Taking Wing: *Archaeopteryx* and the Evolution of Bird Flight

By Pat Shipman, 1998, Simon & Schuster, New York, 336 pages. Hardcover $25.00.

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What is an anthropologist doing writing a book about bird origins? Pat Shipman explains that she became interested in the *Archaeopteryx* debates among evolutionists and wanted to answer her own questions, such as "Did its wings fold up fully, like a bird's, or only partially?"

She believes her background allows an unusual perspective, which might help shed light on the origin of bird flight and whether the two *Archaeopteryx* species: *A. lithographica* and *A. bavarica* are ancestors of modern birds. She thinks so. Shipman is an anthropologist who knows bird anatomy well, especially *Archaeopteryx*. She does not overwhelm with stultifying detail, but the reader will learn much about *Archaeopteryx*.

The book's greatest value is the discussions of important anatomical features of *Archaeopteryx*, other birds, and their supposed theropod ancestors. Even an uninformed reader will be able to understand why *Archaeopteryx* is a bird, what features are considered reptilian and what are clearly avian. Most evolutionists regard *Archaeopteryx*' wing claws, teeth, and long, bony tail, as evidence of its reptilian ancestry. The configuration of birds' teeth groups them strongly with crocodilians, which is why Larry Martin believes birds split off from the crocodilians possibly in the late Permian or early Triassic period [about 250 million evolutionary years ago—mid-Flood deposits from our perspective] (pp. 113-114). If you want detailed comparative anatomy of birds and dromaeosaurs (theropods), get *The Rise of Birds* by Chatterjee.

Wing claws are found on many other birds. Shipman notes that the young hoatzin has them. However, so do ostriches, swans, ibises, touracos, and many other birds. Are they also primitive?

Among *Archaeopteryx*' distinctly avian features are its wings, feathers, brain,

skull, and hollow bones. It also has a furcula or wishbone, which Shipman assumes was evolutionarily modified by fusing the collarbones in its supposed theropod ancestors. She says that new evidence indicates a closer relationship between birds and dinosaurs, pointing out that furculas have been found in dinosaurs. She explains that Gavin de Beer argued that *Archaeopteryx* could not fly. She says, "The evidence was its lack of a bony, keeled sternum (revealed to exist in the most recently found specimen) (p 255)." Elsewhere, Shipman says only *Archaeopteryx bavarica* has a bony, sternum, "which is nonetheless unkeeled (p. 212)." Dr. Duane Gish would have like to use this new information, that *Archaeopteryx* even has a sternum, in his debates and books since modern flying birds have keeled sternums. He wanted to show that *Archaeopteryx* was 100% bird that could fly and was not a transitional form. Previously, he had to build his case on the existence of *Archaeopteryx*' furcula to show it could fly. Now his job will be a little easier.

All the *Archaeopteryx* specimens are still encased in limestone. This has preserved how the skeleton was in life. However, it would be nice to see one of the better fossils freed from its limestone matrix, so that more details could be learned. This would probably answer many questions according to Chatterjee.

Although aware that birds have fairly rigid lungs, Shipman does not deal with the major differences between bird lungs and those of alleged theropod ancestors (p. 75). *In Evolution: A Theory in Crisis*, Michael Denton explains that it is physiologically impossible to evolve from bellows type lungs of reptiles to flow-through bird lungs.

What avian features does *Archaeopteryx* lack? For one, it doesn't have the triossial canal. This canal is a bony tunnel through which a strong tendon passes. It acts as a pulley mechanism, and is used during an in-flight wing maneuver. Does the lack of this canal make it less birdlike? Flightless birds, like the ostrich, lack it, but they are not less avian because of it.

There are no overt references to creationists or special creation. Shipman mentions that Rudolph Virchow strongly disapproved of evolutionary theory and that the ideas of natural selection and survival of the fittest "struck at the very heart of mainstream Christian beliefs in divine creation and the immutability of species (p. 23)."

Shipman gives fair representations of opposing hypotheses, including those of Alan Feduccia, John Ostrom, Larry Martin, Sankar Chatterjee, and others. She

reflects how admirably, overall, evolutionists with opposing hypotheses "remained respectful of their opponents and willing to listen to divergent views (p. 278)," but she does not consider the disrespect creationists have received. She debunks Fred Hoyle's claim that someone forged feather imprints in the *Archaeopteryx* fossils.

