blacks and for whites. Although this may seem like an obvious and commonsensical thing to do, it is something that analysts of public opinion and voting data all too often forget about.

On the other hand, there is room for improvement in a number of respects. As is the case with virtually all public opinion studies, there is a tendency here to reify questionnaire responses and to pay insufficient attention to behavioral consequences (if indeed they exist). To be sure, Abramson does better than most, in that he does investigate the possible effects of attitudinal changes on turnout in national elections. But I must say that at the end of the book I still wondered whether it really mattered very much that Americans continue to express a fair amount of intolerance for deviant groups, or an increasing degree of cynicism about "people in government," or a growing sense that the government is not very responsive to public demands.

A related problem, for me anyway, is the fact that the political attitudes Abramson analyzes are "deep background" sorts of issues; he does not investigate public attitudes toward major social and economic problems, such as unemployment or crime in the streets, or attitudes about major public policy choices, such as abortion or defense spending. Abramson also gives short shrift to studies that lie outside the conventional, social psychological approach of mainstream political science. In particular, he fails to discuss the theories and analyses of researchers whose orientation is that of economics rather than psychology or sociology. It would be unfair, however, to be overly critical of Abramson on these grounds; all authors must draw the line somewhere between what lies within the scope of their studies and what does not. These shortcomings, then, are primarily sins of omission rather than of commission, and are largely inevitable.

Political Attitudes in America is reasonably well organized and well written. It is probably the case that Abramson fails to make the topics he covers any more exciting than they inherently are, but such a statement can be made about virtually all scholarly writing. I would recommend this book to anyone with a healthy interest in public opinion or voting behavior studies; I suspect, though, that it will remain of interest primarily to academic political scientists.

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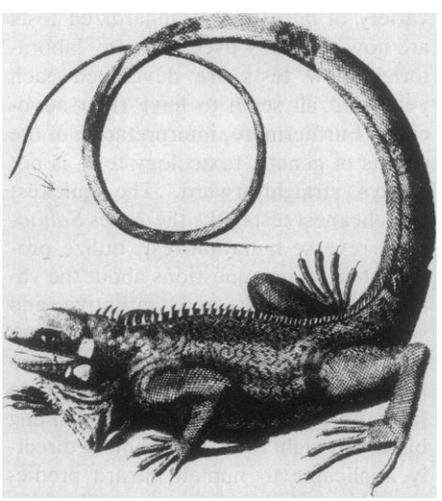
Reptilian Herbivores

Iguanas of the World. Their Behavior, Ecology, and Conservation. GORDON M. BURGHARDT and A. STANLEY RAND, Eds. Noyes, Park Ridge, N.J., 1982. xx, 474 pp., illus. $55. Noyes Series in Animal Behavior, Ecology, Conservation and Management.

Iguanines are notable lizards because of their herbivorous habits, large body sizes, and relatively phlegmatic behavior. However, while information on smaller, more active insectivorous members of the iguanid family has been steadily accumulating in the literature, little information and almost no field data have been available for the iguanines. The present volume is an attempt to remedy this situation and is designed, according to the editors, to be a comprehensive "state of the art" book on iguanas. As such, it includes chapters by almost everyone currently working on these lizards, ranging from discussions of the energetic and physiological bases of herbivory to a catalogue of the mating systems of iguana species.

The chief virtue of the book is that it does contain most of the information available on a unique taxon of lizards. By flipping through the chapters, the reader can identify the important themes of iguanine research. For example, many of the contributors discuss the question why herbivorous lizards should be larger than insectivorous species. Ten years ago, Pough suggested that large size was necessary for efficient digestion of plant material, but evidence from this volume refutes this hypothesis. The juveniles of several iguanine species are shown to be exclusively and efficiently herbivorous despite their relatively small size, and young *Iguana iguana* actually grow at higher absolute rates than do young *Basiliscus basiliscus*, insectivorous iguanids living in the same habitat (Van Devender, chapter 10). Alternative reasons for large herbivore size are suggested by other authors, but data that test these hypotheses are lacking.



Iguana as depicted in Albert Seba's *Locupletissimi Rerum Naturalium Thesauri*, vol. I (Amsterdam, 1734).

In other animal groups, body size is often related to a suite of life history traits: Larger members of a taxon often have higher adult survivorship, deferred age of maturity, and lower annual reproductive output than do smaller species in the same taxon. The contributions in the present volume confirm this relationship for iguanas. Interestingly, reduced reproductive rates in iguanines are not due to decreased clutch weight relative to body weight. Instead, iguanines reproduce less often than do many tropical insectivorous iguanids, usually producing only one clutch a year, during a very restricted breeding season. Moreover, females often do not reproduce every year; reproduction may not occur in years of poor rainfall or food, and females of some species may only reproduce one year in four (Case, chapter 11).

