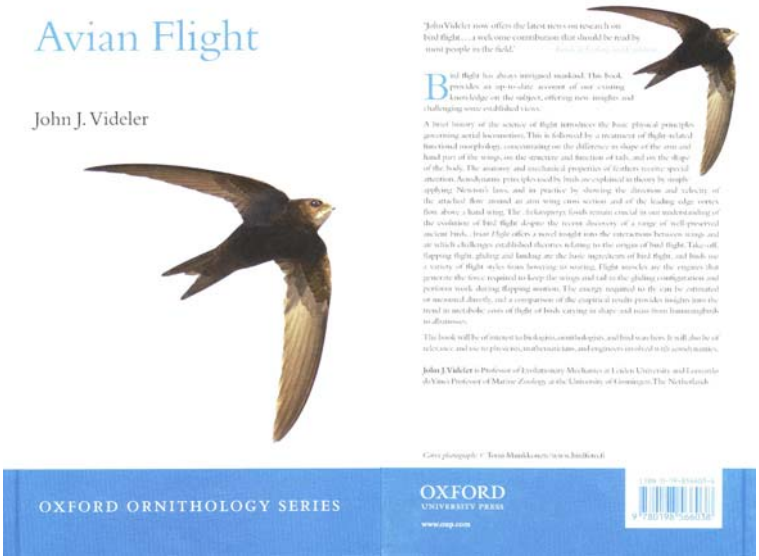
Videler, J.J. 2005. Avian Flight. – Oxford, Oxford University Press (Oxford Ornithology Series, edited by T.R. Birkhead. Volume 15)

Book review by I.J.J. Nieuwland



Let us call it the 'Linus Pauling Dilemma': should you judge a scientist (or a book, for that matter) by the overwhelming amount of competent work that he has performed, or by his oddities – which, in Pauling's case, put him firmly inside the 'lunatic fringe'. It is a thought that comes up whilst reading John Videler's 'Avian Flight'.

For on the one hand this is an expertly written introduction into all aspects of bird flight. What makes it even better is that Videler's narrative emphasis is not so much on the mechanical *minutiae* of avian flight, but rather on explaining and describing what makes it all work. There is enough mechanical detail for those who want it, but the fact that it is largely separated from the main text makes this book a treat for experts as well as newcomers to this fascinating field. His writing style, moreover, is enthusiastic and colourful.

Videler takes a wide approach. The result is a text that shares many new insights from a variety of different disciplines, with nine chapters that are thematically divided. The first one treats the history of human interest in flight, from prehistoric times to the present. Here, again, Videler's erudition is apparent, and more importantly it is embedded in a good sense for the historicity of developments (which can easily be lost amid the overwhelming positivism so general in this type of publication). The subsequent two chapters go into avian morphological adaptations for flight. Especially the structure and function of feathers are treated in detail. Chapter 4 describes the most important environmental circumstances relating to bird flight: aerodynamics. Here, particularly, one is pleased not to be flooded with detail – examples in the text, and illustrations, are insightful and well–chosen. Chapter 5 deals with the evolution of bird flight; we will return to this later. The remaining four chapters are dedicated to bird flight modes, their 'flight engine', energy required for flight, and the metabolic 'costs' of flight, respectively. All are treated extensively, and made more accessible by the incorporation of numerous, well–chosen examples.

A very worthwhile publication, then? Certainly. But a problem crops up when we start to look at bird evolution, in chapter 5. Considering the breathtaking pace at which new fossils are discovered and the frequently violent discussions on the origin of bird flight, this is indeed a difficult subject to treat in such a book. In fact, a book about this topic is almost always dated by the time it appears – for instance, Videler mentions eight known specimens of the first bird *Archaeopteryx*, whereas we now have ten (including the recently–found 'Thermopolis' specimen, Mayr *et al.*, 2005). One could therefore ask why Videler decided to include this topic in the first place.

The answer to that question probably lies in his adaptation of the 'Jesus Christ Lizard hypothesis' (p. 99–113): the idea that *Archaeopteryx* used its wings to run across the water in the same way a modern Meso–American basilisk lizard *(Basiliscus sp.)* does (Videler, 2000). The explanation of the development of flight–specific adaptations from pre–adapted earlier forms is still one of the main, and one of the most heated themes in discussions on the evolution of bird flight. After all, what good would half a wing do if it did not give the creature that possessed it another evolutionary advantage?

That idea, although generally ignored, provoked a reply (from among others this author), challenging its physical, morphological, and environmental assumptions (Ma *et al*., 2002). Pages 99 to 109 consist of Videler's reply to this challenge. Unfortunately, it is apparent that the author first of all *wants* his *Archaeopteryx* to run over water. As a consequence, the evidence is presented very much to demonstrate that it could have been possible. Not that it seems that *likely*, mind you. Typical for this attitude are sentences such as (p. 111): "[...] none of the *Archaeopteryx* specimens shows that there are more biomechanical solutions to the problem. *Archaeopteryx* could have used the Basilisk or the Grebe technique or even used a completely different method to run at the surface." The question of *whether Archaeopteryx* would run at the surface in the first place does not seem to merit discussion. Moreover, the 'reply' does not treat essential elements in our criticism of the hypothesis, such as the geography of the Solnhofen area and important differences between *Archaeopteryx* and *Basiliscus* in the anatomy of the feet and general propulsion technique. A closer proximity to Occam's razor would have done Videler no harm in this respect.

Returning to the opening sentences of this review, the problem we are faced with is this: should we see this as a quirk from an otherwise competent author; or does the wishful thinking in chapter 5 indicate a problem that also casts doubt on the rest of the work? If so, that would be a shame, because this appears to be a very detailed, expertly written and most informative work – even if it is seriously flawed in this one respect.

Videler, J.J. 2005. Avian Flight. – Oxford, Oxford University Press (Oxford Ornithology Series, edited by T.R. Birkhead. Volume 15). 280 pp. ISBN13: 978–0–19–856603–8; ISBN10: 0–19–856603–4. Price € 114,50 (hardback).

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