"ecognosis" (p. 5), an ecological awareness that is "weird," with a "twisted, looping form" (p. 6).

Throughout the book, the author describes the ecological world as shimmering, magical, flickering, strange, fuzzy, buzzy, vibratory, quivering, and sparkling. But readers seeking a plan of action will not find one. Despite the volume's subtitle, Morton does not explore who and what might be allowed to coexist in the future and by what means. And by refusing to place responsibility for the Anthropocene on those who consume more resources—"everyone wants air conditioning," he writes (p. 15)—he sidesteps crucial questions of equity and justice. The justification for this lies in object-oriented ontology, a philosophy holding that all things exist in a withdrawn state; they "cannot be splayed open and totally grasped by anything whatsoever, including themselves" (p. 16). This has a plausible ring at times, as when Morton describes political systems as "playful and half-broken things that connect humans and nonhumans with one another" (p. 113). But not everybody is at liberty to experience political systems as "toylike" (p. 113).

Dark Ecology was first delivered as the Wellek Library Lectures in Critical Theory at the University of California, Irvine, in 2014. Other reviewers have noted its dense, breathless pace. The book is declarative, casual but not conversational. Although its references are catholic, skipping from Hegel to *Harold and the Purple Crayon* to The Doors, it will offer few ways in for students and nonspecialists. The most interesting and provocative comments in *Dark Ecology* concern the role of the aesthetic realm in knowing the environment. Morton writes that "causality is aesthetic" and "the way things affect one another (causality) cannot be direct (mechanical), but rather indirect or vicarious" (p. 16). Later he states "[b]eauty is the givenness of data" (p. 150). These statements are compelling and deserve expansion.

Climate change, it seems, is motivating a turn back toward animism, realism, and materialism in the humanitistic disciplines. The author's work, together with the recent work of scholars such as Anna Tsing, Donna Haraway, and Bruno Latour, asks us to consider how humanists can produce theory that confronts environmental problems. Morton writes that tools of the humanities are themselves "compromised products of agrilogistics" (p. 43). More broadly, this scholarship asks us to question the relationship between political tactics and ontological truths.

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QUANTITATIVE ECOLOGY AND EVOLUTIONARY BIOLOGY: INTEGRATING MODELS WITH DATA. *Oxford Series in Ecology and Evolution.*

By Otso Ovaskainen, Henrik Johan de Knegt, and Maria del Mar Delgado. Oxford and New York: Oxford University Press. $125.00 (hardcover); $59.95 (paper). xiii + 285 p.; ill.; index. ISBN: 978-0-19-871486-6 (hc); 978-0-19-871487-3 (pb). 2016.

WHY BIRDS MATTER: AVIAN ECOLOGICAL FUNCTION AND ECOSYSTEM SERVICES.

Edited by Çağan H. Şekercioğlu, Daniel G. Wenny, and Christopher J. Whelan. Chicago (Illinois): University of Chicago Press. $135.00 (hardcover); $45.00 (paper). x + 387 p.; ill.; index. ISBN: 978-0-226-38246-3 (hc); 978-0-226-38263-0 (pb); 978-0-226-38277-7 (eb). 2016.

This is a comprehensive and well-edited volume dedicated to describing the ways in which birds benefit society. The book is comprised of 12 independent research papers (chapters) by multiple experts in the field, each with its own specific goals and themes relating the importance of birds in relation to humans. Chapters focus on the ecological effects of birds with respect to four major categories outlined at the beginning of the volume: provisioning services (i.e., resource production); regulating services (i.e., disease prevention); cultural services (i.e., inherent religious or societal importance); and supporting services (i.e., ecosystem maintenance). Chapters also allow readers to understand these services from the scale of individuals to ecosystems, illustrating the tangled and intricate interactions birds possess with their environments and human society.

