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THE AGE OF BIRDS

ALAN FEDDUCCIA. 1980. Harvard University Press, Cambridge, Massachusetts. 196 pp.

The first book in English devoted to paleornithology (the study of fossil birds and their evolution) was published in 1937 by Gerhard Heilmann and entitled *The Origin of Birds*.⁴ This book was the primary source of information then known on avian evolution. Though some of the text is dated, and certain taxa have subsequently been abandoned or reorganized, it is still highly cited. Alan Fedduccia's *The Age of Birds*, published in 1980, is the current synopsis of this topic but is written in a more popular vein. This book is filled with questions and divergent theories, and collates them in a geologically historical perspective.

Fedduccia's 181 pages of text and illustrations begin as one would expect with *Archaeopteryx* — the earliest known bird, found in the Solnhofen region of Germany in rocks of the Jurassic Period, 140 million years ago. The first chapter also introduces the reader to avian osteology, avian paleontology in evolutionary thought, and flight mechanics, all of which are relevant throughout the book.

The next two chapters deal with the ancestry of birds (dinosaurs or pseudosachians?) and the evolution of flight (cursorial, arboreal or both?).

Succeeding chapters discuss the habitational or general morphological groups: toothed birds; shorebirds; ducks and waders; birds of prey; and land birds. One section (Chapter 6)

discusses flightlessness as an evolutionary adaptation. All chapters are thoroughly researched, with occasional citations of major published works — to this there is not doubt. Fedduccia's expertise (and occasional bias) also surfaces when he discusses birds from the Eocene Epoch.

There are more than 200 illustrations, tables, and photographs, which help the reader understand discussions of osteology, reconstructions and habitat. However, if there is a problem with the book, it is in the consistency (or lack of it) of illustrations. They range from simple line drawings to black and white photo reproductions of colour prints. It would have been more pleasing to the eyes if there had been a competent illustrator on hand to make the graphics more coherent.

Another problem I had was the often overextensive discussions of ornithology as opposed to paleornithology. It is worthwhile to compare distinct forms to related modern species, but it does not seem useful to spend paragraph after paragraph discussing the distribution and habitat of modern species when early ancestors could have had a quite different distribution owing to climatic and geographical differences.

The last factor that should be discussed in some detail is the age of the book. It was published in 1980 and as far as I know no subsequent editions have come forth. This book should be updated. For example, Storrs Olson's publication on avian evolution arranged in systematic order, has collated almost the entire

literature of fossil birds into a cohesive portfolio.⁵

One of the major changes to the book, should Fedduccia consider a rewrite, would be to update the entire first three chapters.

In 1983 Sankar Chatterjee, a paleontologist at Texas Tech University, discovered the remains of a small fossil skeleton over 200 million years old, at the Dockum Foundation of Texas. The fossil, as it turned out, is a fairly advanced bird (at least more so than the next oldest bird, *Archaeopteryx*, at 140 million years) and has been tagged with the name *Protoavis* (see Figure 1). Since 1983, another partial skeleton has come to light and recently Chatterjee officially announced these discoveries to the world.³ His monograph deals with the skull in detail only, with a subsequent monograph on the rest of the body promised. The 69 pages of text and illustrations describe the skull in detail, its cranial structure and comparisons with archosaurs (dinosaurs) and birds (including the famed *Archaeopteryx*). If the paleontological community were to agree with Chatterjee's conclusions, concepts of the organization and early radiation of birds would drastically change. Agreement is not to be found so far.^{1,2,6} Fedduccia had commented that calling *Protoavis* "the original bird is irresponsible" and adds that interpreting the material is like "reading tea leaves in the bottom of a dark cup."¹

The position of *Protoavis* in bird evolution will be determined by the test of time and will be based more on discoveries and re-analysis. It should be kept in the back of our minds that *Archaeopteryx* also went through the same period of scepticism. Herman Von Meyer, one of

the original investigators of *Archaeopteryx*, made the comment about this fossil (also recorded in Fedduccia's book, page 15): "The *Archaeopteryx* is of its kind — just as perfect as a creature as other creatures, and if we are not able to include this fossil animal in our system, our short-sightedness is alone to blame."

The Age of Birds is a fact-filled, easy to read book that covers the broad spectrum of avian evolution and radiation, and should be part of any ornithologist's library. It should also prove interesting to see how future popular synopses of avian paleontology treat *Protoavis*.

Reviewed by *Tim Tokaryk*, Saskatchewan Museum of Natural History, 2340 Albert Street, Regina, Saskatchewan. S4P 3V7

1. ANDERSON, A. 1991. Early bird threatens *Archaeopteryx's* perch. *Science* 253:35.
2. ANONYMOUS, 1991. Early bird born late. *Nature* 351:677-678.
3. CHATTERJEE, S. 1991. Cranial anatomy and relationships of a new Triassic bird from Texas. *Philosophical Transactions; Biological Series* 332:277-346.
4. HEILMANN, G. 1927. The origin of birds. D. Appleton and Company, New York.
5. OLSON, S. 1985. The fossil record of birds. In *Avian Biology*, Vol. 3. D.S. FARNER et al., editors. Academic Press, Toronto.
6. OSTROM, J. 1991. The bird in the bush. *Nature* 353:212.



