multicellular organisms have arisen independently five times, and lists red algae, green algae, plants, animals, and fungi. He forgets the heterokonts, which can be exemplified by kelp, one of the largest organisms in existence. Some readers may object to the listing of both green algae and plants, but Lane is right here, although he also forgets that there are multicellular prokaryotes: Heterocyst-forming filamentous cyanobacteria have true differentiation of cell types with functional cooperation.

Lane loves the word “iconoclastic” which he uses repeatedly. Also frequent are his direct or indirect references to book titles, when he uses expressions as “chance and necessity” (Jaques Monod), “the red queen” (Lewis Carroll and Matt Ridley), “in the blink of an eye” (Andrew Parker), to mention a few. He demonstrates his knowledge of classical literature. He rather dogmatically says that there were two different Homers authoring the Iliad and the Odyssey, while it seems that expert opinions still differ on whether there were one, two, or more authors of these epics. The very title of Lane’s book is a slight variation of Bronowski’s “The Ascent of Man,” to which he pays homage in the Epilogue.

At the end of the book, there are also notes and a bibliography, which increase the usefulness of the book as reading for university students.

References

Freeland SJ, Hurst LD. 1998. The genetic code is one in a million. Journal of Molecular Evolution 47:238–248.

Martin W, Russel MJ. 2003. On the origin of cells: a hypothesis for the evolutionary transitions from abiogenic geochemistry to chemoautotrophic prokaryotes, and from prokaryotes to nucleated cells. Philosophical Transactions of the Royal Society of London B 358:59–83.

Lars Olof Björn
Department of Biology
Lund University, Lund, Sweden
E-mail: lars_olof.bjorn@cob.lu.se

Advance Access publication 23 November 2009
doi:10.1093/icb/icp119

Sustaining Life: How Human Health Depends on Biodiversity. Eric Chivian and Aaron Bernstein, editors.

New York: Oxford University Press, 2008. 568 pp. ISBN 13: 9780195175097 (hardback), $34.95.

Conserving biodiversity is a primary way to sustain healthy ecosystems and the services they provide, which we depend on for health, well-being and development. Over the past 50 years, however, we have changed ecosystems to an unprecedented degree, reducing biodiversity, and putting ecosystem services at risk. The United Nations, through its Millennium Development Goals, recognizes the need to reconcile conservation of biodiversity with the promotion of health and well-being. Sustaining Life: How Human Health Depends on Biodiversity is a landmark book that lays out the case for the conservation of biodiversity and the multiple benefits it provides—pharmacopeia, regulation of infectious diseases, and food production/security. By illustrating these relationships, the authors support the case that, through improved policies and management of, as well as better communication on the value of, biodiversity, we can maintain and/or enhance the human benefits provided by a biologically diverse environment.

The book is well organized, with beautiful supporting imagery. It begins with a primer on appreciating biological diversity from the level of genes to ecosystems. The primary causes of losses in biodiversity—alteration of habitat, overexploitation,
introduction of nonnative species, pollution, conflict (and resulting human displacement), and climatic change—are the result of complex socioeconomic factors such as human population dynamics, consumer attitudes and preferences, market failure, and social inequity. Subsequent chapters provide good, informative overviews, particularly the ones related to the medicinal value of conserving biological diversity.

*Sustaining Life* is an authoritative reference work, also including recommendations on what one can do at the individual and community levels to conserve biodiversity, appendices on the history of global policy development, and list of notable intergovernmental and nongovernmental organizations involved. It provides a solid foundation upon which to advance needed interdisciplinary work on the biodiversity and health relationship. Some areas, such as regulation of disease, are less well studied and causal mechanisms not fully understood. The biodiversity–health relationship here is complex, where species interactions, dynamics of hosts and vectors, pathogen evolution, and human behavior all need to be considered. Is species richness alone enough to maintain ecosystem services or is species composition more important, for example, when looking at transmission of human diseases? Does loss of biodiversity lead to a nonlinear response in impairing ecosystem function and posing human risk? More research is needed on the role of biodiversity in maintaining the condition and functioning of ecosystems, and empirical studies needed showing clear links to the well-being of humans.

Despite the signing of the Convention on Biological Diversity more than a decade ago and subsequent conservation efforts globally, the loss of biodiversity is accelerating. As our population continues to grow and develop into new areas, we should consider the possible and probable consequences of the changes we make to the environment so that, at the very least, we can be better prepared to mitigate any adverse effects. We might go further than this, however, with more precautionary guidance in policy, recognizing that some forms of loss of biodiversity are irreversible. Integrating biodiversity and health and well-being should forge new cross-disciplinary partnerships not only for research but also for improved management. There is reason for optimism, with the growing EcoHealth movement, and other initiatives like the Cooperation on Health and Biodiversity, which are working to facilitate the sharing and networking of information and to effect science into policy-making. *Sustaining Life* is a much needed resource and a call to appreciate and take action to conserve our biological diversity at this critical time.

About the reviewer: Montira Pongsiri is an environmental health scientist at the U.S. Environmental Protection Agency. She works on interdisciplinary issues involving human health, biodiversity, and ecosystem change. These views do not necessarily represent those of the agency.

Montira Pongsiri  
U.S. Environmental Protection Agency  
Washington, DC, USA  
E-mail: pongsiri.montira@epa.gov

Advance Access publication 14 December 2009  
doi:10.1093/icb/icp126

---

**The Molecular Organography of Plants. Quentin C.B. Cronk.**

New York: Oxford University Press, 2009. 288 pp. ISBN 13: 978-0-19-955035-7, $70.00 (paperback), $150.00 (hardback).

Organography, or the scientific study of organ form and function, in its most comprehensive manifestation requires the integration of morphology, developmental biology, genetics, genomics, and evolutionary history. In this book, Quentin C.B. Cronk admirably attempts to bring together this spectrum of scientific approaches and to present the current interdisciplinary status of the organography of plants. This is a bold undertaking that is made difficult by the immense diversity of forms and functions of plant organs and the relative paucity of molecular and developmental data available from nonmodel plants.

In the first chapter, the author sets out an evolutionary conceptual basis that provides a context for the rest of the book. He describes the importance of understanding developmental mechanisms, molecular networks, and phylogenetic data to assess true homologies from more superficial analogous similarities. He introduces different types of homology and presents the variety of molecular mechanisms that can...