Pelicans, Cormorants, and Their Relatives: The Pelecaniformes

Author: Schreiber, E. A.

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veyance of comparative anatomy and behavior. Knowledgeable readers will wince at statements that nuthatches are zygodactyl and that gannets and pelicans have supraorbital salt glands, leaving them a bit uneasy about the accuracy of descriptions of lesser-known Mesozoic fossils. The proximal expansion of the cnemial and patellar regions of foot-propelled divers is for hypertrophied pedal and digital flexors and extensors, not to provide a lever for the hind limbs. The *supracoracoideus* muscle is not characteristically smaller in birds with high wing loading; quite the reverse is true. Gruiformes and Pelecaniformes are suggested to have originated in Gondwana, owing to the geographic distribution of extant species, but genetic evidence contradicts their monophyly. Many readers will be disappointed to find no list of characteristics shared by birds and alvarezsaurids or to define Enantiornithes, inasmuch as these are central to the lengthy discussions of these taxa. At times, there is protracted use of Latin binomials without adequate accompanying illustration—for example, where alluding to the great diversity of enantiornithe tarsometatarsi. Chiappe also seems to have experienced author's fatigue. The first half of the book is more conceptual, whereas the second is more taxon-specific. The eloquent verbiage of earlier chapters eventually gives way to increasingly frequent grammatical and spelling errors, and repetitive themes and phrases.

I confess disappointment for the authoritative professional reference this book almost is, but is not. Professional utility could be greatly augmented without detracting from the meandering narrative, simply by including numerical citations in the text and a full bibliography of primary literature at the end, as well as by the addition of key character matrices where they are available. Certainly, no other author could have succeeded in accommodating both audiences, for Luis Chiappe's experience and international networks in the field are unparalleled. I may be faulted for measuring a popular text with a professional's yardstick, but one should not underestimate the influence this text could have on the professional growth of its readers. It was indeed a natural-history magazine article that led directly to my first professional ornithological field experience. This also will likely be the first point of reference for many nonspecialists in the ornithological community. A book that is otherwise so inspiring should not be dumbed-down for lay readers who are clearly eager to learn the Latin names of fossils and anatomical structures. I have no doubt that some interested readers of *Glorified Dinosaurs* will be insatiable. Apparently, I am one of them.—Peter Houde, *Department of Biology, New Mexico State University, Las Cruces, New Mexico 88003, USA. E-mail: phoude@nmsu.edu*

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Pelicans, Cormorants, and Their Relatives: The Pelecaniformes.—J. Bryan Nelson. 2005. Oxford University Press, Oxford, United Kingdom. ix + 680 pp., 12 color plates, 159 drawings, 62 maps. Illustrated by J. Busby, A. Mackay, and A. Teunis. ISBN 0198577273. Hardbound, $174.50.—Seventeenth in the series *Bird Families of the World*, this volume covers the complete Order Pelecaniformes in six families and follows the general format of previous volumes in the series. Relationships among the families, fossil history, general descriptions of the characteristics of each family, and taxonomy are discussed in Chapter 1. Behavior and breeding biology for the order in general are discussed in Chapters 2 and 3. Chapter 4, "Pelecaniformes and Man," covers a broad range of topics, including human disturbance of colonies, conservation, use of logging devices to study birds, conflicts with fisheries, and mythology. Chapter 5 provides general accounts of the six families. These chapters constitute Part I, and individual species accounts appear in Part II. The volume contains one appendix of measurements. The format of having some characteristics of the order discussed in Chapters 2 and 3, then further discussion of characteristics in the family accounts (Chapter 5), and finally discussions of characteristics for each species in the species accounts (Part II) makes it difficult to know where to go to look up particular information, which may be presented in any of the three places and sometimes in all three.

Sixty-five species are included in Pelicaniformes, lumping the now recognized Nazca Booby (*Sula granti*; American Ornithologists' Union 2000) with the Masked Booby (*S. dactylatra*) ("to me, unnecessary splitting"). Nelson suggests name changes for the Cape Gannet (*Morus*

capensis; "African Gannet") and Northern Gannet (*Morus bassanus*; "Atlantic Gannet"), though there does not appear to be any support for this.

Coverage of individual species (Part II) is uneven, emphasizing Nelson's main species of study, gannets. Thirty pages of text are devoted to Atlantic Gannets, whereas 10 cover two well-studied species, Brown Pelicans (*Pelecanus occidentalis*) and Double-crested Cormorants (*Phalacrocorax auritus*). Some cormorants receive only about two pages.

Some species descriptions have omissions. Two examples: on page 278, the description of male pouch color in the Brown Pelican is correct for the California population only (Schreiber et al. 1989); and on page 352, the description of soft-part colors in the Red-footed Booby (*S. sula*) leaves out the dramatic, distinguishing color differences between male and female in some regions (Palmer 1962 and others).

In the sections on growth of young in each family account, Nelson illustrates allometry of growth in chicks in several graphs but offers no discussion of potential reasons for this. He also does not discuss the extensive effects of weather on growth, which could greatly add to the reader's understanding of the ecology of the species. For instance, in a discussion of differences in growth rate in Red-footed Boobies (pg. 356), he says that chicks fledge at 14–17 weeks "depending on region," without mentioning that the occurrence of an El Niño can change growth rate within a region from year to year. Differences in growth rate among areas could indicate that the studies were done in different years, and not necessarily reflect regional variation in growth. The ability of chicks to grow more slowly in times of poor food availability and still survive to fledge (Schreiber 1996, Wilson 2005) is an important adaptation in seabirds.

