research program misleadingly named the Census of Marine Life. Not a census but rather a much grander global ocean exploration in space and time, the recently completed initiative included 17 different international projects with names such as History of Marine Animal Populations and Top Predators, engaging roughly 2,700 researchers, launching more than 500 expeditions, producing thousands of scientific publications, adding over 1000 species to scientific awareness and, I dare say, having some great fun.

That is not conjecture. Over the course of several books (as an independent writer), I worked with some of the researchers studying tuna, sea turtles, and albatrosses, and the intellectual interest was matched by camaraderie, adventure, and physical and conceptual beauty. They were learning things both fundamental and entirely new. Where the animals go. How fast they travel. What corridors they use. Where they stop. Things like that. Our ignorance is so basic and pervasive, that almost anything could widen a scientist's eyes. In deepwater samples that Snelgrove's team dredged up off eastern Canada, half of the worm species had never been named. Other teams found living black corals that were already 1000 years old when Aristotle and Buddha were born.

The Census pushed back the curtains of the unknown, and the view was magnificent. And although the Census has concluded, the quest—and the romance—continue.

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BIOGEOGRAPHY. *Fourth Edition.*

By Mark V. Lomolino, Brett R. Riddle, Robert J. Whittaker, and James H. Brown. Sunderland (Massachusetts): Sinauer Associates. $102.95. xiv + 878 p.; ill.; index. ISBN: 978-0-87893-494-2. 2010.

Recently my graduate students were teasing me for being old fashioned, subscribing to paper copy journals, not owning a Web-enabled cell phone, and preferring not to communicate through social networks. When I responded that I still enjoyed reading the printed word and that there would always be a place in my heart for journals and textbooks, one student quipped, "What's a journal?", while another joked, "What's a textbook?" As I pondered the possibility of a world without hardcopy teaching resources, I began writing this review, and soon became convinced that I had on my desk a perfect model of all that I value in a textbook. The fourth edition of Lomolino et al.'s sensationally successful *Biogeography* provides an ideal example of the heuristic value of a comprehensive and synthetic summary of the disciplines we now collectively call "biogeography."

Like the last edition, this volume is organized into six units, each with two or three chapters and each representing major themes or subdisciplines of biogeography. These range from the several chapters on the geographic and ecological foundations of the field, a set of chapters on biogeography processes and Earth history, three chapters on evolutionary history of lineages and biotas, and chapters that address the fundamentals of ecological biogeography. The book begins with an introduction to the discipline and excellent historical review, and concludes with two chapters (condensed down from three in the last edition) on conservation biogeography, the geography of humanity, and future frontiers of the discipline. This volume has it all.

A major improvement in the fourth edition has been the addition of color throughout. This has resulted in beautiful color photography, vibrant chapter front pieces, colorful maps, and graphs, and new, reworked line-art figures. Particularly welcomed is the addition of photographic portraits of most species incorporated into their distribution maps and the addition of satellite imagery insets, showing the position of close-up maps in the context of a view of Earth from space. Not only does the addition of color make for a better appreciation of the organismal biology in biogeography, but also it makes for enhanced reader *understanding* of several key seminal works. For example, a student is much more likely to appreciate the intricate detail in C. Hart Merriam's depiction of North American life zones or William Smith's delineation of the strata of England and Wales ("the map that changed the world") if he or she sees these masterpieces, now reproduced in their original color, in this edition.

One thing that impresses me most with this work has been the authors' ability to stay current and incorporate the latest technological and conceptual advances in the many subfields that contribute to the discipline. This results in new, state-of-the-art material added to nearly all chapters. Examples include enhanced information on GIS tools for distribution mapping, niche modeling, species' range prediction, paleoreconstruction, and novel uses of remote sensing technology for new applications such as the study of dispersal. Similarly, the authors have stayed abreast of advances in systematics, population genetics, and phylogeography, and have done a fine job of describing, for example, the significance of the recent revolution in statistical phylogeography, the power of multilocus datasets, advantages of incorporation of uncertainty due to individual gene histories, and coalescent-based approaches to phylogeny estimation in biogeography.

