

## The Inner Bird – Anatomy and Evolution

By G. W. Kaiser. 2007. UBC Press, University of British Columbia, 2029 West Mall, Vancouver, British Columbia V6T 1Z2 Canada. 386 pages. 85 CAD. Cloth.

Although not as richly illustrated as Feduccia's 1999 book on bird evolution, Kaiser's book is an up-to-date summary of the evolution of birds, including both sides of some of the debates in the field. As its title suggests, the book has little to do with plumage. Only one chapter discusses feathers at any length, presumably because plumage has contributed little (though ever-increasing amounts) to our understanding of bird evolution, relative to the bones, and now the use of DNA. It is the bones that dominate the other chapters, with only passing discussions of soft tissue systems like gas exchange, muscle and digestive.

The book is well organized from basic skeletal anatomy through the dinosaur-bird integrate, to adaptations of birds which allow them to exploit different environments. The chapters of the first section, *What is a Bird*, provide a good anatomical background to the understanding of the future chapters on avian evolution, as largely interpreted by the bones of the fossil record. The author also draws parallels between the extant and the extinct, helping to infer how the latter lived. There is plenty of space devoted to comparing and contrasting birds with dinosaurs.

The frequent references to the primary literature (and a correspondingly large list of references), suggests a thoroughly-researched work. Having said that, there are more than a few (but not a lot of) factual errors. For example, the author claims that feathers are not evolutionarily derived from scales, but hair is; in reality, the reverse is largely considered to be true. Semicircular canals, despite being part of the ears, have nothing to do with hearing, as the author suggests. Double-headed ribs are not unique to birds and dinosaurs, they are widely distributed among the tetrapods. Most of the errors I found were anatomical — it's not clear to me if the cause of this is that the author is a seabird biologist who does not specialize in anatomy, or the reviewer is a specialist in anatomy, and therefore wasn't finding errors in other components of the book which lay outside his specialty.

## Seabirds: A Natural History

By A. Gaston. 2004. Yale University Press, [Christopher Helm], P.O. Box 209040, New Haven, Connecticut USA. 210 pages. 45 USD.

Canadians should notice the publication of this book: Since seabirds tend to be good indicators of the ocean environment, they represent how the three Canadian oceans are dealt with. The author, a leading employee

This book fills several gaps in recent ornithological literature. Ornithology textbooks of today, unlike the not-so-distant past, do not spend much space on skeletal anatomy, and when they do, the accounts are largely restricted to the chicken as the typical example. So much of the wonderful variation of avian osteology is described in Kaiser's book, that all researchers could be inspired here. However, it would take a multivolume series to fully explore this field. There are several places in this book where another diagram or two would really help the reader understand the structures being described in the text.

The second section, *What kind of bird is it?*, does as much, as any review book can, to survey the complex evolution of birds from dinosaurs, and the subsequent radiation into their more restrictive clades. Convergence is always a problem to deal with, and has been addressed. Several cladograms are presented, some based on physical characteristics, some, as is the trend, based on DNA. Additionally, there is a lot of discussion of other taxonomic research whose cladograms are not re-illustrated in this book. Given the amount of space allotted to avian evolution, the author has managed to cover the breadth of the topic quite well.

The third section of the book, *How does a bird fly?* takes us from a chapter on feathers and feathered dinosaurs (the shortest chapter in the book) through to adaptations that allow birds to exploit terrestrial and aquatic habitats (with a look at both aerial surface-foragers and diving marine birds). It presents unresolved conundrums such as why loons and grebes fly at considerable height over water, whereas murrelets and cormorants (among others), fly just over the water's surface. These conundrums help to create a book of intrigue, not just one of facts.

Birders will be fascinated with this book as it is written in a language that they will be able to appreciate; ornithologists will find enough detail to satisfy and stimulate them as well.

### Literature Cited

Feduccia, Alan. 1999. *The origin and evolution of birds*. Yale University Press, P.O. Box 209040, New Haven, Connecticut. 480 pages.

RANDY LAUFF

St. Francis of Xavier University, Antigonish, Nova Scotia  
B2G 2W5 Canada

with the Canadian Wildlife Service (CWS) of Environment Canada, presents us with his life's work summary of what seabirds are like, and how they fit into the world. It makes for a challenging book on a complex topic.

The text of 222 pages makes usually for a rather delightful naturalist reading, but it falls short on most relevant conservation management issues citizens are

concerned about. This has been the profile of the Canadian government for decades, and it is nothing a Canadian can be really proud of, or be happy with.

