

Bees: Nature's Little Wonders

By Candace Savage. Greystone Books. 2008. Paperback, \$16.95.

Review by Thomas D. Seeley

The sweetest new book that I've read so far this millennium is Candace Savage's *Bees: Nature's Little Wonders*. With only 127 pages, some of them devoted to whimsical drawings of bees, it might seem at first to be a small book written for younger readers, but actually it is a gem of a book on honey bees for readers of all ages. Savage is a gifted writer living in Saskatchewan who has produced a prize-winning work in natural history every few years for the past 30 years. Her previous books have explored the lives of wolves, crows, grizzly bears, falcons, and other fascinating creatures, while also providing glimpses of the lives of the scientists studying them. We are fortunate indeed that she has written a book devoted to honey bees.

Savage begins with an introduction titled "Little Things" in which she entices the reader by stating "If you are like me, learning about bees will change your life. I'm not suggesting that you'll drop everything and devote yourself to studying insects (though that is possible). What I have in mind is more subtle: a new alertness, a quickening of wonder." If we stop and pay attention to the bees on flowers, she explains, we will "open our eyes to the wonderful strangeness of the life that goes on, every day, all around us." She then guides the reader on a journey into the "beeosphere," describing how the 20,000 or so species of bees living today, nearly all nectar and pollen eating herbivores, evolved from carnivorous wasps starting about 100 million years ago, when flowering plants were just starting to appear in a world filled with coniferous plants. Most of world's bees are loners who build separate nests, but a few hundred species are social bees, including bumble bees and honey bees.

Most of the book is devoted to describing the biology of honey bees, and although the book is small and can be read in an hour or so, it provides an accurate and attractive introduction to the inner workings of a honey bee colony. It is accurate by virtue of the author's diligence in fact-checking with scientists. It is outstandingly attractive by virtue of the beautiful artwork, stunning photographs, and interesting poems and excerpts tucked into text boxes, from such diverse sources as Shakespeare, Pliny the Elder, a religious text from ancient Egypt, Ralph Waldo Emerson, and Emily Dickinson. Moreover, these graphical materials and text boxes are embedded in the gorgeous and delightfully quirky writing of the author herself. For example, in describing how drone cells are 20 percent larger than worker cells, she refers to drone cells as "the deluxe rooms in the Honeycomb Hotel." And in explaining how a worker bee favors the rearing of drones who are her brothers (from queen-laid eggs) rather than her nephews (from worker-laid eggs), she writes that a worker "nips [any worker-laid eggs] in the bud by sniffing out the offending morsels and eating them. There are limits to sisterliness."

A special feature of the book is the way it tells the story of how two German researchers, Karl von Frisch and his student Martin Lindauer, made their pathbreaking discoveries on honey bee communication and social organization. Savage describes the curiously indirect route by which von Frisch made the startling discovery in the 1940s that foraging bees are able to inform one another, by performing dances inside the hive, of the locations of high-quality food sources. She also explains how an American biologist, Adrian Wenner, in the 1960s challenged von Frisch's conclusion that bees use the information expressed in their waggle dances, and how this so exasperated von Frisch that he once wrote "How could such a differentiated dance have evolved, if it were of no significance? Apparently Wenner and his followers don't trouble themselves with this." Savage concludes this section with a brief review of the ingenious tests in recent years that have discredited Wenner's arguments.

The work of Martin Lindauer actually provides a storyline for the book. We learn how he began studying with von Frisch in 1943, when invalided home to Munich from the Russian front and eventually discharged from the Germany army for his injuries. We also learn about his discoveries of how a honey bee colony regulates its water collection, how it chooses a new home, and how it maintains a proper distribution of its work force across the range of jobs within a colony, despite its ever-changing needs. In explaining how Lindauer solved the last mystery, Savage describes how Lindauer worked with an observation hive to patiently observe Bee 107 for many hours each day, starting when this bee emerged on July 5, 1949 (whereupon she was caught and marked) and continuing until she disappeared in a thunderstorm 25 days later. His 177 hours of observation revealed that bees do not follow a rigid program of work, but instead respond flexibly to the labor needs that they sense while making lengthy tours of inspection, looking for things to do.

Of the many books that provide a basic look at the biology of honey bees, and that provide a great starting point for further reading, *Bees: Nature's Little Wonders* ranks among the best. Even for someone who does not want to learn more, it will foster a deeper appreciation for these miraculous insects, our most-important pollinators. Anyone who reads this book will embrace its closing sentences: "What bees ask of us is simple: a world free from poisons and other stressors... In return, they offer to teach us their deepest lesson yet. Much as a honeybee belongs to her colony, so we humans belong to the living community of the Earth. The wild lies all around us, and we draw it in like breath. Our lives are indivisible from the lives of insects."