, reviewed in *The Canadian Field-Naturalist* 111(4): 696-697).

Here he aims at a more semi-popular approach in a near coffee-table large format (28.5 × 22.1 cm) narrowed geographically to concentrate on the Great Lakes but expanded taxonomically to encompass all vertebrates. An Introduction is followed by nine chapters: The Pleistocene Ice Age, The Pleistocene in the Great Lakes Region, Where to Find Vertebrate Fossils, Collecting the Fossils, Dating the Fossils, A Bestiary of the Great Lakes Region Ice Age Vertebrates, Important Pleistocene Vertebrate Sites in the Great Lakes Region, Interpretation of the Fauna, and The Holocene and the Aftermath of the Ice Ages. An eight-page appendix lists the occurrence of all species by subregion. The bibliography is 17 pages arranged by chapter. Finally, two pages give illustration credits, two a General Index, and four an Index to Common and Taxonomic Names.

Half the book, 114 pages, is taken up by the "Bestiary" which details the orders, families and species of fish, amphibians, reptiles, birds, and mammals that are recorded for Pleistocene fossil sites in Wisconsin, Illinois, Indiana, Michigan, Ohio and Ontario. Morphological and ecological characteristics are given from living animals when populations still are extant, and conjecture on the latter when only known from fossils. Sites are listed for each species and these are mapped for various groups. Drawings are provided of the majority of species and some diagnostic bones. The latter are exact, but the whole animal depictions are of variable quality. The mammals, though tending to be fuzzied or outlined only, are adequate, as are the turtles and the fish (the latter mostly outlines). But the token birds (ducks) are poor as is the anolis lizard (a southern species surprisingly included as representative of the group despite not occurring as fossil in the region covered). The full snake (a coachwhip) is crude – naked, apparently skinned — and the frogs are atrocious, apparently overlaid with fly-screening, particularly the supposed Green Frog.

The site-by-site chapter is 26 pages. Eight sites from Ontario are included ranging from early to late Wisconsin. The Rostock Mammoth Site in Perth County near Stratford in southern Ontario has provided a pollen record of vegetation correlated with radio-carbon dates to give an outline of ecological changes. From 14000 to 13000 the area was a wasteland very near the glacier, from 13000 to 12000 a tundra woodland, from 12000 to 10000 a boreal woodland.

Inevitably, an occasional lapsus occurs. One notable one is on page 182 in a discussion of the only Late Wisconsin reptile in the Michigan record, the Painted Turtle, *Chrysemys picta*. Although probably correctly considered to be "the most cold-tolerant turtle in North America" it is questionably characterized as having "the most northern distribution" (Snapping Turtles in central and eastern Canada and Wood Turtles in the east may at least stray as far or farther north). The statement seems based on erroneously crediting the Painted Turtle as "occurring north to the Great Slave Lake". The only reptile with this northern a range is the Red-sided Gartersnake, *Thamnophis sirtalis parietalis*. For the Painted Turtle, I know of documentation only north to 51° in Lake Winnipeg, Manitoba.

Holman sums up the remarkable wave of extinctions at the end of ice age (page 196) with: "Let us say that everything went wrong at once at the end of the Pleistocene. The climate changed from an equable one to a nonequable one, mating and birthing in large herbivores became out of step with the new climate, mosaic communities gave way rapidly to less diverse communities, large herbivores are thrown into intense competition with one another, and salt supplies for salt-dependant megahervivores diminish because of lower water tables. Humans and other mammals emigrating from Eurasia to North America bring new diseases to which the New World mammals lack immunity. Finally, for some unexplained reason, bands of experienced, intelligent hunters 'lose it' and kill every large mammal in sight as they move from Alaska to the tip of South America."

Finally, Holeman further adds "Biodiversity, which suffered a tremendous blow at the end of the Pleistocene and took another hit when monoculture agriculture replaced natural plant communities, continues to diminish in an almost out-of-control fashion, as natural communities are replaced helter-skelter by artificial human habitation". After observing that inevitably the present Holocene itself will be replaced by a new unit of geological time he finishes in an apparently up-beat fashion with a wish that the next epoch will be "marked by natural geological processes rather than by human-induced catastrophic extinction".

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