

**The Dancing Bees: Karl von Frisch and the Discovery of the Honeybee Language.** By Tania Munz. 2017. University of Chicago Press. (ISBN: 9780226526508). 278 pp. Paperback, \$21.

Every biology teacher and student knows the three European “Fathers of Ethology” (the study of animal behavior) who shared the 1973 Nobel Prize in Physiology or Medicine: Konrad Lorenz, Nikolaas Tinbergen, and Karl von Frisch. The work of these three early 20th-century scientists revolutionized the study of animal behavior, moving it from an amusing pastime of gathering natural history anecdotes to thoughtful design of controlled experiments on par with those of the “hard” sciences. *The Dancing Bees* examines the life of von Frisch, the Austrian ethologist who deciphered the now famous code of movements through which honeybees communicate location and quality of food sources to each other.

At times *The Dancing Bees* reads like a conventional (and somewhat unexciting) biography, with descriptions of birth, childhood, marriage, and early education. However, it is a worthwhile read for any biologist interested in understanding thoughtful experimental design. The care and intellectual beauty underlying von Frisch’s experimental designs is evident in the author’s descriptions of many of his studies. Meticulous and clever, each experiment revealed previously unknown elements of animal behavior and physiology. Von Frisch used both observation and training to uncover aspects of animal behavior, including the senses of taste and sound in fishes; the senses of color, smell, and taste in bees; and, of course, the famous communication dances of honeybees. Several experiments are described in detail, emphasizing clever

design in testing each experimental variable while carefully managing controlled variables.

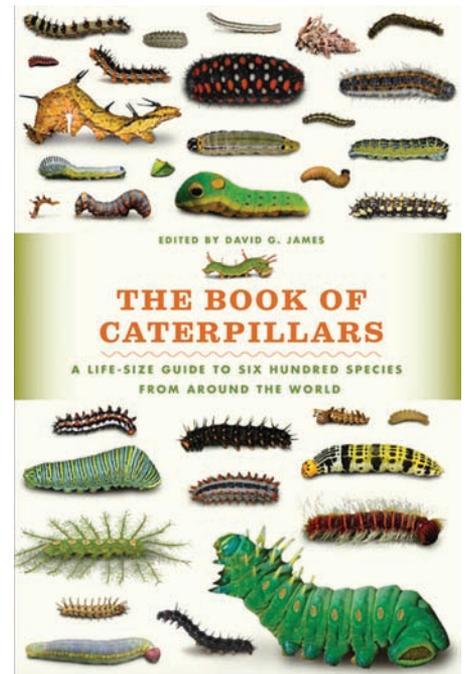
Equally striking are the social contexts of von Frisch’s work. His revolutionary use of film in both recording and presenting experimental results is detailed, emphasizing the communication of results as an important element of science. Also described in detail is the influence of the people around him. A particularly interesting point is made in the account of von Frisch’s disagreement with a fellow scientist, Carl von Hess, over color blindness in fishes and bees. This not only led to one of von Frisch’s more famous experiments, showing that bees do indeed see color, but also highlights the importance of critique in intellectual development. As the author notes,

it is easy to dismiss the dispute between von Frisch and von Hess as little more than a perturbation in the path of the former’s rapidly rising star. But that would be to miss its significance at the time. Indeed, it was surely not in spite of his disagreement with von Hess but in large part because of it that he enjoyed such precipitous success in those early years of his career. (p. 67)

Central to the book, and to von Frisch’s career, are his struggles to continue scientific work in Europe during the tumultuous years leading up to and during World War II. Nazi edicts about “non-Aryans” disrupted von Frisch’s research team and colleagues through both deportation and emigration, and questions regarding his own ancestry challenged von Frisch as he strove to continue the work of his institute. Some of von Frisch’s tactics are questionable, including appealing to the Nazi focus on eugenics and disregarding atrocities as he positioned himself to continue his scientific work under the auspices of the Nazi regime – which he was finally able to do by focusing on the *Nosema* parasite threat to the bee population and the associated threat of food insecurity. A thoughtful reader cannot help but be struck by the suffering, turbulence, and impossible choices of the time. Through its descriptions of von Frisch’s life and work during this period, *The Dancing Bees* offers an important reminder that science exists within, and can be swayed by, the opportunities and challenges of the human social world.



Cate Hibbitt  
Lincoln School  
Providence, RI 02906  
chibbitt@lincolnschool.org



**The Book of Caterpillars.** Edited by David G. James. 2017. University of Chicago Press. (ISBN: 9780226287362). 656 pp. Hardcover, \$55.

For the lover of all things lepidopterous, *The Book of Caterpillars* is a beautifully curated collection and guide to 600 species from around the globe. Beginning with an eloquent and comprehensive general overview of caterpillars and their life cycles, the volume has enough background for the novice but a level of color and detail that even a professional scientist can appreciate. Before introducing the variety of species, the opening chapter provides a narrative introduction defining the caterpillar, looking at metamorphosis, feeding, defenses, the relationship of caterpillars and people, and the research and conservation efforts that are underway to protect and learn more about both moth and butterfly caterpillars. The closing pages of the volume include handy reference guides, including indexing by both common and scientific names and the general classification of Lepitoptera.

The most brilliant contribution of the book, however, is its highly vivid and life-size (unless specifically noted) pictures of so many butterfly and moth caterpillars, along with high-resolution magnified images. Whereas most books focus on the final life stage, this volume highlights the caterpillar in great depth. The resulting butterflies and moths are represented by small images of patterns, so as not to steal focus from the featured stage of the life cycle. Also included are general overviews of the behavior of each species and its interactions with its surroundings, as well