The author has tried to provide us here with a “Naturalist view” on seabirds. Not taking on responsibility that comes with scientific knowledge and being in a high-ranking governmental research position, he tries kindly to retreat into telling “amazing stories” about seabirds (relevant statistical analyses are virtually lacking) and to promote the idea of an “objective” expert science (one that is mostly funded by taxpayers). It blurs the lines because the entire lack of any reference to by-catch, overfishing, (chronic) oil and plastic pollution, and even climate change (topics known for over four decades and globally discussed these days) shows us how wrong this concept from the 1960s has drifted by now: in the wider view of things, such a profile basically makes for a subsidy destroying Canada’s oceans (and its seabirds) even further (e.g., Bandura 2007). Evidence comes from the well-knowing author who states that large seabird populations must have existed prior to contact with the (western) human race. He also gives a faint hint that the wrongly assigned and outdated mandates of CWS (looking after seabirds) and the Department of Fisheries and Oceans (Canada) (DFO; looking after fish and the oceans overall) need an urgent revision towards a more meaningful and sustainable concept.

In the elaborate 10 chapters, Gaston presents his assembled expertise, covering “the gamut of seabirds” with topics as diverse as Seabird Types, Adaptation, Plumage, Distributions and Communities, Feeding Behaviour, Migration and Movement, Breeding, Coloniality and Its Consequences, Birth and Death Theory & Observations. An Afterword, a Bibliography and an 11 page Index conclude this compact little book on seabirds of the world with 50 figures and 13 tables. The publication is rather nicely illustrated with photos, colour plates and drawings in black/white by D. Powell, J. Chardine, T. Lash, the author’s wife and others.

“Thick-billed Murres may not be the wisest birds in the world” so why study them for your life, and put entire government budgets behind them at the cost of other (more important) things? Gaston never really justifies this question crucial to Canada, but promotes marine ornithology being an interdisciplinary science. He criticizes, correctly, that “seabirds never received much attention from marine biologists.” His book is “Looking at seabirds on a global scale” (although Gaston seems to lack relevant seabird experience in the Antarctic, Russia and the pelagic ocean).

The taxonomy presented in this publication shows no source, and comes from the early 1990s. But as a seabird biologist, biological oceanographer, birder and naturalist, you still want to read this book. This is because it is strong on the brainstorming and intellectual side; e.g., density-dependence *vs* food shortage, and life history questions. Gaston stuns us with conclusions like Emperor Penguins, albatrosses and large petrels would

be more similar in their demographics than pre-agricultural humans. He cites Sindbad the Sailor, and some rather funny text sections are found. The sea is a good place to survive, but a poor one to reproduce (because eggs do not float). Perhaps that’s why “Compared with terrestrial birds, there are relatively few species of seabirds”? This publication shows that seabird diversity is higher in the southern hemisphere: the highest number of breeding species occurs on the Crozet archipelago.

Classic seabird concepts carried over from the good old British seabird science days in Oxford and from others (e.g., Murphy, Wynne-Edwards, Lockley, Lack, Nelson, Nice, Cairns) can be found throughout the chapters, e.g., Ashmole’s Halo, Hungry Horde and Information Theory where to find food (widely dismissed in animal behavior textbooks though). Readers will learn in some rather fascinating text sections whether birds walk or hop, whether there is territoriality at sea, what the effects are of buoyancy in diving seabirds, how Kleptoparasitism evolved, what chick obesity is, “What is a Colony”, whether eye size is a limiting factor in underwater feeding, why seabirds are not smaller, why the U.S. Navy picked colors for their warships matching the plumage of the Antarctic Prion, that most seabirds have a long neck (but a small hindtoe and short tail), whether they can smell, whether “reciprocal altruism” exists in seabirds, how white wing tips and related feather pigments attract flocks, that seabirds can drink saltwater, have feathers for isolation, why they have beak and face ornaments in burrow-nesting seabirds, how foraging range is related to life history, the impact of aspect-ratio for wing loading, that auklets have one of the most unusual songs and that Wandering Albatross take 20 years to develop a mature plumage. Gaston makes a good point that there has been no relevant progress in bird navigation studies for virtually 100 years.

I further liked his hypothesis that the presence of Bald Eagles precludes the existence of Common Murres in the Northwest Pacific, that colony locations existed for thousands of years affecting colour morphs (e.g., in fulmars), and that sharks would generally limit predatory behavior in the tropics. Other fascinating questions deal with diving behavior, why are there no tubenoses in Indonesia, whether seabirds would be “among the most weather-dependent of birds”, are chicks at smaller colonies better fed, and do “leks” occur in seabirds; e.g., for Razorbills on boulders? Interesting for biogeographers is the section on “Convergence and Co-Evolution” analysing three boundary upwelling zones (California, Humboldt and Benguela Currents) and their avian communities and endemics.

Gaston’s writings on colony-related questions, are obviously strong, specifically for Thick-billed Murres and Ancient Murrelets (basically his life-long pursuits). The spectacular breeding displays of seabirds are not “overly” covered. But readers will appreciate the review of seabird wrecks and irruptions, and find the provid-

ed overview tables and maps very useful (e.g. islands where the world's endemic seabirds are found).

