it is obvious that *Confuciusornis* was neither terrestrial nor arboreal in the sense of clambering around in trees. The very long pointed wings and highly asymmetrical vanes of the remiges are those of an aerially adapted bird such as a tropicbird, tern, falcon, nightjar, or swallow. The two extremely long central rectrices of some individuals make sense only if used in aerial display, as are the long rectrices of tropicbirds and some nightjars, or in arboreal displays as in some birds-of-paradise.

As Chiappe et al. note (p. 79), the presence of many individuals in a single layer over a small area of lake deposit suggests colonial (or at least flocking) behavior and a catastrophic dieoff, perhaps associated with volcanic activity. I would suggest that the reason *Confuciusornis* is the most abundant bird in the deposit is because flocks of them were flying over the lake when disaster struck. There can be little doubt that the principal means of locomotion of *Confuciusornis* was flight. This is a most important fact because it was flying with a primitive, fused scapulocoracoid without an enlarged acrocoracoid process, it was flying without a keeled sternum, it was flying without an alula, and it apparently was flying without a fully modern avian wrist. *Confuciusornis* shows us, therefore, that we should not posit the highly refined aspects of modern birds as being requisite for active flapping flight. It also removes virtually all of the objections to *Archaeopteryx* being capable of active flight.

Thus, if Chiappe et al. actually understand the true significance of *Confuciusornis*, then they have done their best to prevent it from being revealed. Their paper will stand as an exemplar of manipulation of information to conform to preconceived ideas, but it is otherwise insufficiently credible or comprehensive to constitute a lasting addition to knowledge.—STORRS L. OLSON, *Division of Birds, MRC 116, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560, USA.*

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Avian Growth and Development: Evolution within the Altricial-Precocial Spectrum.— Edited by J. Matthias Starck and R. E. Ricklefs. 1998. Oxford University Press, Oxford. v + 441 pp., 177 figures. ISBN 0-19-510608-3. Cloth, $70.00.—This book is the latest in the long and rich history of seminal articles, symposia, and authoritative reviews on the subject of avian eggs and growth and development of avian embryos. The pioneering work of Portmunn, Nice, Hamburger, Romanoff, and other more recent treatments (Carey 1980, Seymour 1984, Metcalfe et al. 1987, Deeming and Ferguson 1991) published on this subject may serve as a useful background for understanding the foundation on which this book was written. Reading these other books first may be a necessary prerequisite for beginning graduate students or ornithologists/developmental biologists

who do not have the background with which to understand some of the sophisticated approaches employed in this book. Although this book should be present on the shelves of every academic library, it is unlikely to appeal to all but the most enthusiastic students of avian egg/embryo biology.

This book focuses on patterns of development throughout the altricial-precocial spectrum. In this regard, comparative biologists who use the development of the chicken embryo to represent patterns of development in all birds might be in for a surprise. The contributions of the editors, who are authors on 9 of the 17 chapters, present many of the freshest ideas and novel analyses that most represent significant advances over previous volumes. Their chapters cover embryonic growth and development, structural variants and invariants in avian development, comparative analyses of and internal constraints on growth, developmental plasticity, models of avian development, and the evolution of avian developmental modes, as well as patterns of development throughout the altricial-precocial spectrum. New approaches found in these chapters include the development of a new measurement (lean body mass of hatchlings) used in classifying various taxonomic groups along the altricial/precocial spectrum, and the construction of various predictive models. Readers must be armed, however, with a thorough knowledge of statistics and principal components analysis to understand these chapters fully.

The other chapters deal with topics that have been frequently reviewed in the past (ontogeny of thermoregulation, energy metabolism and gas exchange, endocrinology) or with new topics that have not been addressed in the avian egg/embryo forum before (immunology and development of locomotion). However, even in the chapters that cover familiar ground, particularly those by Carol Vleck and Terry Bucher on metabolism, gas exchange, and ventilation, the authors find new issues to cover.

Even without its other contributions, the thorough coverage of the literature, complete list of citations, and plethora of tables make the book a valuable reference. It is an outstanding contribution to the literature on growth and development and will serve as a standard in its field for years to come.—CYNTHIA CAREY, *Department of Environmental, Population and Organismic Biology, University of Colorado, Boulder, Colorado 80309, USA.*

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Rails: A Guide to the Rails, Crakes, Gallinules and Coots of the World.—Barry Taylor. 1998. Yale University Press, New Haven, Connecticut. 600 pp., 43 color plates, 15 text figures. ISBN 0-300-07758-0. Cloth, $49.95.—Among the many family-level bird books that appeared in the 1990s, this is one of the best. Barry Taylor's encyclopedic knowledge of rails leaps from every page of this carefully researched book. Whatever criticisms I put forth here do little to dampen my overall enthusiasm for *Rails,* a book with small but legible print that packs more good information than any mortal could ever absorb.

With clarity, conciseness, and fairness, the introductory section covers the topics of phylogeny, classification, morphology, flightlessness, habitat, feeding, voice, behavior, breeding, movements, conservation, and extinction. Taylor presents the information objectively, unafraid of controversy where it exists, such as in the classification of rails. The new book is much more thorough than the rail chapter that Taylor wrote for the *Handbook of the Birds of the World,* vol. 3 (del Hoyo et al. 1996). Previous to Taylor's efforts, the last time that all rails were treated in book form was in the lavish, large-format *Rails of the World* by S. Dillon Ripley (1977). Except for Storrs Olson's chapter on fossil rails (which is now obsolete in parts but still very useful) and certain of the color plates by J. Fenwick Lansdowne, little need now exists for ornithologists to reach for Ripley's *Rails.*

The species accounts follow a standard format, furnishing 145 species of rails (133 extant, 12 extinct) with a distribution map and a text with sections on taxonomy and nomenclature, identification, voice, description, measurements, geographic variation, molt, distribution and status, movements, habitat, food and feeding, habits, social organization, social and sexual behavior, and breeding and survival. These accounts serve as a proxy for how much we know about some species (13 pages worth for *Porphyrio porphyrio* and 12 for *Gallinula chloropus,* for example) and how little we know about others, such as less than one page for the historically extinct *Porzana monasa* or for the extant *Rallina leucospila.*

The distribution maps are very useful but would be even more so with the addition of place names.