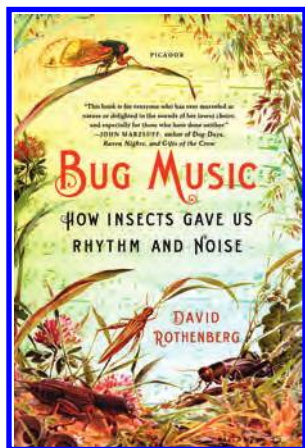


INSECTS



Bug Music: How Insects Gave Us Rhythm and Noise. By David Rothenberg. 2014. Picador. (ISBN 978-1-250-04505-8). 278 pp. Paperback. \$16.00.

In nature, sounds abound.
Downed trees generate sounds,
Hounds in pounds make sounds;
Ants in mounds yield sounds.

Sounds are found all around,
On the ground, underground,
Often profound, Frequently astounding,
Sometimes confounding.

Nature's sounds are everywhere, and many originate from living organisms. Chirping, growling, croaking, buzzing, hissing, and other sounds are sometimes described as music. Reflecting on the sounds of insects as examples of nature's music and their influence on human music, *Bug Music* is a fascinating fusion of the arts and the sciences. The author considers insect music to be true music because "it communicates not

as simple information, but as rhythmic flow and performance in a regular, aesthetically judged manner."

Beginning with the cicada, wide-ranging information is presented on the different species, their history, complex behaviors, periodicity, genetics, and evolution. The point is made that much of cicada biology remains a mystery. Moving on to other insects, we learn that cricket music has attracted people for centuries. Although cricket fighting is a sport in China, with large amounts of money changing hands and champion crickets being awarded titles, most people still prefer to listen to cricket music. A man identified only as Mr. Fung actually raised an orchestra of 108 crickets (a number that is symbolic to Buddhists).

Cricket chirps exhibit rhythmic patterns that remind us of rhythms experienced in human music and dance movements. In fact, the author considers it likely that humans developed their love of rhythm from listening to insects. Studies of these rhythmic chirp patterns have been quantified using relatively simple mathematical models that show them to be similar to those of firefly flashing and frog croaking. Rhythms of insect music are also compared to the circadian rhythms that steer the life cycles of organisms. From the regular and predictable oscillations of atoms to the rhythm of the heartbeat to the periodic emergence of the cicadas, the suggestion is made that "life is a vast music."

Composers and musicians have devised many ways to integrate insect music into human music, using both traditional instruments and electronics to imitate insect sounds and rhythms. A playlist of insect music included in the book contains familiar compositions, such as Rimsky-Korsakov's *Flight of the Bumble Bee*, as well as more than two dozen lesser-known works. The author notes

that Bob Dylan's song "Day of the Locusts" was composed in honor of the cicada and was sung over organ music resembling the "insect orchestra."

Besides analyzing insect music, the author describes performances of insect-infused music in a variety of locations, both in the wilderness and inside buildings. Impressive creativity is shown in such musical works as "Glittering Clouds," British musician Imogen Heap's piece based on a locust plague, and "Ghosts," German musician Robert Henke's composition based on a rainforest expedition. The author himself has released a 16-track CD, *Bug Music*, to coincide with the book's publication.

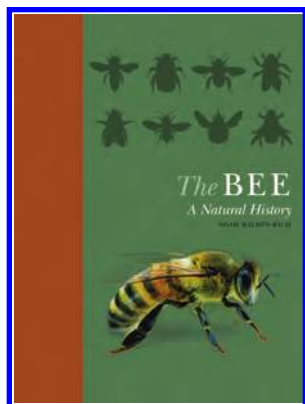
Much information on insect biology and ecology, acoustics, evolution, art, literature, folklore, philosophy, music, and other subjects is packed into this fascinating book. The author's passion for the subject engages the reader in writing that often captivates like science fiction. Science and math concepts regarding the life cycles and behavior of a variety of insects are expressed in considerable detail, while at the same time providing elegant comparisons to human music and other art forms. The theme of the book might well be expressed in the statement "If you learn to hear all sounds as music then the more you listen, the more you will be surrounded by beautiful wind and earth symphonies and will come to love the world."

The text is enhanced by appropriate graphics illustrating anatomical structures, sonograms, and complex musical patterns. Also included are suggestions for further reading, detailed chapter notes, and a comprehensive index. *Bug Music* would be useful for supplementary reading in college courses on animal behavior or entomology. It might also be useful in certain music classes, as it

brings in a fascinating new perspective on what makes music.



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The Bee: A Natural History. By Noah Wilson-Rich. 2014. Princeton University Press. (ISBN 978-0-691-16135-8). 224 pp. Hardcover. \$27.95.

