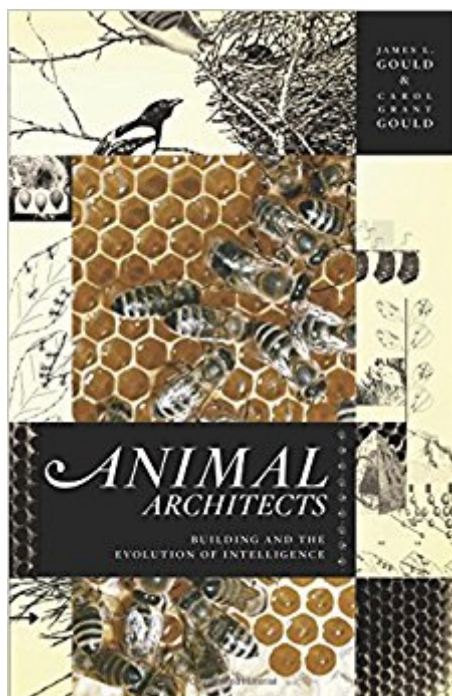


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# Animal Architects: Building And The Evolution Of Intelligence



## Synopsis

Animal behavior has long been a battleground between the competing claims of nature and nurture, with the possible role of cognition in behavior as a recent addition to this debate. There is an untapped trove of behavioral data that can tell us a great deal about how the animals draw from these neural strategies: The structures animals build provide a superb window on the workings of the animal mind. *Animal Architects* examines animal architecture across a range of species, from those whose blueprints are largely innate (such as spiders and their webs) to those whose challenging structures seem to require intellectual insight, planning, and even aesthetics (such as bowerbirds' nests, or beavers' dams). Beginning with instinct and the simple homes of solitary insects, James and Carol Gould move on to conditioning; the 'cognitive map' and how it evolved; and the role of planning and insight. Finally, they reflect on what animal building tells us about the nature of human intelligence—showing why humans, unlike many animals, need to build castles in the air.

## Book Information

Hardcover: 336 pages

Publisher: Basic Books; 1 edition (March 12, 2007)

Language: English

ISBN-10: 0465027822

ISBN-13: 978-0465027828

Product Dimensions: 6.1 x 0.8 x 9.2 inches

Shipping Weight: 1.2 pounds (View shipping rates and policies)

Average Customer Review: 4.3 out of 5 stars 12 customer reviews

Best Sellers Rank: #1,486,194 in Books (See Top 100 in Books) #102 in Books > Science & Math > Biological Sciences > Zoology > Animal Psychology #331 in Books > Science & Math > Biological Sciences > Zoology > Animal Behavior & Communication #4861 in Books > Politics & Social Sciences > Anthropology > General

## Customer Reviews

In order to elucidate the thought processes of animals—and those processes' evolution—the Goulds (*The Animal Mind*) consider those animals' egg caches, cocoons, webs, nests and other structures. According to the authors, "complex nervous systems exist to make sense of the world

The Goulds (he's a leading animal behavior expert, and she is a science writer) present an

eye-opening survey of an underappreciated facet of animal life--the building skills of insects, birds, and mammals. Because most animal architecture is hidden from human view, we are unaware of the extent of animal ingenuity, so the revelatory tour the Goulds conduct elicits one wow after another. They dissect the sophisticated construction and elegant aesthetics of coral reefs, webs, cocoons, hives, nests, dams, lodges, and towers, marveling at the resourcefulness of animals in terms of the materials they produce and collect, the tools they fashion, and the "astonishing complexity" of their structures. They also dispel the old assumption that animals are simply programmed to build, creating out of instinct. Instead, as painstakingly gathered evidence reveals, animals invent new skills to solve problems and communicate their intentions. As our ancestors knew, there is much to be learned from other species, especially now as we endeavor to create ecologically sound human architecture and technologies. Donna Seaman Copyright © American Library Association. All rights reserved

Interesting information, though the writing style leaves a bit to be desired. Lots of interesting "factoids" but only worth it if you have a particular interest. Ranges from termites to beavers to birds.

I found this to be book full of thoughtful discussions and excellent examples of how animal brain development and social behaviors influence and are influenced by the structures they build. Would very much recommend it!

Good read

Nice and well illustrated volume. Pretty useful and excellent material for both lecturers and students. Highly recommendable for neophytes as well.

I am actually a computer scientist interested on robotics, and find this book an excellent source of inspiration for autonomous systems.

Gould and Gould write about a fascinating subject. Unfortunately, the book is not as readable as it could have been. The authors have a bad habit of getting into new topics with a welter of detail and only then coming back to basics or making larger points or providing context. The result is that I'm often lost--what's the species they're talking about? What are the basic facts about it? I keep asking myself who their intended reader is. I think they intend to speak to a general audience, but they

don't think enough about this audience's needs. The book is written in a plain textbook-like style, without much poetry, context, allusion to bigger issues, or the like. Still, I have learned quite a bit by reading it.