Even the cover of *Why Birds Matter* illustrates these services well, and is rightfully referenced within the text itself. On it, we see an adult black-throated blue warbler (*Setophaga caerulescens*) picking a caterpillar from a coffee bush. This bird is a classic example of a species contributing to multiple different ecosystem services, benefiting human global economy by depredating coffee parasites and providing cultural value by being an inherently beautiful species sought by birdwatchers. The book is full of additional references to services provided by particular species that have been studied in depth, and it presents detailed examples of how birds shape and maintain the ecosystems in which they occur. From geese spreading aquatic plants across continents to Clark's nutcrackers (*Nucifraga columbiana*) caching seeds and incidentally planting the next generation of pines across the Rocky Mountains, birds directly influence the propagation and recruitment of plant communities, and thereby help maintain ecosystems that we use for timber, drinking water, and recreation. Such

effects abound, from pollination to seed dispersal, and the authors show that bird communities cannot be effectively replaced by other groups of organisms. Other services discussed include birds feeding on carrion, speeding its removal from the ecosystem and reducing the number of scavenging mammals (such as dogs) and thereby reducing disease rates in humans; falcons, hawks, and owls living in farm fields and reducing crop damage from rodents and granivorous birds; and the usage of waterbird guano as a fertilizer to improve crop yields. Conversely, the authors do not shy away from ecosystem disservices (such as crop damage) and provide evidence showing that the benefits of birds to society far outweigh such negative impacts. Similarly, the authors note that significant research is yet to be done in this field, and use case studies to highlight knowledge gaps regarding avian ecosystem services.

Even as someone who already believes that birds matter, this is a well-written and worth reading collection of papers with a summary of the current state of documentation of this fact. This is a thorough primer for anyone wishing to broaden their knowledge on societal benefits derived from bird populations, and is a good introduction to ecosystem services in general. *Why Birds Matters* ends with a quantification of what is necessary to continue the conservation and preservation of the essential services birds provide, and its call to action for additional conservation and research of ecosystem services is coupled with the knowledge to defend and further explore these avenues of research.

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The California Current: A Pacific Ecosystem and Its Fliers, Divers, and Swimmers.

By Stan Ulanski. Chapel Hill (North Carolina): University of North Carolina Press. $30.00. xv + 233 p.; ill.; index. ISBN: 978-1-4696-2824-0. [This book was published with the assistance of the Wells Fargo Fund for Excellence of the University of North Carolina Press.] 2016.

It is often said that the most effective way to communicate science is by storytelling, especially to nonscientists. Stan Ulanski develops a compelling narrative about the California Current pelagic ecosystem, emphasizing the finned, flippered, fluked, and flighted denizens, which cannot help but draw in readers. It is an account of a highly productive ocean province as told through the lens of some of its macroscopic inhabitants. It is part natural history, part historical context, and part contemporary challenges. Although not an academic treatise, it would be an unusual academic scientist who did not learn a good deal from this book. The author has taken the care to research a spectrum of issues from the original scientific literature and distill results in an accessible manner. Ulanski is a talented and literate writer, who occasionally draws on Aristotle, Polybius, and Thomas Aquinas, and equally on the cultural traditions of Inuits, Haida, and Makah.

This book begins with essential background in the circulation of the California Current system, the process of coastal upwelling, and perturbations by El Niño, the Pacific Decadal Oscillation, and climate shifts. It then treats a number of major taxa, chapter by chapter. We are introduced to sea turtles and the marvels of natal homing; seabirds and their vital connection to key breeding and feeding sites on the Farallon Islands and Channel Islands, some of the major pelagic fisheries of the region, ranging from sardines, tuna, and swordfish to market squid, sea otters and pinnipeds, and cetaceans, including the diverse whales, dolphins, and porpoises found in the region. Each chapter weaves a fascinating story about the natural history of these organisms, with a coda addressing human interventions, including critical needs for quantitative stock assessments and understanding fundamental biological characteristics of these populations. The final chapter, Looking for Solutions, addresses some of the management challenges associated with an inherently variable ecosystem.

I began reading this book with a slight tilt against its emphasis on the larger, conspicuous pelagic fauna and flora. As a zooplankton ecologist, it was immediately clear to me that the charismatic microfauna would not receive their due here. The "Serengeti-like" proliferation of enormous populations of fishes, marine mammals, and seabirds in the California Current Ecosystem is, after all, dependent upon the exceptional productivity at the base of the food web. However, Ulanski's focus on the macroscopic organisms further up the food web provides an immediate connection to his human readers. As I move across the California Current Ecosystem, the spyhops of humpback whales, social interactions within pods of common dolphins, and plunge diving of seabirds garner my attention, too. And there are other places to turn for an introduction to the splendor and diversity of the planktonic world (e.g., C. Sardet. 2015. *Plankton: Wonders of the Drifting World.* Chicago (IL): University of Chicago Press). In summary, Ulanski's book is a gem and not to be missed.

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