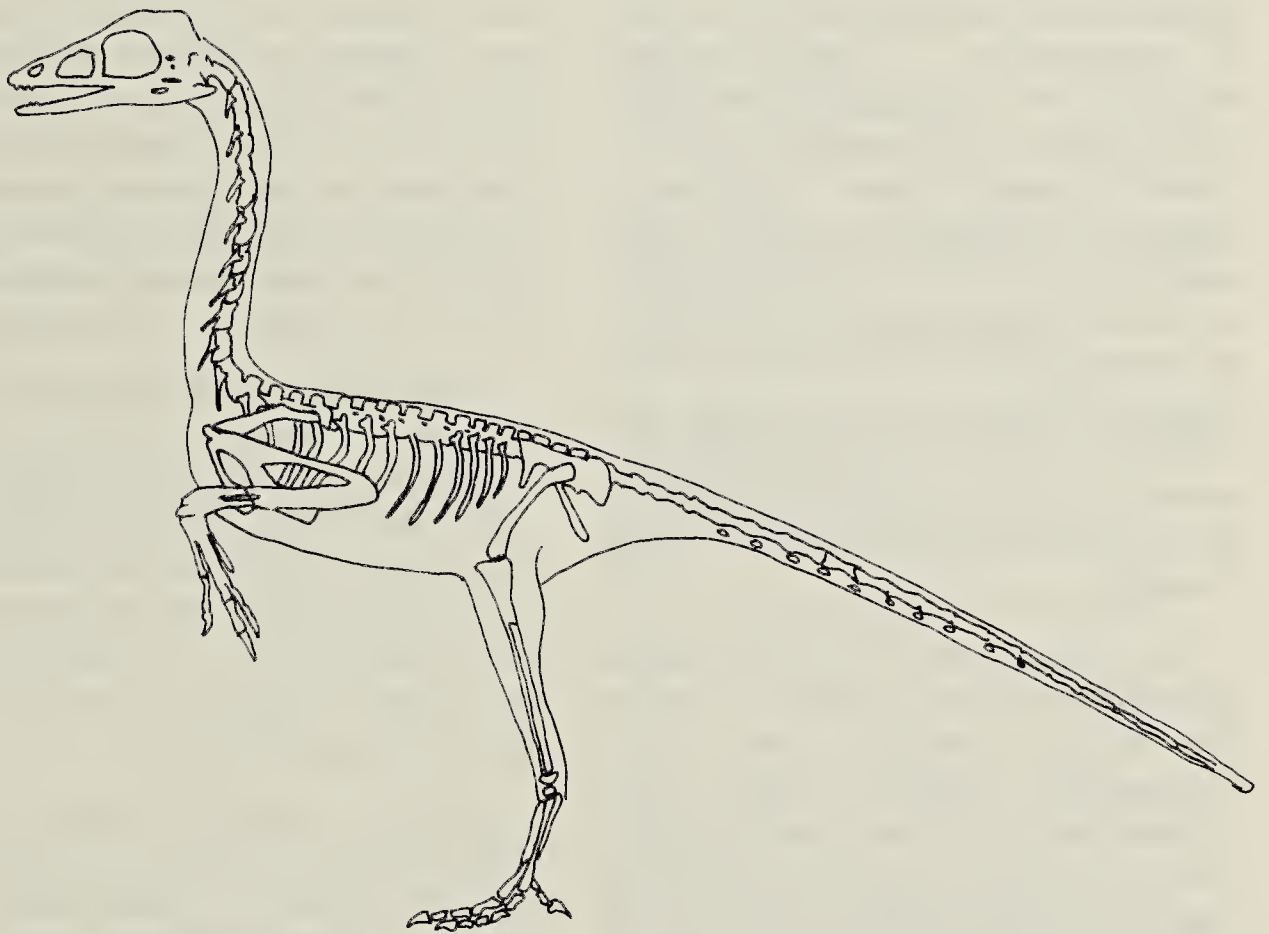
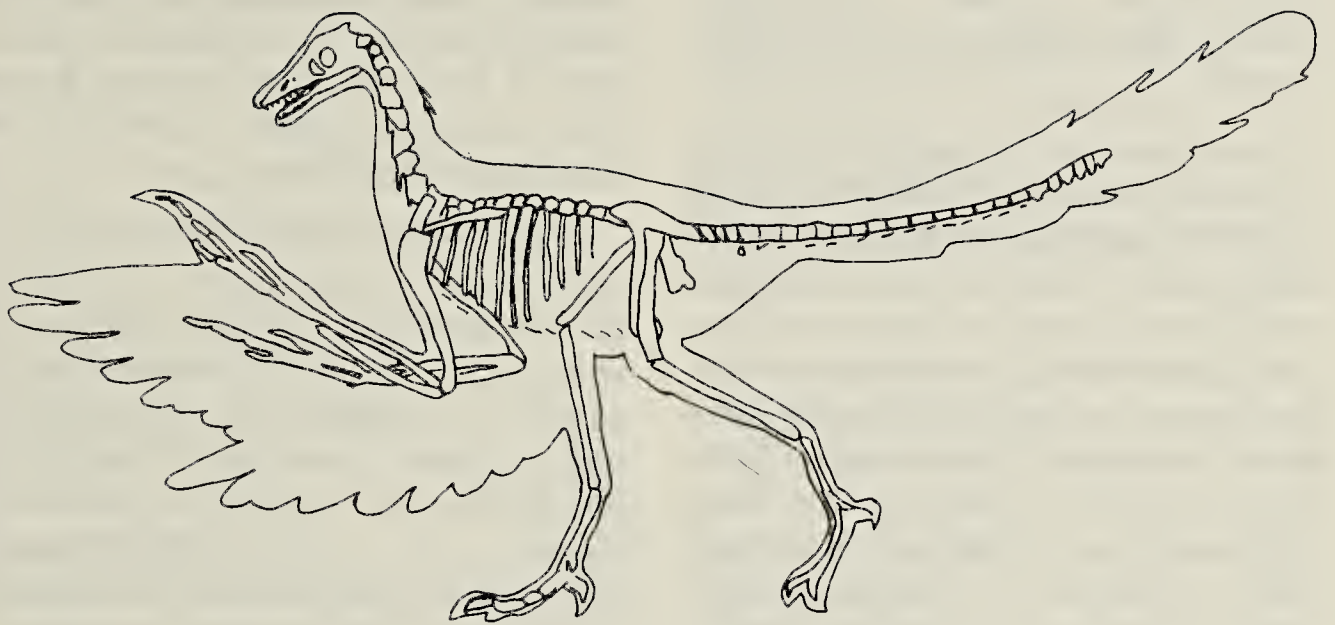