This book is somewhat more concerned with animal intelligence than animal architecture. The authors explore architecture in the context of things like learning and understanding instinct. Using such words as "intelligence" and "architecture" is a little misleading, in the sense that to build a building implies an act of will--siting, design for purpose, construction, systems such as electricity and water. The animals explored are intriguing but their structures show, I think, more of adapting an instinctual base structure, than planning. I have read the book twice, and both times found much of interest. This is not a particularly easy read, so preview the book a bit before you purchase it. Sections are a bit slow. The book explores what can only be describe as structures, in insects, birds, mammals and so on. The text sometimes gets in the way of the fascinating information. I personally found the accounts of bowerbirds and beavers to be the most interesting. The bowerbirds pose the question of, do these birds in some way we don't fully appreciate have a sense of aesthetic? And, beavers not only build dams but repair them, and there is a sense of an awareness of hydrology in their response to flooding, dam breaks, and other events affecting pond levels. This is not the best book an animal architecture, but it is a good one. Think of the book as a collection of case studies that compare how different species adapt instinctive behaviors about their structures to environmental challenges. I actually rate the book as between three and four stars, deciding on three because I found the writing style to be an issue in portions.

Asking a lone wasp dragging a cricket across a paddock how she finds her way home won't elicit much response. Interrogating a honeybee about why she's doing this task now, while she was engaged in something entirely different a short time ago will net you little information. The Goulds, however, delve into some of the motivations behind animal behaviour. In this easily accessible volume, they provide some interesting and challenging answers to the question of how animal minds work. In doing so, they overturn some long held misconceptions - most notably the one that declares only humans have broken the bonds of innately determined behaviours. This is highly speculative material, but the proposals are well thought out and amply supported by the workers cited. The underlying proposal is simple: the other animals are only slightly more prompted by innate drives than we are. Categorizing the behavior of other animals as "just intuition" is demonstrably fallacious. Whether we label it "reasoning power" or "cognitive ability" is irrelevant.

The point is that even that solitary wasp is confronted with the need to make decisions that will take her from a fixed path. She can, and does, survey changed conditions in order to achieve a desired goal. She is not fixed in her responses and can adapt using her mental resources efficiently. The authors use various forms of "mappings" to explain how variations of cognitive capacity and ability are found in nature. That solitary wasp, for instance, needs to locate the burrow where she's left her egg. Somehow, tucked in her miniscule brain, there's record of landmarks around that tiny hole in the soil, allowing her to move with confidence. Shift the landmarks - a stone or twig - and she's confused. Her Local Area cognitive map has become unreliable. Yet, if she's typical, she'll have other nests - each with their own landmarks to tax her mental map. Moving up the cognitive ladder, there are wasp groups who build nests of mud or paper. They must perform a sequence of operations in the construction process to ensure the nest is the proper shape, weight and balance. From this start, the Goulds demonstrate how animal constructions reflect cognitive abilities requiring decision-making and adaptive variations. From the complexities of spiders building webs, birds constructing an extensive variety of nests and beavers' wide-area engineering projects, "animal architects" refute our common belief that "instinct" is the central controlling factor. The Goulds propose that cognitive mapping can be shown to advance from the individual and its surroundings, through various levels of complex reasoning needed to complete the organism's task to complete a goal. It's important to note that these are in no way predictable, hence, innately driven, steps. Adjustments must be made for local conditions. When those adjustments mean interacting with co-workers in different ways, then the group must make decisions. The authors use bees as a significant example. Too often classified as a "socialist" species, the Goulds demonstrate honeybees are the finest example of free enterprise in Nature. Individuals must shift roles as conditions change, with each bee making independent decisions on a course of action. The steps involved require the insect to sift through several available options, using mental processes the authors describe as "Tiers". Sets of Tiers may include Local Area Mapping, Social Mapping - which likely includes Hierarchical Mapping of status, and the ultimate, Network Mapping where many forms are brought together to complete one or several tasks. This book is awarded five stars with some reluctance. Although the ideas themselves are well presented and supported by good examples, a glance at the "Readings" for each chapter gives one pause. The list suggests that little on these topics has been published during the past generation - except their own, of course. The authors deal with many forms of life, with insects predominating. Yet, their only reference to Edward O. Wilson is a single work. John Alcock's studies don't appear, nor do those of Bert Hölldobler, Thomas Eisner, Bernd Heinrich or other workers. None of those researchers' efforts would

challenge the Goulds' proposals and their omission is an enigma. Instead, there are long renditions of the pioneers in various related fields. Valuable, but necessarily incomplete. Even so, this work is too innovative and challenging to ignore or dismiss lightly. Cognition, whether human or other animal, is a significant field, growing rapidly. The authors list many topics requiring further study. One can only hope this book will inspire younger readers to take them up and help resolve them.  
[stephen a. haines - Ottawa, Canada]

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