

Bird Nests and Construction Behavior

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Bird Nests and Construction Behavior.—Mike Hansell. 2000. Cambridge University Press. Cambridge, United Kingdom. xi + 288 pp., 22 halftones, 80 figures, 12 tables. ISBN 0-521-46038-7. Cloth, \$80.—By closely examining the nests of birds, we get a glimpse of solutions to the general problems associated with oviparity. How do birds trade-off the costs of predator detection with the benefits of thermoregulatory control? How are nests constructed and which materials are most commonly used? What are the behaviors associated with nest construction? Is nest construction a sexually selected trait? Are there patterns among closely related groups? Such questions (and many others) are addressed by Hansell in this book. Hansell goes to great lengths to convey to his reader that the nests of birds (and other creatures) offer a wealth of information about a species' current ecology and evolutionary history. In doing so, his book underscores the importance of paying attention to those structures, in addition to their builders.

Ornithologists have long been interested in the diversity and function of nests that birds construct, as demonstrated by numerous publications on this topic ranging from early works on avian nests (e.g. Ad-

ams 1871), numerous field guides for identifying the builders of nests (e.g. Baicich and Harrison 1997), to many recent papers that formally address hypotheses about nest architecture, both historically (e.g. Winkler and Sheldon 1993) and functionally (e.g. Soler et al. 2001, Tortosa and Villafuerte 1999). Although Collias and Collias published a very thorough treatment of nest building and bird behavior in 1984 (that text is now out of print), Hansell's book has much new information to offer. For example, he provides very practical instructions for quantifying characteristics of nests in the third chapter and he carefully describes the structure of bird nests, layer by layer, in the fourth and fifth chapters.

This book introduces to the reader a very complete set of factors related to the study of nests. In many places, the review of current literature, including a list of alternative hypotheses, is healthy. I found the discussions of (1) the nest lining, including the use of green plant materials (Section 5, Chapter 5), (2) the costs of nest building (Chapter 6), and (3) the influence of predators on site selection (Section 4, Chapter 7), to be particularly useful to the student interested in studying the breeding ecology of birds. In general, this text contains loads of interesting ideas for students looking for projects, either in the museum or field.

In his first chapter, Hansell clearly states that a goal of his book is to create a general treatment of nest building so that the principles outlined in his book can be applied to nest builders across taxonomic groups. Accordingly, the first chapter serves as a general introduction to the topic of nest structure and building behavior. Hansell strives to delineate commonalities among the diversity of nest builders starting with examples of how "animals build artifacts to extend their control over the environment" (p. 2). In doing so, he places birds as builders within the context of other animal builders. Indeed, Hansell's knowledge of the nests of other taxonomic groups is evident—many examples of nonavian nest structure and construction behavior are peppered throughout his text to bolster the notion that the problems of nest building are not unique among birds. For example, Hansell provides an extensive review of the associations of bird nest sites with arthropods, termites, ants, bees, and wasps (Chapter 7, pp. 172–185). However, this book is not a formal comparison among nest building taxa, rather, non-avian examples are assiduously included to highlight a particular point about bird nests.

The scope of Hansell's book is impressive. For example, in his second chapter, Hansell attempts to condense decades of research on several major questions in ornithology, ranging from a discussion of evidence of parental care in dinosaurs, a summary of age-old debates about the evolution and function of oviparity, and a whirlwind tour of literature regarding optimal clutch size. The novice will be thankful

for this review before Hansell embarks on specific considerations, for example, the discussion of the nest and clutch size. However, the veteran who is familiar with this literature may find it rather superficial. That is forgivable given the ambitious breadth of Hansell's book.

The third chapter of this book, in particular, contains a useful guide for formalizing the study of nests. Hansell provides careful definitions regarding the classification of nest types and materials. The reader will find the figures that accompany those definitions to be very helpful. Although most useful for interspecific investigations, this chapter may also provide insight into measuring differences among individual nests of the same species.

Based on the protocol in Chapter 3, Hansell created nest profiles of more than 500 species, each based on one museum specimen. All of the information in the fifth chapter (the functional architecture of the nest) is collected from the nest profile data, which clearly underscores the importance of augmenting the nest collections of most museums. Although Hansell offers several tips for collecting nests throughout the book, it would have been worthwhile to formalize the procedure in one place in the book. Important considerations for the collector (besides a proper permit) are to be sure that the species in question does not rely on the nest for reuse or use the nest as a cue for locating a nearby suitable habitat. Hansell also notes that it is vital to collect information about where the nest was located, and in particular, how the nest was attached to the substrate upon which it was built (p. 106).

Hansell's book provides so much information that I often found myself in search of a way to organize the data to get a sense of patterns (e.g. taxonomic, ecological, or physiological similarities). For example, the fourth chapter contains a laundry list of construction behaviors, each with many interesting avian examples. At the end of this chapter, Hansell proposes ideas about the role of learning and genetic bases for building behavior (pp. 87–88). But without a clear organization of that information, whether by taxonomy or ecology, it is hard to discern among those possible explanations. By the last chapter of the book, it is obvious that many researchers have used phylogenetic analyses to look for trends among related groups with little success. Hansell remarks, "there appear to be few aspects of nests, in terms of either their design or composition, which are not to be found in a number of unrelated families" (p. 95). He later concludes that there appear to be a limited number of solutions to the problems of creating a protective environment for eggs and young. However, birds appear to be quite flexible in their solutions to that problem, as demonstrated by myriad similarities in the structure and materials of birds among closely related and disparate groups (p. 122). Still, it seems that similarities of nest characteristics

in unrelated families warrants another way of synthesizing the enormous amount of data, perhaps by ecological factors, including similar problems of predators, thermoregulatory considerations, and the availability of materials. Because (1) Hansell does provide so much data, (2) all species names are highlighted with an asterisk so one can easily skim the book for species-specific data, and (3) all of the references are located in one place, the investigator interested in such comparisons will have no trouble using the information in this book.

Hansell's book contains loads of information that will be both helpful to the scientist and interesting to the enthusiast. Overall, this book is comprehensive, although an interesting omission is a consideration of interspecific brood parasites who do not build nests at all, and contains both well-known and novel examples. Thus, it is thorough, engaging, and fun to read. Hansell's book will be enjoyed by students of ornithology, animal behavior, ecology, and evolutionary biology. It will become a valuable part of the collections of university libraries, professional ornithologists, and those generally enthusiastic about all things avian.—REBECCA JO SAFRAN, *Department of Ecology and Evolutionary Biology, Cornell*

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