Figure 1. Reconstructions of skeletons Archaeopteryx (top) (after Fedducia 1980, p. 44) and Protoavis (after Chatterjee 1991, p. 285). Neither are to scale.

GEOLOGICAL HISTORY OF SASKATCHEWAN

JOHN STORER. 1989. Saskatchewan Museum of Natural History, Regina, Saskatchewan. 91 pp. Colour and black and white photographs; index. Softcover, \$13.50 plus GST and \$2 mailing charge.

John Storer's *Geological History of Saskatchewan* is a book that many of us have waited for. It fills a void of many years. Now we have available more than a sketchy treatment of our geological history, as well as our native plants and animals and the life forms from which they evolved. Anthony Gordon's *Geology of Saskatchewan: A Historical Approach* (1979, reviewed in *Blue Jay* March 1980, p. 58), was a substantial help, but it lacked colour illustrations. Lack of imagination in distribution and early use of Dr. Gordon's book further limited its usefulness. Dr. Storer's recent book provides a balance of detailed accurate verbal description with colour and black and white photographs and line drawings, an extensive list of references and a detailed index. It is readable and worthy of careful study by both the curious amateur and the serious student of the geology of northern North America.

Two quotations will give potential readers some estimation of quality and clarity in the text. First, on the Ordovician Period, page 28: "Ordovician rocks are very familiar to people because they are normally used as building stones such as the Tyndall stone that faces the Saskatchewan Museum of Natural History, the Legislative Building and many other buildings. Although Tyndall stone is quarried near Winnipeg and shipped from there to other parts of Canada, identical rock is found as glacially transported fieldstone throughout southern Saskatchewan."

For a second example, on the fauna of the middle Miocene, page 68: "Woodland, possibly occurring along stream banks, is also indicated by the presence of hedgehogs, moles, shrews, bassarisks, peccaries, chipmunks, flying squirrels, beavers and a mastodon. This was probably a less dry environment than that of the preceding Topham Local Fauna, but much more open than the Oligocene landscape."

Some of the terms in the quotations used as examples may seem formidable, but most are defined in the text or skillfully related to similar objects or species by the author's appropriately descriptive language. References to the Earth Sciences Gallery in the Saskatchewan Museum of Natural History at Regina will lead readers to mark Regina and the museum as necessary destinations. Whether readers of the book visit our museum or not, *Geological History of Saskatchewan* will provide them with a new perspective of Saskatchewan landforms, present plants and animal species and some vision of the pre-history of our province.

The book has few deficiencies, but the lack of a table of contents could confuse some readers. Similarly, the presentation of a chart of the glaciations and interglacial periods of the Quaternary Period should precede or be placed earlier in the discussion of this major event in evolution of landforms and lifeforms.

Storer's *Geological History of Saskatchewan* is much more than geology. It offers a magnificent expansion of any reader's vision of the province. Moreover, it provides insight into the origin of the Great Plains of North America and the living and extinct forms which characterize this part of our home earth.

Reviewed by J.R. Jowsey, Box 400, Saltcoats, Saskatchewan. S0A 3R0