Teaching a course as conceptually broad as biogeography has been challenging—one wants to

teach such an important class particularly well. My class is typically comprised of 25–30 students, and approximately one-half are upper-division undergraduates, while the other half are first- and second-year graduate students. Interestingly, for several years now, half of my class has self-identified themselves as ecologists and the other half systematists. As a systematist myself, a challenge for me has been to stay conceptually broad, with equal lecture and class time devoted to the ecological side of biogeography. Lomolino et al.'s textbook provides the perfect structure, the right balance of topics, sufficient historical review, and an eloquent synthetic summary of recent advances in the field. It makes for a great teaching tool, and also a great reference for more advanced readers. It is also a perfect one-word answer for my smart-aleck students.

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EVOLUTION

IN THE LIGHT OF EVOLUTION. *Volume IV: The Human Condition. Based on a colloquium held in Irvine, California, 11-12 December 2009.*

Edited by John C. Avise and Francisco J. Ayala. Washington (DC): National Academies Press. $59.00. xvi + 411 p.; ill.; index. ISBN: 978-0-309-10405-0. 2010.

This book is the fourth in a series initiated by the editors, John Avise and Francisco Ayala, to explore aspects of evolutionary biology, with particular reference to areas that have a bearing on societal issues and problems. It is based on a symposium held in December 2009 as part of the Darwin bicentennial celebrations. The volume contains 16 papers by 42 contributors, including geneticists, paleontologists, anthropologists, psychologists, and linguists. Most of the papers are reviews or syntheses, but a few present original research, such as Hancock et al.'s paper on genomic evidence for recent adaptation to diet and climate or Bryc et al.'s contribution on genetic admixture in the founding of modern Latin American populations.

As with most symposium volumes, the contributions vary widely. Jablonski and Chaplin have a fine review of the adaptiveness of skin pigmentation to UV radiation. Avise, in a paper directed against intelligent design creationism, applies to the human genome a favorite Darwinian argument: the presence of poor design shows the trace of history in an organism's body or genome. Avise argues that the frequency of deleterious mutations in mtDNA challenges the notion of optimal design, but surely the sharper evolutionary argument is that mitochondria show every sign of having arisen by the merger into the cytoplasm of another organism. Less compellingly, he argues that nonoptimal design somehow solves the problem of theodicy for what he calls "mainstream religions."

In the final chapter, Ayala takes on the question of the origin of the moral sense and, in doing so, some of the other contributors. Arguing, rightly it seems to me, that the moral sense is a generalized, evolved capacity, and that specific norms are culturally determined, he counters Cosmides et al. who argue for specifically evolved capabilities for the detection of "cheaters." He further argues that the moral sense is uniquely human, and does not occur even incipiently in other animals. This would probably surprise Goodman and Sterner, who state that the human brain is "different by degree and not kind" (p. 59), and Pinker, who in other contexts has discussed what he calls the rudimentary moral sentiments. Indeed, Ayala's claim would surprise anyone acquainted with the behavior of vertebrate animals, especially a phylogenetically diverse group of them. The incipient stages of the development of the moral sense, and the gradations in the complexity of familial and social behavior in animals, have long been known and documented, but they are also pretty evident to anyone who has ever owned a dog.

The volume is attractively produced but, in a few papers, color figures are reproduced in grayscale making them difficult, if not impossible, to interpret.

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THE EVOLUTION OF ANISOGAMY: A FUNDAMENTAL PHENOMENON UNDERLYING SEXUAL SELECTION.

Edited by Tatsuya Togashi and Paul Alan Cox. Cambridge and New York: Cambridge University Press. $75.00. xi + 250 p.; ill.; index. ISBN: 978-0-521-88095-4. 2011.

Where do boys and girls come from? Anisogamy, the production of gametes of two different sizes, is the source of several fundamentally important biological phenomena. The sexes are defined via differences in gamete size and, therefore, without anisogamy, separate genders would not exist. The evolution of separate sexes leads to sexual selection and sexual conflict, both major drivers of evolution. The divergence of gamete sizes is also behind the evolution of immotile eggs and internal fertilization. It is surprising that a book devoted to the evolution of anisogamy has not existed until now, even though well-formulated theories to account for its origin date back to the 1930s. *The Evolution of Anisogamy* fills this gap. It comprises seven chapters, which discuss