ELIZABETH COWLES, DEPARTMENT EDITOR

ANIMAL BEHAVIOR

Built by Animals: The Natural History of Animal Architecture. By Mike Hansell. 2008. Oxford University Press (ISBN: 978-0-19-920556-1). 280 pp. Hardback. $29.95.

Built by Animals is a very unique book about animal architecture–it answers the "who, what, when, where, why, and how" of building in the animal kingdom. It is written for the armchair scientist, although only those with a basic understanding of biology (and sometimes chemistry and physics) will appreciate some of the more comprehensive explanations. The book focuses on the "decision-making" that accompanies building behavior. It goes beyond the structures themselves, though they are fascinating, and delves into their construction, the evolution behind the construction, etc. It is a can't-put-it-down sort of book with a lot of "aha" moments. The writing flows well and is often in "first person."

Experiments regarding building behavior are mentioned throughout the book, and help illustrate many of the author's points. For instance, some caterpillars roll birch leaves for temporary retreats, creating shelters that enhance biodiversity in the area. There are surprising examples of species co-existing (small birds nesting in the huge webs of social spiders in Africa); examples of different shapes of homes (termites building flattened mounds to possibly help their food stores dry out faster after seasonal flooding); examples of animals selecting building materials by certain sizes (caddisfly larva picking out specific sizes of sand grains), manipulating building materials for stability (mud daubers and swallows vibrating mud as they build, to achieve uniform consistency and prevent cracking), even parasites that manipulate their host's building behavior (parasitic wasps forcing spiders to spin cocoon webs before sucking them dry)!

You may find your knowledge of animal architecture challenged. Those perfect hexagons in beeswax aren't purposefully made by the bees–it is just a result of heat from the hive softening the wax that flows into those forms. Weaver birds have handy beak shapes for weaving, but birds spend many more hours using their beaks for nutritional rather than nesting purposes, so beak shape is most likely to indicate diet. Evolution does affect nest design–the common ancestor of the swallows and martins dug a nest burrow, and variations on the design gradually led to mud nests on cliffs.

When ants go looking for bigger homes for the colony, how do they estimate the size of a new space? Experiments have shown that they use the principle of "Buffon's needle," laying down scent trails and determining how frequently they intersect. Within leafcutter ant colonies, job specialization is determined by head size, while in bee colonies, age determines the job. Sometimes the home itself dictates the job. Some species of wasps, upon detecting a hole in their nest, will get material to repair the hole. Other wasps in the nest that detect the hole will do the same until the hole is fixed. Not all social insects are fixed into rigid roles.

One chapter is devoted to tool use–did human tool use lead to a more nutritious diet and therefore bigger brains? Did social behavior? Do tool users in the animal kingdom necessarily have more intelligence than other species? What defines tool use? Tool use by–and experiments with–birds, apes, monkeys, and even insects are discussed in this chapter.

There is an excellent example of honest signal in sexual selection, and that is the example of the spotted bowerbird bowers. The more green berries displayed in a male bowerbird's bower, the more matings that male will achieve. An experimenter put extra green berries in a few bowers, and the birds removed them! Extra berries means more attacks from rival males, which damages the bower and doesn't increase mating frequency. It doesn't always pay to cheat.

The book is written at the level of an advanced or AP Biology class. It would be excellent reading for anyone interested in animal behavior or even architecture. Some of the explanations are rather in-depth–spider webs not throwing insects back off after they hit the web because of hysteresis and aerodynamic damping, for instance. It's truly fascinating, but even the author warns, "If you feel your eyelids getting heavy at the mention of such things, then you might be tempted to skip a couple of paragraphs. . ." Recommended readings and references by chapter are in the back. If you don't have time for your class to read this book, I recommend that you read it and use excerpts in your teaching. It is definitely a must-read if not a must-have in your collection!

Shelley Mitchell, MS, NBCT
Science Teacher
Stillwater High School
Stillwater, OK
smitchell@stillwater.k12.ok.us

ELIZABETH COWLES teaches freshman biology, biochemistry, and entomology at Eastern Connecticut State University. She has taught at the undergraduate and graduate college levels for over 20 years. Her interests include insect toxicology, protein characterization, and astrobiology. Cowles holds degrees in biology and biochemistry from Cornell University and Michigan State University. Her address is Department of Biology, ECSU, 83 Windham St., Willimantic, CT 06226; e-mail: cowlese@easternct.edu.

PLANT PATHOLOGY & PLANT BREEDING

American Chestnut: The Life, Death, and Rebirth of a Perfect Tree. By Susan Freinkel. 2007. University of California Press. (ISBN 978-0-520-24730-7). 294 pp. 1 black and white photo, 1 line drawing, 1 map. Hardcover. $27.50. Available under $19.

This book outlines the history of *Castanea dentata* after the establishment of European settlements on the North American continent. It opens with a photograph of 1910 showing the trunks of four magnificent chestnut trees dwarfing two woodsmen. Before the text there is also a 1938 distribution map of chestnut from northern Maine to southern Alabama and from eastern Rhode Island to central Arkansas. These illustrations give