Shipman details how flight in pterosaurs, birds, bats, and insects might have evolved from preexisting structures that had other functions before developing into effective wings. Could *Archaeopteryx* fly? She thinks so and presents the results of several interesting experiments and calculations that helped her decide. Based on some studies, she thinks *Archaeopteryx* might not have had muscles powerful enough for takeoff. However, she further speculates that it may have been cold-blooded, like reptiles, and because of this, it could produce "burst-level" activity—a non-oxygen burning (anaerobic) activity that reptiles use to produce twice the power generated by muscles of similar size in birds and mammals (p. 266). This may have been sufficient to a power takeoff.

Among others, Shipman's statement that, "All limestone is made up of the fossilized remains of the calcareous skeletons of millions upon millions of tiny marine organisms (p. 188)," convinces me she is a uniformitarian. In the same paragraph, she reflects on a fossil fish with a smaller fish halfway into its mouth, explaining that these fish, *Archaeopteryx*, and other fossils were superbly preserved because the quiet lagoon of Solnhofen was hypersaline and oxygen-depleted. This situation would have been inimical to scavengers, preventing them from ravaging the carcasses that sank to the lagoon bottom. The stagnant bottom waters left the remains undisturbed, allowing the excellent preservation of many fossils. Creationists, however, attribute the high quality preservation of the fossils to catastrophic, rapid burial.

Shipman acknowledges that the present is not the key to the past for avian evolution. She says, "Part of the difficulty lies in the fact that the past was not like the present. Dinosaurs aren't birds—at least, not birds as they are now—and the first feathers weren't feathers as they are now, either. Even *Archaeopteryx*, the hallowed First Bird, isn't a bird as birds are now; it is only closer to them than it is to anything else we can lay our hands on, (p. 278)." She admits that there is no known common ancestor for birds. What came before *Archaeopteryx*? She says, "But now the focus must be on the steps between theropods, the most probable ancestor of birds, and *Archaeopteryx*. 'Proavis' is still a mystery (p. 272)."

Shipman makes an interesting observation about evolutionists' speculations. She says, "Reconstructions of fossil-free ancestral birds became popular. In 1915, William Beebe described another hypothetical ancestor. 'Tetrapteryx,' which had feathers on both fore- and hindlimbs. In turn, German scientists started to write of the 'Urvogel,' the primeval or essential bird. Of them all, only 'Proavis' took on a life and personality of its own. 'Proavis' is still universally recognized as *the* ancestral bird [her emphasis]—the one that preceded *Archaeopteryx*, and the one that truly gave rise to all later birds. Although its iconic status is not quite as hallowed as that accorded to *Archaeopteryx*, 'Proavis' is still dear to a great many paleontologists and ornithologists (p. 112)."

Problems with this book might include some inconsistency. For example, clarity falters when Shipman discusses whether or not *Archaeopteryx* has a keeled sternum, as shown in her parenthetical remark following her mention about Gavin de Beer's refusal to accept *Archaeopteryx* as a flying bird. One might be lead to believe *Archaeopteryx* had a keeled sternum, although she emphatically stated earlier in the book that *Archaeopteryx*' sternum was unkeeled. Also, not a bird expert, she tends to state speculation as fact, e.g., "Without dispute, bats evolved from a once-gliding ancestor (p. 188)." She then admits bats have a poorer fossil record than birds and says:

> Thus the evolutionary transition from flightlessness to flight in bats is completely undocumented in the fossil record; there are no clues to guide researchers other than the characteristics of living forms and the constraints of aerodynamics and ecology. Nonetheless, there is 'overwhelming' evidence that bats evolved from an arboreal, mammalian glider (p. 236).

As evidence, Shipman recites the similarities between bats and modern gliding mammals. Perhaps, her confusion arises from the lack of evidence and her unswerving commitment to evolutionary descent from a common ancestor. Her attempt to reconcile the lack of fossil evidence by using modern mammals to justify her claim of "overwhelming evidence," e.g., the flying lemur which glides and hangs upside down when not flying, betrays her unwillingness to consider creation as a possible answer.

Taking Wing is an excellent book to begin a serious study about *Archaeopteryx* and the origin of bird flight. It is not burdened with technical jargon and would be a good introduction to bird paleontology and avian anatomy. It will prepare the serious creationist apologist to answer evolutionists who believe that

Archaeopteryx is the best example of a transitional form.