ECOLOGY AND EVOLUTION

Leaping Lizards

Rosemary G. Gillespie

Tropical islands, vibrancy, color, and sex make for an intoxicating combination. For a biologist, if you add in high diversity, endemism, and a strikingly charismatic group of animals, it is difficult to imagine a more captivating system. In *Lizards in an Evolutionary Tree: Ecology and Adaptive Radiation of Anoles*, Jonathan Losos describes such a system in ardent detail. The book represents a rich compendium of information by an extraordinarily insightful biologist with a deep and broad understanding of the diversity of *Anolis* lizards in the Caribbean. Losos (an evolutionary biologist and herpetologist at Harvard University) indicates two audiences for the book: "those deeply interested in anoles and those interested in general questions of biodiversity, evolutionary biology and ecology." I fall in the latter category, although the book certainly enhanced my appreciation of the former. The solid foundation in natural history makes this a compelling read even for biologists with a marginal interest in lizards or evolutionary biology. As Losos comments, "only by having a rich and deep understanding of the organisms we study can we have insights into how and why they vary and how they have evolved." It is this foundation of understanding that has made books by such natural history giants as Jane Goodall, Gerald Durrell, George Schaller, and Bernhard Grzimek so influential. Although Losos's book is aimed at a somewhat higher level, it offers the same inspiration.

Lizards in an Evolutionary Tree
Ecology and Adaptive Radiation of Anoles
by Jonathan B. Losos
University of California Press, Berkeley, 2009. 527 pp. $75, £52. ISBN 9780520255913. Organisms and Environments.

One of the most intriguing aspects of the *Anolis* system is that it offers so many directions for research: Whereas some species have bizarre adaptations for crypticity, others appear to run, using speed and alacrity to elude predators and catch prey. Likewise, although much of their behavior and morphology provides mechanisms for escaping detection, the lizards display colorful dewlaps and perform staccato head bobbing to signal to mates and competitors. Clearly, sexual selection can run counter to natural selection—but it doesn't always. Indeed, anoles display key innovations in the form of toe pads that allow them to explore a new ecological arena through natural selection and dewlaps that may enhance the rate of speciation through sexual selection. Perhaps the most intriguing element in the system is that, despite the apparent diverse selective pressures acting on these lizards, there is remarkable predictability in the repeated evolution of ecomorphs on the Greater Antilles.

Except for a brief discussion in the final chapter of parallels in other systems, Losos quite wisely makes little attempt to analyze the lizards in the context of other studies: Had the book taken this avenue, it would have grown to encyclopedic proportions [like those of (*1*)]. However, readers always draw parallels to systems with which they are most familiar. So I will mention some of these in the context of radiations in the Hawaiian Islands, because such comparisons allow us to evaluate common themes. For example, in the anoles, "body size diverged early in the radiation without much subsequent change, but … habitat use has been diverging throughout the radiation." In the same way, Hawaiian sap-feeding planthoppers in the genus *Nesosydne* (Delphacidae) appear to have undergone extensive ecological shifts early in their radiation and relatively minor changes subsequently (*2*).

In the context of community assembly, the very clear pattern of repeated evolution of ecomorphs in the Caribbean anoles suggests that evolution has allowed species to occupy the ecological space more rapidly than has colonization. In contrast, many Hawaiian plants underwent major ecological changes early in their radiation, with communities on younger islands being filled simply by colonization of ecological equivalents from older islands. For these plants, it appears that colonization occurs more readily than evolutionary shifts within an island. Yet, in other lineages (both plants and animals), there are varying levels of independent ecological radiation into the diverse habitats on each island (*3*).

Repeated evolution of ecomorphs with discrete sets in any one habitat, as in the anoles, is most pronounced in spiders (genera *Tetragnatha* and *Ariamnes*), and comparisons are intriguing. First, as in anoles, some habitats may be missing a member (usually the same one) of the ecomorph set. Losos considers the most likely explanation for this to be island size. The geochronology of the Hawaiian Islands may allow the phenomenon to be scrutinized in some detail. Second, the anole radiation is characterized by several taxa with unique ecological attributes. In Hawaiian *Tetragnatha*, taxa outside the "spiny leg" clade have several unique representatives, and convergence in the more-encompassing lineage seems—if anything—to be limited to the form of the web rather than the body phenotype. Third, anole ecomorphs have arisen almost entirely through convergent evolution, whereas in Hawaiian *Tetragnatha* spiders, communities have been filled by a combination of colonization and evolution. The domination of evolution over colonization in the anoles (perhaps also in Hawaiian *Ariamnes* spiders) indicates that movement in the anoles must be severely curtailed, an attribute that Losos also discusses in the context of population structure.