Seabird dispersal and migration is covered in informative detail (e.g., for phalaropes, jaegers, Bonaparte's and Sabine's gulls). Regarding telemetry (a big topic in seabird research these days), resource selection and biomass/prey models, this book is a disappointment. Also no work is presented that involves Geographic Information Systems (GIS) or online mapping initiatives. The book presents monogamy and seabird mating systems, but lacks the exciting findings on Extra-pair Copulations (EPCs), as well as on Stable Isotopes (e.g., Canadian flagship work by K. Hobson) and on the Wilson's Storm Petrel (probably the most abundant bird in the world). The author is also plain wrong in his statement that our ability to predict hot-spots for seabirds would be poor (accuracies of over 80% are reported in the literature). But he is absolutely right that many pelagic seabird colony, survey and distribution data are still unpublished and not publicly available, blocking progress on the world's seabird research and management (examples are found for the Arctic, Antarctic, Indian Ocean, with BirdLife International and many of the surveys involving funding from the U.S. National Science Foundation, ICES and PICES for instance).

Being a naturalist and a modern scientist can mix, beyond log-transformed linear regressions. And so, it's too bad that the demography chapter ends with literature of the late 1980s (whereas a real explosion has happened in this discipline in the last two decades making for a main scheme in colony-based seabird research and management). One should always be doubtful when facts in biology get presented as "it makes sense that" (as done in this book).

Another serious omission is that Gaston does not make reference to another major reference on seabirds by Schreiber and Burger (2002), nor to the extensive works by Nettleship or Montevecchi (or the classic papers on smell by Newell). Since the author is being an international editor for seabird journals, one won-

ders why that is? Citation biases are definitely not professional. The tragedy here is for Canada and its seabirds that the Gaston style equals more or less the CWS style (instead of for instance, Anderson et al. 2003).

Compared to other disciplines, it is striking that so little real progress has been made on seabirds and their habitats and management ("Seabird ecology does not provide many Eureka! moments"), when considering the chronic oil-spill situation in our oceans, overfishing in Newfoundland and elsewhere, and that 17 out of the 19 albatross species are basically of major conservation concern (two species occur in Canadian waters). Considering the impacts of climate change, the times for story telling and of a science that "objectively" gets removed from adaptive management is probably over, certainly for seabirds in the Arctic (a topic Gaston is an expert in) and where we are facing a warming of 8 degrees Celsius.

Overall, we are left here with a nice Gaston-style publication and his views as a self-defined CWS naturalist, but naturalists of this world do cover much more ground and are usually rather concerned about sustainability. A more serious book about seabirds and their habitat, management and conservation — beyond just interesting stories and facts — still awaits to be written so that Canada can be proud again of its traditionally well-balanced values, (governmental) research and an ocean science that truly achieves, long-term.

#### Literature Cited

- Anderson D. R., E. G. Cooch, R. J. Gutierrez, C. J. Krebs, M. S. Lindberg, K. H. Pollock, C. A. Ribic, and T. M. Shenck. 2003. Rigorous science: suggestions on how to raise the bar. *Wildlife Society Bulletin* 31: 296-305.
- Bandura, A. 2007. Impeding ecological sustainability through selective moral disengagement. *International Journal for Innovation and Sustainable Development* 2: 8-35.

FALK HUETTMANN

Biology and Wildlife Department, Institute of Arctic Biology, 419 Irving I, University of Alaska, Fairbanks Alaska 99775-7000 USA

## BOTANY

### Monograph on Bamboo in China

By Yi Tongpei, Shi Junyi, Ma Lisha, Wang Haitao and Yang Lin. Science Press, Beijing, China. 2008. 766 pages, 480.00 CNY Cloth.

In phytotaxonomy, bamboo are monocotyledon woody perennial evergreens (except for some temperate species) plants in the family Gramineae (or Poaceae), subfamily Bambusoideae, tribe Bambuseae. According to the statistics, worldwide totalling more than 70 genera and 1200 species of bamboo covers a total area of about 22 million hm<sup>2</sup>. Bamboo is distributed between the Tropic of Capricorn and the Tropic of Cancer, covering the tropical, subtropical and warm

temperate areas. China, especially the southern part of China, is located in the central distribution area of bamboo. Bamboo in China has 39 genera and 509 species, which is 36% and 39% of the total number of genera and species of bamboo in the world, respectively. Bamboo area in China is about five million hm<sup>2</sup>, which is 4% of the total area of forest in China, and 25% of the total bamboo area in the world.

Early in the period of Yangshao and Hemudu Cultures, about 6000-7000 years ago, the Chinese began to use bamboo in their daily lives and production activities. In China, bamboo has been extensively used in