species and played well amid fears of nuclear catastrophe and turbulence in American streets.

Like several historians of this period, Weidman considers the high drama surrounding E. O. Wilson and his controversial sociobiology. However, she also shines a light on a group of Wilson's detractors who have received less attention: the Genes and Gender Collective (GGC), female biologists opposed to deterministic and sexist theories. Although a critical force in repudiating Wilson's work, the GGC faced many challenges, including sexist marginalization by the better-known Sociobiology Study Group. The author thus provides vital new context for understanding this debate. She also provides an example for our times. Members of the GGC did more than influence scientific debates: they opened the door for both scientists and members of the public to challenge sexist and deterministic declarations, even when these pronouncements were promoted by influential showmen as scientific fact.

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Understanding Bird Behavior: An Illustrated Guide To What Birds Do and Why.

By Wenfei Tong; Foreword by Ben C. Sheldon. Princeton (New Jersey): Princeton University Press. $27.95. 224 p.; ill.; index. ISBN: 978-0-691-20600-4. 2020.

ANATOMY, PHYSIOLOGY, AND DEVELOPMENT

Secret Worlds: The Extraordinary Senses of Animals.

By Martin Stevens. Oxford and New York: Oxford University Press. $29.95. xi + 254 p. + 11 pl.; ill.; index. ISBN: 978-0-19-881367-5. 2021.

The author begins the preface of this book with a thought experiment from the philosopher Thomas Nagel: "What is it like to be a bat?" (p. vii). It is difficult to respond to this rhetorical question about any animal, but especially arduous when it comes to bats because of their highly developed echolocation system. Many animals are visually sensitive to the short wavelengths of light in the ultraviolet. Not so for us. But as we can see short wavelengths (we perceive them as blue), we can imagine what it would be like to extend our visual range some tens of nanometers shorter and see something akin to another shade of blue. Echolocation is a different story. Yes, some of us are quite good at using returning echoes of the taps of a cane on the floor to navigate. But this hardly provides us with the rich acoustic image of the world that bats perceive in the returning echoes of their ultrasonic vocal emissions.

Von Uexküll's concept of the *Umwelt* emphasizes that different animals can exist in different perceptual worlds. We have little experiential access to many of these worlds as we are deaf to ultrasonics; blind to ultraviolet; anosmic to most odors around us; and we do not have a clue that would allow us to empathize with electric and magnetic reception.

All of this is made crystal clear by a riveting new volume that explores the extraordinary senses of animals. Martin Stevens is an authority on this topic as evidenced by his previous scholarly book on sensory biology (2013. *Sensory Ecology, Behaviour, and Evolution.* Oxford (U.K.): Oxford University Press). This volume brings the wonders of these sensory worlds to a more general audience.

The author guides us through the biology of vision, electrical reception, tactile sensations, olfaction, and magnetic reception. In each chapter he presents three animal systems that illustrate the importance of these senses in nature. Readers of most backgrounds will find many of the details relatively accessible. But Stevens does not shy away from difficult concepts. For example, he gives a fairly lucid description of the challenging theory of the radical-pair light-dependent mechanism of magnetic reception based on retinal cryptochromes.

An important contribution is the final chapter that details how our Anthropocene footprint comes down hard on the sensory experiences of many animals, depriving them of some basic tools needed to survive in this disturbed world we have created. There are some important details for conservation considerations here.

For those of us who traffic in sensory ecology, we will all have favorite examples that have been omitted. That is not a criticism, but a testament to how ordinary these extraordinary senses are that populate the world around us. Stevens has done a commendable job in bringing these worlds to readers.

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Life Out of Balance: Homeostasis and Adaptation in a Darwinian World. *Nexus Series.*

By Joel B. Hagen. Tuscaloosa (Alabama): University of Alabama Press. $59.95. xiii + 341 p.; ill.; index. ISBN: 978-0-8173-2089-8 (hc); 978-0-8173-9347-2 (eb). 2021.

In this book, the author examines the profound influence Walter Cannon's concept of homeostasis had on physiology, evolutionary biology, and ecology