Quaternary Insects and Their Environments.

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hatchlings of *Maiasaura*, the good-mother lizard, of Egg Mountain fame. *Maiasaura* juveniles were designated as "hatchlings" based in part on the tooth wear of these individuals, and thus provided the basis for the inference of parental care.

There are several very good papers describing dinosaur nests, particularly those by Cousin et al. (Chapter 5) and by Grigorescu et al. (Chapter 6). The latter paper presents a novel approach to interpreting paleoenvironment with eggshell data. There is a good deal of discussion of eggshell morphology and the application of taxonomic nomenclature to eggshell type (Chapters 7, 10–13). Eggshell nomenclature, however, has to be viewed as a parataxonomy with questionable biological meaning, given the general lack of corroboration by association of embryos and eggs. Other weaknesses of the volume include the lack of a crisp definition for dinosaur "baby," although there is a loose set of criteria for recognizing "baby" dinosaurs in the final chapter. Similarly, one has to wait until Chapter 13 to find a definition of a dinosaur nest.

Despite the varying quality of individual papers, this book represents a significant source of primary literature and references for any individual interested in dinosaur eggs, nests, and juveniles.

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EVOLUTION OF THE TRILOBITE SUBFAMILY PROETINAE SALTER, 1864, AND THE ORIGIN, DIVERSIFICATION, EVOLUTIONARY AFFINITY, AND EXTINCTION OF THE MIDDLE DEVONIAN PROETID FAUNA OF EASTERN NORTH AMERICA. *Bulletin of the American Museum of Natural History, Number 223.*

By Bruce S. Lieberman. American Museum of Natural History, New York. $15.00 (paper). 176 p.; ill.; no index. ISSN: 0003-0090. 1994.

THE TERTIARY RECORD OF RODENTS IN NORTH AMERICA. *Topics in Geobiology, Volume 12.*

By William W. Korth; Series Editors: F. G. Stehli and D. S. Jones. Plenum Press, New York. $85.00. xiii + 319 p.; ill.; taxonomic index. ISBN: 0-306-44696-0. 1994.

The author has taken a disparate literature and organized it into a basic reference text on Tertiary rodents of North America. He begins with a section of three introductory chapters detailing rodent cranial and dental anatomy, origins, and classification. The second section of the book is concerned with a review of the Tertiary rodents. Twenty-one families are considered with regard to characteristic morphology, evolutionary changes in the family, fossil record, phylogeny, problematical taxa, and classification. A few monotypic families are briefly treated, and nine genera not referable to recognized families are discussed at the end of the section. The third section summarizes changes in the rodent fauna of North America through time and compares these changes with modifications on other continents.

Professionals will be disappointed by the illustrations in this expensive tome. Most are sparse line drawings, often only marginally useful. None of the cladograms (that appear for each family) include character matrices or accompanying discussion on their construction. Despite these limitations Korth's book, on the whole, produces exactly what its title claims: a solid review of the rodent fossil record for the last 50-plus million years. Having worked with this literature, I know this is no small achievement.

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QUATERNARY INSECTS AND THEIR ENVIRONMENTS. *Based on a seminar course given at the University of Alaska, Fairbanks, 1991.*

By Scott A. Elias; Foreword by G. Russell Coope. Smithsonian Institution Press, Washington, D.C. $40.00. xv + 284 p.; ill.; index. ISBN: 1-56098-303-5. 1994.

There was a time when studies of the Quaternary biota overwhelmingly consisted of two basic types of study: pollen analysis and reconstruction of vertebrate assemblages. Scott Elias has introduced an important third component, insect assemblages, by summarizing the recent accomplishments of a small but dedicated group of fossil insect researchers interested in documenting the response of insect species to the advance and retreat of glaciers during the past 1.7 million years. The relevant take-home message of Elias's readable account are: (1) virtually all Quaternary insect fossils are populations of extant species; (2) the response of insects (especially beetles) toward invasion of recently deglaciated terrain was geologically instantaneous whereas plant colonization of the same areas exhibited a considerable lag, often measured by centuries or more; (3) although apparently there was a major reorganization of many boreal to north-temperate plant communities approximately 11,000 years ago, ". . . certain suites of species appear again and again, having been repeatedly reassembled whenever or wherever suitable (cold or warm) climatic conditions prevailed" (p. 217); and (4) because of these special attributes of Quaternary insects, there now must be incorporation of fossil insect data in local and regional syntheses of organismic response to Quaternary environments. Because Quaternary paleontology has fine enough resolution to address important evolutionary questions, serious students

of the Quaternary need to absorb its principal messages. This book is necessary background for all researchers reconstructing Quaternary landscapes, those interested in species longevity, and especially participants in the emerging debate of faunal stability through time.

