

the Spotted Sandpiper (*A. macularia*) reported years ago in the Ibis (1968, 110: 574). It should also be noted that the record for Buff-breasted Sandpiper (*Tryngites subruficollis*) from Rapa, evidently based on Holyoak's report (Notornis 23: 2, 1976) is in fact a record of a Ruff (*Philomachus pugnax*) (Mem. Mus. Nat. d'Hist. Nat. 127: 79, 1984). These omissions from and errors in the checklists were found after only a cursory search so I have real reservations about their overall reliability. However, these lists should at least provide an idea of birds to look for in the various areas covered.

Should you buy this book if you are going to Hawaii and the tropical Pacific? Absolutely. There is nothing else like it. The book contains an immense amount of information in a small space, enough so that it is somewhat more than a field guide if perhaps less than a manual. The authors are to be congratulated for having produced a noteworthy guide to an area that has long needed one.—**Roger B. Clapp**, National Ecology Research Center, U.S. Fish and Wildlife Service, National Museum of Natural History, Washington, DC 25060 USA.

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Seabirds: Feeding Ecology and Role in Marine Ecosystems.—J. P. Croxall (Editor). 1987. Cambridge University Press. vii and 408 pp.—The role of seabirds as top consumers in marine ecosystems has been the subject of world-wide research over the past two decades, and this book is a fine summary and synthesis of recent findings. An often-burned, potential book-buyer tends to be wary of multi-authored, symposium-based volumes. But no caution is required with "Seabirds." Coverage is even, and high standards are maintained throughout the 16 chapters by 22 authors, and all have taken care to provide thorough coverage of their topics. Each chapter includes informative summaries of pertinent information, intriguing generalizations, and tantalizing displays of the gaps in current knowledge. The authors, and especially the editor, are to be congratulated for their efforts.

The book is an outgrowth of a symposium on "Seabirds and nutrient cycles"

arranged for the XVIII International Ornithological Congress in Moscow in 1982. The delay in publication has only enhanced the volume as new information has been incorporated, and there is little sign of the usual errors associated with a rush to publication. The book's title is a fair indication of its content, which is divided into four chapters on such general problems as ecological scale, flight, diving, and prey robbing, four chapters on the feeding ecology of various seabird groups, and six chapters on community energetics. An introduction and a conclusion by the editor provide a context for the chapters. The editor pithily describes this context as the "nature of seabird diets," and it is that unassuming goal that provides the strength and cohesiveness of the volume. It is not a volume to get lost in imponderable or unprovable theory, but one that does not shrink from testing hypotheses using the admirable base of information that has been accumulated on these birds. Geographic coverage is complete, including a chapter on the much neglected tropical seabird communities. Taxonomic coverage is purposely biased toward the "true" seabirds, the penguins, pelicaniforms, and alcidids, with less attention being paid to the nearshore larids.

The taxonomic chapters provide overviews of the food and feeding ecology of various groups. Croxall and Lishman contribute a comprehensive discussion of the extensive literature on penguin foraging, discussing similarities and differences in diet, behavior, and ecology. Prince and Morgan cover the same ground in the procellariiforms. Perhaps the most surprising result of the summary of pelecaniforms feeding, by Schreiber and Clapp, is the lack of information on the details of foraging for most species, other than cormorants. This is a group worthy of additional study in tropical systems. The feeding ecology of alcidids in the eastern north Pacific is discussed by Vermeer, Sealy, and Sanger, who also emphasize important gaps in knowledge.

Hunt and Schneider, in the initial chapter, discuss the concept of ecological scale as it pertains to the study of ocean processes. It is a thoughtful attempt to correct the tendency of the uninitiated to think about the oceans too homogene-

ously. Pennycuik discusses adaptations and constraints on seabird flight by an ingenious act of Special Creation of "the standard seabird" using only three variables (body mass, wing span, and wing area). The author is then able to calculate many aspects of flight and energetics and explore how various seabirds deviate from his standard. As an example of the strength of such an approach, the author calculates that a penguin's much diminished wing could not only permit it to fly but also to cruise at the impressive speed of 40 m per s. Unfortunately to do so, it would have to beat its wings like a hummingbird, and they are too big to withstand such stresses. But they can be used at lower frequency to fly through the denser medium of water. Such intriguing insights abound, derived in large part from standard aerodynamic models. Less is known about diving, but Kooyman and Davis similarly discuss the topic from a hydrodynamic and metabolic perspective. Furness provides a comprehensive review of prey robbing and especially examines hypotheses that have been proposed to account for various aspects of the interaction. He usefully divides robbers into opportunists and specialists.

Community energetics and trophic relationships are covered in the final chapters. Harrison and Seki and Croxall and Prince use energetic models of daily

energy requirements to investigate seabird communities in the tropical and polar environments, respectively. Schneider, Hunt and Powers contrast energy flux in the Bering Sea and North Atlantic. Duffy and Siegfried, evaluating the other end of the path of energy flow, use guano deposition rates to calculate historical variation in food consumption. Sanger evaluates trophic structure in the Gulf of Alaska and concludes the most seabirds function as secondary carnivores. Croxall and Prince, in their review of one of the best known systems in South Georgia, conclude that a fuller understanding of seabird predator-prey dynamics will require additional knowledge of the dynamics of prey populations. This, in fact, is one of the take-home messages of the book: additional attention needs to be paid to patterns of prey abundance and of prey availability. Briggs and Chu have attempted to make such a connection between feeding and food in California, where the most incisive work has been done. The interaction between bird populations and fishery practice remains one of the most compelling reasons to study seabirds, and this book is an excellent contribution to that understanding.—**James A. Kushlan**, Department of Biology, University of Mississippi, University, Mississippi 38677, USA.

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