Throughout the book, the author makes frequent, and often questionable, speculations about behavior, breeding biology, and the reasons some of these characteristics have evolved. I do not have space to list all the statements (mostly without citations) that I question, nor to provide the data that cause me to question them, but I will give a few examples. For instance, the lack of a gular pouch in tropicbirds (Phaethontidae) "has important consequences…in that it generally requires a hole or shaded site [for nesting] which can lead to severe competition with…fighting and eviction of chicks" (page 6). Having watched tropicbirds pant to dissipate heat similar to the way pelicans do, I cannot say what effect the lack of a gular sac has on the choice of a nest site. One might ask why white terns can nest in direct sun without having a gular pouch. In my studies on two species of tropicbirds, I have rarely seen any competition for sites, and I have observed chick eviction even more rarely.

On page 30, Nelson states: "Acting against permanent [pair] bonding is the difficulty of precise synchronization of reproductive condition in an aseasonal environment [the tropics]…." The environment of the tropics is definitely not aseasonal; wind levels, rainfall, air temperature, current speed, upwelling locations, and food availability change seasonally (Longhurst and Pauley 1987), and most species nest seasonally. On page 31, differences in the type of nest built "are to do with energetics: each species does no more than it needs." Yet some Red-footed Boobies build nests 2–3 feet tall, whereas others throw together barely 2 inches of twigs for a nest. Obviously, some do more than is needed. Additionally, we have no data on what is energetically different between Brown Boobies, which build a nest, and nearby nesting Masked Boobies, which do not. Neither has a problem with water chilling the chick, which Nelson suggests is the reason some ground-nesting pelecaniforms build a nest whereas others do not.

Similar problematic, unsupported speculations are found throughout the text. I provide five examples of 54 that I noted. First, being tied to a colony increases the "risk of…death when landing and departing the colony" (page 47; something I have never seen). Second, regional differences in egg size being related to food availability (page 59; I have found these differences to be directly related to differences in adult size and totally unrelated to food availability). Third, "only species with post-fledging feeding can afford to fledge with out…having exceeded adult weight" (page 78; not true in tropicbirds). Fourth, in sulids, "the upper mandible…is movable via the naso-frontal hinge" at the base of the bill, "which helps to accommodate large prey" (page 132; this does not explain how prey get past the jaw hinges or the fact that the upper bill hinge allows birds to get more pressure at the bill tip to hold slippery prey in the bill). And fifth, "plumage differences in the Brown Booby are linked to the environment" (page 390; no data given). The reader should keep in mind that

many statements are the author's opinion and do not necessarily reflect data from studies. This same problem was noted in a review of Nelson's *The Sulidae* (Schreiber 1979).

There are no citations from papers published after 2001 (the past six years), so that newer data, published since the common use of satellite transmitters and dive loggers, and from DNA studies (which have provided significant advances in our understanding of pelecaniforms), are missing. Further, Nelson cites summary volumes, such as Marchant and Higgins (1990) and del Hoyo et al. (1992), instead of going to the original literature. Knowing how slight changes in meaning can occur each time an author cites another's work, I am leery of what an author is saying when secondary sources are used. The use of these secondary sources, also, does not help the reader find where to read more about the topic.

Distribution maps, presented under family descriptions, present uneven coverage, giving breeding locations for all the tropicbird species (3) and booby–gannet species (9) but lumping all frigatebird species (5) and all cormorants (39), and no map is given for the Anhingidae (2). It would be good if the series editors had a standard procedure for maps that provided similar information among species and volumes.

Black-and-white drawings by John Busby are well done and make an excellent contribution to understanding the behaviors of the species and the general gestalt of the animals. His sketches add greatly to the text, capturing, in his own unique way, accurate postures and the real feeling of the bird. Birds in the color plates by Andrew Mackay are small and lack detail, making using the plates for identification difficult. It would have been more useful to have the identifying black-and-white drawings (presented in the family accounts) placed near the color plates, so that full identification information for a species was presented in one place.

Measurements given in the Appendix are written in paragraph style and are difficult to use. Tables would be much preferred; and to have them located with the species accounts would be even more useful. There are a few typos and errors in the text, as always seems to happen in a publication of this size, and the reference section has many errors.

Bryan Nelson provides us with another extensive review of his many years of study on gannets and boobies in this work, as well as a summary of much of the literature on them and on other pelecaniform species. He provides some good discussions of interesting, unsolved questions about pelecaniforms in Chapter 3, Breeding Ecology (e.g., the difficulties of determining whether food depletion occurs around seabird colonies, possible causes of brood reduction, and reasons for colonial breeding). The volume is very readable. It will be most useful to researchers and students working on these species and in libraries with graduate programs in ornithology.—E. A. Schreiber, *Pelican Springs Lodge, 122 Jump Cove Road, Weaverville, North Carolina 28787, USA. E-mail: schreibere@aol.com*

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