

and fun, both entertaining and evidence-based, and both well illustrated and well referenced. It is theoretically sophisticated but also deeply personal. It would make a great introduction to evolutionary aesthetics for undergraduate seminars and for researchers interested in the area, and as an example of how to promote consilience among the sciences, humanities, and arts. I would also highly recommend it for art students in a Master of Fine Arts program, and for art professionals, historians, critics, and curators curious about the origins of their aesthetic passions.

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ANATOMY, PHYSIOLOGY, AND DEVELOPMENT

TRANSITIONS BETWEEN SEXUAL SYSTEMS: UNDERSTANDING THE MECHANISMS OF, AND PATHWAYS BETWEEN, DIOECY, HERMAPHRODITISM AND OTHER SEXUAL SYSTEMS.

Edited by Janet L. Leonard. Cham (Switzerland) and New York: Springer. \$169.99. xii + 363 p.; ill.; index. ISBN: 978-3-319-94137-0 (hc); 978-3-319-94139-4 (eb). 2018.

Evolutionary biologists have long been fascinated by the diversity of sexual systems found in plants and animals. In most species, either male and female sex functions are genetically determined and expressed by distinct individuals (dioecy) or, alternatively, male and female sex functions are expressed by all individuals (simultaneous hermaphrodites). However, an amazing and intriguing variety of other—much rarer—systems exists. For instance, sex may be determined by environmental factors (environmental sex determination) or individuals may change sex at some stage of their life (sequential hermaphrodites). Why do different species exhibit disparity in sexual systems? What evolutionary pressures favor the evolution and stability of particular sexual systems? What are the evolutionary pathways in between sexual systems? What are the adaptive values of genetically determined versus environmentally flexible sexual systems? This volume beautifully tackles these questions and provides a broad and thorough overview of what we know and what we do not know about the evolution of sexual systems.

The book is separated into 12 chapters. Besides the introductory chapter, which explains the conceptual background and describes the variety of sexual systems across the whole animal kingdom, each chapter focuses on a taxonomic group. Land plants, flowering plants, nematodes, polychaetes, bivalves,

caenogastropodes, barnacles, shrimps, fishes, and reptiles are thus discussed at great length within separate chapters. Chapters are written by different authors, but all of the chapters share a common philosophy of highlighting both what is and is not known. The volume is particularly timely. The recent development of phylogenetic tools has allowed us to better understand how different sexual systems are distributed along phylogenetic trees, and thus how they have likely evolved. The book reads as a coherent and well-balanced text discussing concepts and evidence in sexual system evolution in diverse contexts.

The first chapter is key, as it provides ideas that reappear along the different chapters of the book. It is, for instance, explained that boundaries between sexual systems may be unclear at times, and that one can view sexual systems as a continuum in which dioecy and simultaneous hermaphroditism are the two extremes, and that transitioning from one another requires intermediate states such as environmental sex determination, and sequential hermaphroditism. It is further argued that this continuum lay on a gradient of phenotypic plasticity enabling individuals to adaptively adjust their sex, or sex allocation, in response to abiotic or social stimuli.

In summary, this volume will be of interest to all plant and animal biologists focused on sexual diversity. Understanding the evolutionary pressures acting on sexual systems is a fascinating topic, yet many unknowns remain. This book provides several up-to-date lines of arguments and testable hypotheses, which stimulates current curiosity and will help guide future research.

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SEX DETERMINATION IN VERTEBRATES. *Current Topics in Developmental Biology, Volume 134.*

Edited by Blanche Capel. Academic Press. Amsterdam (The Netherlands) and New York: Elsevier. \$178.50. xvii + 375 p.; ill.; no index. ISBN: 978-0-12-811544-2. 2019.

Blanche Capel, a leading researcher in the field and a co-organizer of legendary scientific meetings in Hawaii, edited 11 chapters of this book that contributes to the quest for understanding sex determination in vertebrates. The restriction of the volume to vertebrates is well substantiated. With tens of thousands of current species and a history of several hundreds of millions of years, vertebrates are widely diverse in sex determination, but they still share many aspects of a network controlling gonad development. Most of the research on sex determination has been focused on a few model groups, especially some teleost fishes and eutherian mammals. This is also partially mirrored in the book's content,