Lizards in an Evolutionary Tree offers a winning combination of enchanting animals

Uniquely variable. *Anolis distichus*, a widespread and highly polymorphic trunk anole, exhibits substantial intra- and interpopulational variation in dewlap color (here *A. d. vinosus*, from the Tiburon Peninsula, Haiti).

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and an idyllic setting that addresses some key biological questions. Losos documents an extraordinary history of research on almost every imaginable attribute of *Anolis* lizards. He frequently stops to take stock before presenting the hypotheses and asking how these could be tested, and he whets our appetites by presenting avenues for future study. What an exciting time it is for evolutionary biology, and anoles provide one of the most compelling systems to further our understanding of the field.

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BROWSINGS

CREDIT: FROM C. G. JUNG, THE RED BOOK © FOUNDATION OF THE WORKS OF C. G. JUNG/COURTESY W. W. NORTON

The Red Book of C. G. Jung. Rubin Museum of Art, New York, through 15 February 2010.

On the lower level of the Rubin Museum of Art in New York, there is a small exhibition, "The Red Book of C. G. Jung: Creation of a New Cosmology." Jung, who was a highly influential figure in the history of psychology and psychoanalysis, spent a period of time during World War I in self-investigation and waking visions. He created phantasmagorical, multicolored, and detailed images that illuminate his description of this exploration in the recently released *Liber Novus* (commonly known as "The Red Book"). The beautiful images, as well as a video describing him by guest curator Sonu Shamdasani, are shown in the exhibit. During the exhibit, the museum has been sponsoring a series of dialogues between notable individuals (including Twitter co-founder Jack Dorsey and philosopher Cornel West) and psychoanalysts; audio podcasts of many of these dialogues will be available at www.wnyc.org. The museum is also showing a film series based on Jungian themes.

–Barbara Jasny

COMMUNICATING SCIENCE

If Our Messages Are To Be Heard

Peter Kareiva

Scientists know important things. They know about the role of greenhouse gases in global warming. They know how genes are inherited. They know how the body fights off infections. They know that the world's ecosystems are being needlessly degraded. But most scientists do not know how to talk to anyone other than scientists. As a consequence, political leaders and the public at large either ignore or, perhaps more accurately, are bored by whatever it is that scientists are trying to tell them. The general population's attitude toward climate change has become the iconic story of a public that pays no heed to the message of scientists. This inability of scientists to connect with the nonscientists has far-reaching consequences well beyond any single issue such as global warming. Randy Olson and Cornelia Dean have written two very different books with the same goal: to school scientists on how to communicate with and reach the public.

Dean, formerly a science editor for the *New York Times*, knows well how caveats kill the message. And she has seen firsthand the freezing out that instantly accompanies even a hint of patronizing utterances. As a journalist who was in at the founding of the Tuesday "Science Times," Dean saw thoughtful media coverage of science initially grow but then dwindle under the fiscal pressures of failing newspapers. *Am I Making Myself Clear?* is as much about why scientists need to talk to the public as it is about how we should talk science to the public. She argues that scientists need to develop a civic persona that finds some way to communicate science.

Dean's wisdom, especially for engaging in the political arena, is delivered with a mix of authority and charm, as is evident in her advice on how to respond to questions from a congressional committee or staffer: "Say 'I don't know' when appropriate and offer to provide the needed information later. But as the old saying goes, don't let your mouth write checks your ass can't cash. If you promise to provide additional information, memos, or the like, be prepared to produce them, and fast."

Blogs and e-mail campaigns have become hugely influential—for spreading information, creating their own news, and building a community of like-minded activists. However, as Dean cautions, the work required for maintaining an effective blog is enormous, and the return on investment from a scientist's perspective may be too low. The solution may well be science collectives that maintain blogs and can respond instantly to the latest story about a child dying from a flu vaccine or some article that purportedly overturns 30 years of global circulation models. But before we give ourselves over to the Internet, Dean reminds us what we all know—there is too much information out there, so the key is to master the arts of standing out above the confusion and delivering a message that is heard, understood, and remembered. This is hard enough for a captive audience in a classroom and orders of magnitude harder when trying to reach a public audience that has many vibrant options for reading, viewing, and listening. Yet parents with teenagers in their household will have some idea of the power

Don't Be Such a Scientist
Talking Substance in an Age of Style

by Randy Olson

Island Press, Washington, DC, 2009. 215 pp., illus. Paper, $19.95. ISBN 9781597265638.

Am I Making Myself Clear?
A Scientist's Guide to Talking to the Public

by Cornelia Dean

Harvard University Press, Cambridge, MA, 2009. 284 pp. $19.95, £14.95, €18. ISBN 9780674036352.

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