

Animal Architecture.

Mike Hansell, Oxford University Press, 2005, 322 pp.

ISBN 0-19-850751-8 (hardcover), ISBN 0-19-850752-6 (paperback)

Most people are familiar with natural structures created by animal activities, e.g., spider webs, ant and termite mounds, animal burrows etc. In this book, which is an extensively updated version of Hansell (1984), the author synthesizes research on a daunting array of topics relating to such structures. The result is a comprehensive and inclusive review of the science of animal architecture with respect to every conceivable aspect. For example, physical and chemical properties of various structures are discussed in detail throughout. Applicable ecological and behavioral terminology is also introduced and defined throughout the book. Of particular value are the author's efforts in identifying knowledge gaps, weaknesses and strengths of research, and even offering previously untested hypotheses which could stimulate further research.

The book comprises eight fact-packed chapters. Each chapter is highly structured with objectives, a review of all aspects relating to the objective, and a summary. Chapter 1 introduces animal architecture as driven by three basic functions: "to create a protected home, to trap prey, and for intraspecific communication." Hansell then discusses these functions in order to set the stage for the rest of the book. Chapter 2 discusses the exogenous and endogenous types of materials used by animal architects. Considerable space is justifiably devoted to silk, but other interesting materials are also covered in depth. Chapter 3 describes animal behaviors and anatomy, but also construction methods that are linked to these. For example, various means of connecting building components are described in great detail, and the process of building is discussed extensively. Chapter 5 deals with the essence of architecture as I think of it, namely design and mechanical elements, and how the design constrains or optimizes growth. Chapter 6 discusses costs, solutions and trade-offs of building, e.g., optimal horizontal segment-lengths of pocket gopher-burrows, and an interesting and detailed discussion of the responses by spiders to stimuli (prey availability and size) in the context of metabolic costs of web-construction. Chapter 7 discusses the role of animals as habitat engineers, including a discussion of the keystone species concept and its validity or lack thereof. The final chapter discusses the importance of animal architecture from an evolutionary perspective, including the potential for using architecture as phylogenetic evidence.

Most of the examples used in this book come from invertebrates, particularly spiders and social insects, but

the author has done an admirable job in covering all animal groups. If I had one disappointment, it would be a relative lack of information relating to ant nests (with a few notable exceptions), in spite of a considerable body of literature on this topic. A quick search of "nest architecture", for example, on the online ant bibliography Formis yielded 71 references (<http://cmave.usda.ufl.edu/~formis/searches.html>). Despite this omission, one can not fault the breadth of the author's review of architecture literature, as is evidenced by 48 pages of references for the text. Hansell's grasp of this literature is evident throughout, and he discusses physical ecology with the same authority as animal behavior. This is truly an impressive book in that sense.

In spite of having a mere 255 pages of text, it took me a long time to get through this book, although perhaps that is more a reflection of my own limitations than those of the book! Examples in support of the discussion are numerous, and sometimes appear to be presented in a somewhat mechanical and unengaged fashion. The book has very few typographical errors, but it appears that even the proof readers were exhausted at the end, because the frequency of typos is clearly higher in the final three chapters than in the first five. Nevertheless, these errors do not detract from the value of the book. One of the author's objectives is to present animal architecture as "a coherent biological topic which gives us important insights." I believe Hansell has done an excellent job in that regard.

My interest in reviewing this book related mostly to my fascination with spiders and ants. I was very pleased and impressed with the extensive information on spiders, but somewhat less so with ants, as stated above. Nevertheless, I believe this book is well worth its price (\$124.50 US (new) hardcover from amazon.com, \$61.98 US paperback from walmart.com(!)), particularly for researchers interested in an extremely thorough and detailed reference book. At the very least, I think this book is a must for any self-respecting library at a university or research institution.

B. Staffan Lindgren

Ecosystem Science and Management

University of Northern BC

Prince George, Canada

References

Hansell MH. 1984. Animal architecture and building behaviour. London: Longman