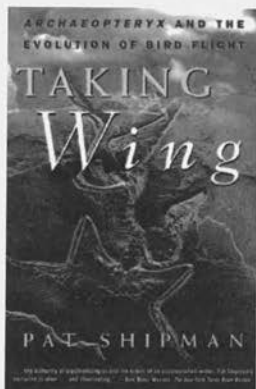


Taking Wing: Archaeopteryx and the Evolution of Bird Flight

William E. Davis, Jr.

Taking Wing: Archaeopteryx and the Evolution of Bird Flight by Pat Shipman. 1998. New York: Simon & Schuster. 336 pages with 77 black-and-white photographs and drawings. \$25 (hardcover), \$15.00 (Touchstone paperback, 1999).



In recent years a deluge of new fossil bird and dinosaur discoveries, particularly in China, has rekindled the debate over the origin and evolution of birds and flight that dates back to the 1860s. This has been highlighted by a flaring of contentiousness among advocates of one theory or another (a pattern that also dates to the nineteenth century), a series of books on the subject, and most recently (February 1999), an international symposium at Yale University titled *New Perspectives on the Origin and Evolution of Birds*.

Pat Shipman has written a book for a general audience that summarizes these recent events (except for some that have occurred since the book went to press). Shipman puts them into a historical perspective built around the "urvogel," or "original bird," *Archaeopteryx*. The first chapter relates the *Archaeopteryx* discoveries, beginning with the first fossil feather impression in 1860, the first skeleton discovered a year later, to, most recently, the seventh skeleton unearthed in 1992. This is a wonderful historical account that documents the impact these discoveries had on the furor over Darwin's then new theory of evolution through natural selection, and the excitement and human drama surrounding John Ostrom's 1970 discovery that a fossil found in 1855, and incorrectly identified, was in fact a specimen of *Archaeopteryx*.


The next two easy-to-understand chapters, "What's the Flap?" and "Flight Plan," deal with the physics of flight, the bone and muscle adaptations for flight in birds, and a brief history of human attempts to fly. Also discussed is the shift of modern paleontology from the study of "lumps of petrified bone" to paleobiology, new classification approaches (e.g., cladistics), and biomechanics.

In chapter four, "Nesting Sites," Shipman begins with a discussion of the definition of "bird." This leads into a maze of bird and birdlike fossils, and nests with young dinosaurs that suggest a more complex level of social behavior for dinosaurs than was formerly thought. Shipman also describes theories of the evolution of birds from reptilian ancestors and the paleontologists who defend one theory or another. The next two chapters explore some of the issues that divide the proponents of the two major theories of the evolution of birds. One theory, that birds evolved from theropod dinosaurs, is supported by most dinosaur paleontologists. The other, which suggests that birds evolved from more generalized, much earlier reptilian stock, is

supported by most avian paleontologists and ornithologists. The debate centers on whether similarities in anatomy are the result of close relationship, indicating a common descent, or a similarity in function, i.e., structures that have evolved to perform similar functions in animals that are not closely related. An example of the latter is the bill of a duck and the analogous structure of a duck-billed platypus. The chapters "A Bird in the Hand" and "On the Wing" explore the debate over the evolution of the bones of the wrist, hand, ankle, and foot of *Archaeopteryx*, and the whether feathers first evolved for flight or for controlling body temperature.

Then follow two chapters that detail the arguments about whether birds evolved from the "trees down" or from the "ground up." The former concept envisions an evolutionary sequence of arboreal creatures jumping, parachuting, gliding, and finally developing flapping (powered) flight. The latter theory postulates bipedal, cursorial (running) dinosaurs that evolved feathers for thermoregulation, and followed an evolutionary sequence from jumping from the ground to flapping flight.

The final chapters deal with comparisons of flight and its evolution in birds, bats, and pterosaurs. Included is an analysis of the flight capabilities of *Archaeopteryx* and the author's conclusions about *Archaeopteryx* and its evolution (I won't spoil it by revealing the ending). One thing is certain: all the answers aren't in, and new fossil finds, some since this book was published, give great promise for eventually settling some of the major debates.

This is a beautifully written book that masterfully reduces the scientific jargon and enormous complexities of paleontological argumentation to writing that is clear, concise, readable, and enjoyable. Anyone with interests in dinosaurs, fossils, evolution, history — or birds — should have a copy of this book. 

William E. Davis, Jr., a member of the Bird Observer staff, selects the cover art for each issue and describes the depicted bird in an essay (About the Cover Bird). He recently donated his massive library to the Cornell Laboratory of Ornithology.