As one who has documented long geochronologic durations of insect taxa, I was not surprised that, based on careful studies of beetle genitalia, modern species are found in Pleistocene and Pliocene deposits. Elias convincingly presents arguments that this constancy in morphology also translates to a continuity of genotypes for hundreds of thousands to millions of years. The rapid colonization by scavenging and predatory insects and mites of recently deglaciated terrains, however, was more intriguing. Evidence supports Coope's prefatory comments ". . . that insect species have responded to these climatic changes by *moving* out of trouble rather than *evolving* out of trouble (p. x, emphases his). Thus Elias concludes that constant shifts in biogeographic ranges were associated with minimal speciation or extinction during the Quaternary, at least for boreal and temperate latitudes of the Northern Hemisphere. Given this species-level stability for 1.7 million years in the face of the most profound climatic perturbations of the terrestrial environment during the Cenozoic, and that these species form ". . . fossil insect assemblages of nearly identical composition during the different glacial, interglacial and interstadial climatic episodes" (p. 63), one arrives at the ineluctable conclusion that beetle assemblages migrated during a change in environmental conditions, rather than fragmenting and reassembling as newfound combinations of species. At the ecological level of the assemblage, which probably corresponds to one or a few dietary guilds, Elias supports a species-interactional explanation that provides for temporal persistence of ecologic structure. Interestingly, Elias contends that this continuity is not preserved at the more encompassing level of the ecologic community.

This volume is the first book-length summary and synthesis of a disparate and often inaccessible literature on Quaternary insect studies. As a first cut, it achieves its purpose of providing ". . . a broad spectrum of readers with the necessary background information in the hope that Quaternary entomology will be more widely understood" (p. xii). I would have preferred less attention to successive recitations of the conclusions of individual articles and more assembling of these conclusions into broader interpretations. The graphical illustrations and photographic reproductions visually document points made in the text. One suggestion however, is that a full-page chart of Quaternary geochronology, with temperature reconstruction curves, labels of important glacial-related events, extinction events, and other pertinent data, be available on the inside of the front or back cover for ease of reference. On balance, I heartily recommend this book for a stimulating account in an area of research where neobiology and paleobiology meet.

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PALAEOZOIC VERTEBRATE BIOSTRATIGRAPHY AND BIOGEOGRAPHY.

Edited by John A. Long. The Johns Hopkins University Press, Baltimore (Maryland). $40.00 (paper). xiv + 369 p.; ill.; systematic index, and stratigraphic and locality index. ISBN: 0-8018-4779-6. [Originally published in 1993.] 1994.

The Old Red Sandstone of Europe played a major role in the history of stratigraphy and the history of paleontology. These Devonian formations, particularly of the Middle and Upper Devonian, turned out to be a case where the fossil fishes were particularly valuable as a guide to geological correlation. In the middle to late nineteenth century, discoveries of fossil fishes provided a new key to stratigraphy. The subtitle of Hugh Miller's "*The Old Red Sandstone*" is "New walks in an old field." In turn, the stratigraphy became important in the unraveling of vertebrate relationships.

One hundred and fifty years later, this special relationship between study of fossil fishes and their Paleozoic geology has expanded enormously. The focus is no longer simply Britain and western Europe, but the world from the Canadian Arctic to China and Australia. And the focus is not just on fishes. At the date of writing, more Devonian tetrapods are known than Mississippian ones. This is just one sign of the immense growth in this field over the last fifteen years.

In this most welcome book, 13 authors combine to produce the first world-wide overview of the field. Subjects range from S. Turner on microvertebrates (a much neglected field), to G. C. Young on the macrovertebrates of Eastern Gondwana, to Wang, S.-T. on the vertebrate biostratigraphy of China. The range of discoveries of new fishes from southeast Asia alone (J. A. Long) has been wonderful.

In all the growing activity there is inevitable unevenness, particularly in using the vertebrates to analyse the stratigraphy. It would have been useful if this book had incorporated more of the nonvertebrate biostratigraphic tools. Long's first chapter is a rather disappointing introduction to the wealth of Devonian vertebrate diversity. The book, however, is well illustrated and well documented throughout.

Insects and their products (and algae) were collected in higher amounts than other aquatic resources while their nutritional value exceeds that of those other food resources. Parsons [20] roughly estimates an insect harvest of 10 kg and insect egg harvest of 5 kg every two weeks per ha reaching an annual insect/insect-egg harvest of 3,900 metric tonnes for an assumed available lake surface area of 10,000 ha.Â Elias SA: The use of insect fossils in archaeology. Advances in quaternary entomology. Edited by: Elias SA. 2010, Amsterdam: Elsevier, 89-121. [van der Meer JJM (Series Editor): Developments in Quaternary Science, vol 12.] Google Scholar. 4. Quaternary Insects and their Environments. Smithsonian Institution Press, Washington-London, 284 p., ill., 1 app., 15,5 Ã— 23 cm, 40 $ US, cartonnÃ©. ISBN 1 J 56098-303-5.. An article from journal GÃ©ographie physique et Quaternaire (Volume 49, Number 2, 1995, pp. 185-324), on Ã‰rudit.Â Citation Tools. Cite this article. MLA. Richard, Pierre J. H. "Elias, Scott A., 1994. Quaternary Insects and their Environments. Smithsonian Institution Press, Washington-London, 284 p., ill., 1 app., 15,5 Ã— 23 cm, 40 $ US, cartonnÃ©. ISBN 1 J 56098-303-5." This chapter was originally published in the book Developments in Quaternary Sciences, published by Elsevier, and the attached copy is provided by Elsevier for the authorâ€™s benet and for the benet of the authorâ€™s institution, for non-commercial research and educational use including without limitation use in instruction at your institution, sending it to specic colleagues who know you, and providing.Â Most of our orders of insects were well established in Permian times, at the end of the Paleozoic. Thus, the insects being of infinitely older stock than the higher vertebrates, we are justified in concluding that the history of their earlier migrations and distribution goes back very much further in geological times than does that of the mammals and birds.