If a teacher could own only one book about bees for a classroom or personal library, this volume would be an excellent selection. It definitely is a “go to” source for comprehensive information on these fascinating insects. There are about 20,000 species of bee, and arguably they are the most important insects on the planet, because they cross-pollinate 90% of the world’s plants.

Ancient carnivorous wasps evolved into bees that thrive on plant nectar. Many of these insects have become highly specialized, with long tongues, hairy bodies, combs, and pollen baskets to facilitate their nutrition as well as their jobs as pollinators. Bees are somewhat unique in that males “have no fathers, but do have maternal grandfathers.” Their anatomy, immunology, life cycle, and genetics are among the many topics discussed in detail in this book.

The book’s hero is the honeybee, the species most important to humans. Detailed descriptions of their dances disclose how vibrations, sounds, and scents are incorporated into movements that allow bees to communicate the “directions, distance and food quality” of a potential food supply. There is even a two-way communication in which a bee colony member head-butts the dancing bee, passing on the message to avoid a particular location “because a danger has been spotted there.” Bees release an alarm pheromone when they sting. Smelling like

bananas, this chemical attracts other bees to help in an attack. The authors point out that this is the reason that “a beekeeper should never eat bananas for breakfast!”

Throughout *The Bee* are wonderful gems that will pique reader interest. For example, some bees exhibit sleep patterns, and it is suggested, from the observation that their antennae sometimes wiggle, that they may be dreaming or perhaps picking up danger signals. Worker bees’ jobs depend on their age. While young, they are active in hive jobs such as tending the brood and the queen, building combs, and cleaning and guarding the hive. Older bees actually leave the hive to collect pollen, nectar, and water. Bees also have a unique way of fighting infections in the hive. Known as “behavioral fever,” the process involves the colony’s bees raising their temperature as a group and wiping out fungal infections that could contaminate larvae. Fascinating information, as in these examples, will inspire readers to keep reading.

Bees have been important to humans for centuries. Hippocrates and Aristotle acknowledged the benefits of bees, and books about bees were printed as early as the 1600s. Aside from pollination and honey production, bees are useful in many other ways. For example, they are used in research on age-related conditions. By studying relationships between aging, memory, and behavior in bees, scientists are learning things that may help us understand Alzheimer’s disease. Research is being done with mellitin, a component of bee venom, which can “destroy HIV-infected cells without killing non-HIV cells.” The U.S. Government has even funded research on the use of bees to track land mines. Bees are also used for studies in epidemiology, communication, genetics, sociology, and other fields.

In addition to extensive information on the evolution, anatomy, and behavior of bees, this lavishly illustrated book also describes their relationship to humans in the areas of beekeeping and the challenges that bees face in the modern environment. Each chapter is like a full plate of food, divided into different topics that can be tasted and consumed in small bites. The bites consist of two-page spreads that include informative sidebars with interesting supplementary information, clearly labeled diagrams amplifying text material, and striking photography.

A valuable feature is the directory highlighting 40 species of bees. Each bee is showcased on a full page with a large colorful illustration of the bee, a silhouette showing

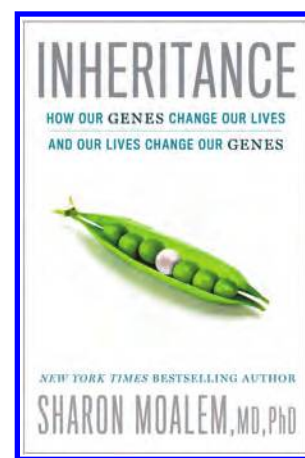
its actual size, a brief description, a detailed discussion of its behavior and life cycle, a list of food sources, and its habitat and status.

The information is thorough and detailed enough for college entomology courses and would be appropriate for supplemental use in high school classes. Some of the less technical portions would appeal to middle school students with an interest in bees. The book includes a wide-ranging bibliography, a list of websites, a comprehensive index, and author biographies.



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HUMAN GENETICS



Inheritance: How Our Genes Change Our Lives and Our Lives Change Our Genes. By Sharon Moalem. 2014. Grand Central Publishing. (ISBN 1455549444). 272 pp. Hardcover. \$20.20.

In this new book, Dr. Sharon Moalem leads the reader through the personal stories of men, women, and children with genetic diseases in order to argue that it is the interplay of nature and nurture that can most accurately explain basic human biology. Through these cases, he details “what our genes do to us and what we do to our genes,” giving the audience a better understanding of epigenetics and why each of us is more than just the sum of our individual parts. He is the author of several books, including *Survival of the Sickest* (2007) and *How Sex Works* (2009), as well as the cofounder of two biotechnology companies that focus on improvement of human health.

Moalem begins his most recent book by making analogies between our own past experiences, such as the “smell of the