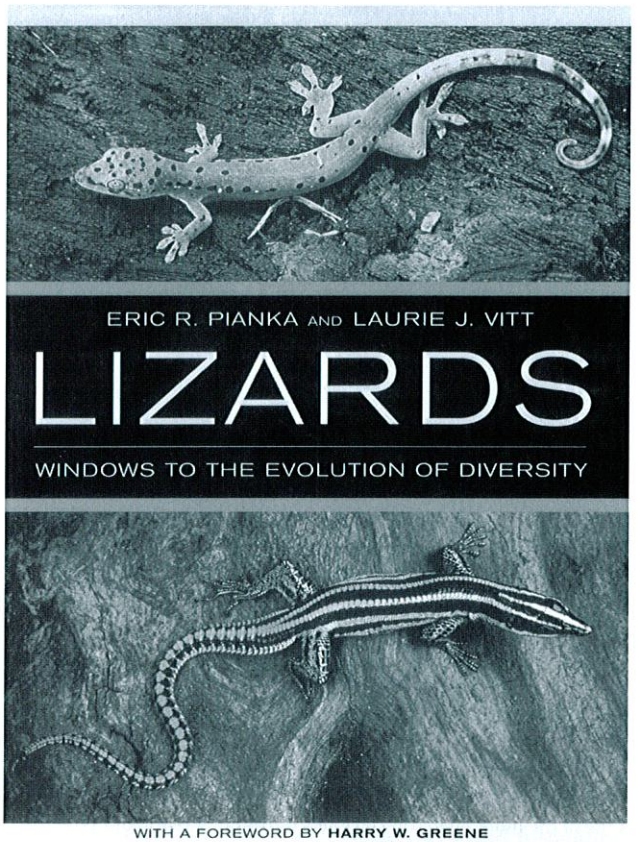
BOOK REVIEWS

Lizards: Windows to the Evolution of Diversity. **Eric R. Pianka and Laurie J. Vitt. 2003. University of California Press, Berkeley and Los Angeles, California. 333 pp. 218 photographs, 8 tables, 31 figures, glossary, index. Clothbound, $45.**



In *Lizards: Windows to the Evolution of Diversity*, Erik Pianka and Laurie Vitt have provided the lay public (and the highly educated "experts") with an invaluable and exhaustive summary of what is known about lizard ecology. Although they may have been a bit ambitious in trying to include such a wealth of information in a book designed for the coffee table, they have certainly achieved their stated goal of providing "an up-to-date, more scientific reference for lay people."

This well-organized and scrupulously researched volume examines lizard ecology from several angles. The first of three parts is entitled 'Lizard Lifestyles.' It examines the various ecological niches filled by lizards. After a brief introduction to lizard phylogeny and classification, the authors highlight many of the adaptations that lizards have evolved to accommodate their diverse lifestyles. This section includes a discussion of the astounding array of locomotor mechanisms, from prehensile tails to zygodactylism (look it up!) to sticky toe pads. The discussion also considers physiological adaptations to different environments, such as water retention strategies and sometimes surprisingly effective thermoregulatory behaviors and mechanisms. Desert lizards, for example, maintain a fairly constant body temperature despite large thermal fluctuations throughout the day. Other lizards, such as nocturnal geckos, largely conform to the ambient temperatures of their environment. This is followed by an examination of predation tactics, which range from highly active foraging to what is termed a 'sit-and-wait' strategy. Some lizards, such as Monitors (a group that includes the Komodo Dragon), actively track large vertebrate and invertebrate prey. Others, such as chameleons, wait passively and ambush invertebrate prey with their projectile tongues. The authors next review escape behavior, which can range from highly alert and active flight (sometimes literally) to a heavy but essentially passive reliance on crypsis. For instance, most species of Horned Lizards either remain motionless when threatened or run for a short distance and then freeze, relying on camouflage to blend imperceptibly into the habitat; in contrast, Racerunners rely almost solely on speed to evade capture. Finally, they address social and reproductive strategies that run the spectrum from large male territories that overlap with those of several females to long-term monogamous pairings. The section is summarized with a review of how these various features and strategies apply to the challenges lizards face in the various natural settings and ecological roles for which they are adapted.

The second part is a trek through what is currently known about lizard phylogeny. Building on information presented in the previous section, the authors proceed to examine a sample of the adaptive radiations that correspond to the various lizard phylogenies. Special attention is paid to examples of convergent evolution (a Pianka specialty), where similar strategies have been adopted by disparate groups of lizards in response to essentially similar environmental pressures. The Thorny Devil (*Moloch horridus*) of Australian deserts and the Horned Lizards (*Phrynosoma* spp.) of the American Southwest are both dorsoventrally flattened, stout-bodied lizards covered with a number of unfriendly looking spines and protrusions. Not only are they essentially similar in appearance, they behave and function ecologically in much the same fashion; both rely heavily on crypsis to evade predation and both are sit-and-wait foragers that feed almost exclusively on ants.

All of this information is united and placed into a coherent context in the last part. A chapter on historical perspectives attempts to trace the adaptations and radiations of lizards through time, explaining their prevalence or absence on certain continents or under certain environmental conditions. The last chapter examines the somewhat uneven relationship of humans with lizards, highlighting the rich history of lizards in culture and mythology — and examining the pressures (almost invariably of human origin) that threaten the continued co-existence of these rather disparate life forms.

Although the section on lizard diversity contains a wealth of information, what the authors chose to present varies considerably from one group to another. For some taxa, they discuss in great detail dozens of species and their many specific behaviors and adaptations. For others, such as chameleons, they cite only two or three species and very few specific examples of unique adaptations or behaviors, instead devoting most of the section to a discussion of very general physiological traits. This can be somewhat frustrating if one bought the book with the intention of enhancing one's knowledge of a particular genus or family, only

One of the more interesting chapters is that on "Lizards and Humans," in which this petroglyph of a Chuckwalla (*Sauromalus ater*) from Arizona is illustrated. *Photograph by Jim Rorabaugh.*

to find that that particular group was given only cursory attention. Because of that uneven coverage, I would hesitate to portray the book as comprehensive. Although it provides substantial detail on a broad range of lizard groups, that obvious depth merely reflects a pronounced bias toward species and genera with which the authors have worked (Pianka largely on desert lizards in North America, southern Africa, and Australia; Vitt on taxa found in the southwestern United States and the mainland Neotropics). This would explain the relative dearth of information on iguanas, most of which live outside the areas frequented by the authors — but which are certainly deserving of more attention, if only because some of them are among the most endangered reptiles in the world. West Indian anoles comprise another group that deserves more attention than given; these lizards have been instrumental subjects in many studies that have provided new insights into the evolution of ecological relationships. Despite the fact that both authors have been phenomenally prolific and have contributed greatly to a better understanding of ecology and herpetology (those of us who are interested specifically in the ecological relationships of reptiles have long been exposed to the profusion of their professional publications), such expertise would unavoidably have led to a better acquaintance with some lizards than others.

Had the book been presented as a textbook, this partiality would be a genuine cause for concern. However, the attentive reader should have been forewarned of this bias, as Harry W. Greene stated in the foreword: "In some ways this is a book about two curious boys who grew up chasing lizards ... and have now synthesized their collective life's work to date." Possibly the most entertaining elements of the book occur when one or the other of the authors reverts to boyhood by recounting a particularly memorable event or expressing a youthful passion for a specific subject. Such asides are scattered throughout the volume and, whenever I turned a page and encountered one, I stopped wherever I was and immediately turned my attention to the story at hand — and inevitably found myself wishing for more.

Throughout the book, Pianka and Vitt frequently pose questions that are meant to inspire more research into some aspect of lizard ecology, phylogeny, or physiology. They also are not averse to making new and interesting generalizations about lizard ecology, including numerous observations about phylogenetic trends in foraging modes and diet composition. Unfortunately, these are not always clearly identified, and the lay reader may experience some difficulty distinguishing new and novel observations from those that have been with us for some time and are widely accepted as true.

Overall, the book is simultaneously thorough and eminently understandable. The depth of coverage results in a volume that is a bit too thick for cover-to-cover reading, although the generally easy-to-read style, presumably a composite effort by the two authors (or very effective editorial work), tempts the reader to stay with the book longer than such a specialized subject might normally merit. Actually, the combination of authority and entertainment creates a rather odd combination of text and coffee table book. In fact, the relative brevity of coverage of some lizard groups may be all that keeps this volume from serving as an adequately comprehensive textbook on lizards. That impression is enhanced further by the abundance of charts and tables, far more than one would expect of a book designed for casual perusal and mere entertainment. Also, the volume contains relatively fewer glossy photos and illustrations than the typical coffee table book — and all that are included seem to illustrate what the authors would lead us to believe are important aspects of lizard biology. Conversely, those wonderful anecdotes are just plain fun!

Ultimately, this book is a terrific resource. The depth of information presented will provide lasting value long after one has thumbed through the glossy photos and read all the captions. Certainly comparable to Rick Shine's *Australian Snakes: A Natural History* and Harry Greene's *Snakes: The Evolution of Mystery in Nature*, until now the best examples of large, profusely illustrated books capable of both educating and inspiring the reader, lizard lovers no longer have to envy the snake fanciers. A bargain at the price, everyone with even a casual interest in lizards should have a copy prominently displayed on their very own coffee table.

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Grand Cayman Blue Iguana, *Cyclura lewisi*, Grand Cayman, Cayman Islands (see story p. 148). *Photograph by Fred Burton.*