For those interested in possible relationships between foraging style, demographics, and behavior, this volume offers a variety of pertinent information. In comparison to insectivorous species of iguanids, iguanines are extremely variable with respect to spacing patterns, mating systems, contexts for aggression, and the ontogeny of social behavior. As discussed by Dugan and Wiewandt (chapter 17) and Ryan (chapter 21), iguana social systems include dispersed home ranges or territories, tyrant-subordinate or hierarchial breeding systems, leks, and, in some species, no evident aggressive behavior at all. Descriptive studies (Dugan, chapter 18; Werner, chapter 19) indicate a sophistication in male mating strategies comparable to that found in higher vertebrates but as yet unreported for other lizards, and the juveniles of several iguanine species exhibit mutual attraction and group cohesion of a degree unknown for other lizards, regardless of age or sex.

It should be apparent that the iguanas have a scientific interest out of proportion to the number of species (about 30, worldwide) or their distribution (mostly islands in the subtropics and tropics). They offer a unique opportunity to study the ecological relationships between food type and morphology, life history traits, and behavior. On an evolutionary time scale, they may be useful as a model for now extinct herbivorous reptiles (such as dinosaurs) or for a comparison

of the relative merits of ectothermic and endothermic herbivory. For example, data in this volume show that iguanas have metabolic rates only 3 to 6 percent of those of mammalian or avian herbivores of the same size (Nagy, chapter 3) but that these rates may be maintained at the expense of activity: even breeding males spend 80 percent of their time sitting perfectly still, and the figure goes beyond 90 percent for non-breeding individuals (Dugan and Wiewandt, chapter 17).

The major problem with the present volume is that its organization and scope do not do justice to its subject matter. Most of the chapters focus on narrow aspects of the biology of one or two species. Many authors do not compare their results with those available for other iguanas, and sometimes authors seem unaware of relevant information contained elsewhere in the volume. There is considerable repetition of some themes (at least seven authors discuss their pet hypotheses for large size in iguanines), whereas some trends apparent to a perspicacious reader of the book are not discussed by any author (for example, reasons for the low reproductive output and strict breeding seasonality of iguanines as compared with other tropical lizards). The only attempts at integration are made by the editors, who provide a useful general introduction, and by four review chapters (out of a total of 23 chapters). The book provides the raw material for review of many aspects of iguana biology but provides finished reviews for only a few.

Another shortcoming of the book, which will probably hurt sales among nonherpetological readers, is the failure of many authors to point out the general significance of their results. For example, the section on digestive energetics, dietary physiology, and morphology would have benefited from a more complete comparison with the systems found in nonreptilian herbivores, and none of the chapters on reproduction, survival, or growth cites the burgeoning literature on the evolution of life-history strategies. With the exceptions of two reviews of iguanine mating systems, the lack of focus on broad issues of ecology, behavior, and evolution will make it difficult for the casual reader to evaluate the importance of the individual papers and of the book as a whole.

In one respect, however, the book is an unqualified success. One theme repeated by most of the authors and expanded in the final chapters of the book is that many of the species in this unique taxon are on the verge of extinction. Iguanas are not only losing habitat to a tide of human expansion, they also have the misfortune to be edible, and even when rare they continue to be hunted as a delicacy. In pointing out the importance of these animals and in showing how meager even our "state of the art" knowledge is on iguanas, the book makes an eloquent plea for their preservation. In addition, the information it contains should be invaluable for those responsible for protecting and managing the populations that still exist. Philanthropic individuals and organizations might be encouraged to send a copy of the book to individuals or government agencies in countries with endangered iguanas. Without a substantial preservation effort, the present volume could well be the last comparative book on iguana biology.

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Genetic Toxicology

Mutagenicity. New Horizons in Genetic Toxicology. JOHN A. HEDDLE, Ed. Academic Press, New York, 1982. xvi, 474 pp., illus. $55. Cell Biology.

Genetic toxicology, the use of mutagenicity, cytogenetic, and DNA-repair assays to assess the carcinogenic potentials of pesticides, drugs, food additives, environmental pollutants, and so forth, is a rapidly developing field. Short-term in vitro assays not only are far quicker and cheaper to perform than full-scale carcinogenicity tests with animals, they are also often useful methods for the study of molecular mechanisms, metabolic pathways, and so forth. Though a variety of fairly well standardized tests are now routinely used by many laboratories, new tests are developed each year, and all seem to have their advocates. Furthermore, interpretation of the results of genetic toxicology tests is not always straightforward. The quickest and cheapest tests, like the Ames *Salmonella* reverse mutation test, utilize prokaryotes, raising questions about the validity of the results as quantitative, and sometimes even qualitative, predictors of human hazard. Tests with higher eukaryotes, like *Drosophila* or mice, are far more expensive and time-consuming but are thought to yield data more directly applicable to human hazard prediction. Nevertheless, data on cells from humans themselves seem even more germane, so there are advocates of such test systems. Finally, of course, in vitro testing, even with human cells, cannot take into account questions of transport and metabolism in the human body, and systems for monitoring exposed populations directly for genetic end points in somatic cells, usually peripheral blood lymphocytes, are coming into general use.

In *Mutagenicity* Heddle has assembled a series of 16 papers by an international group of authors. The first five papers deal largely with bacterial assays, leading off with a thoughtful review by John Ashby covering the design, validation, and application of such assays. The other four papers discuss recent applications of such tests to specific subjects of concern: occupational mutagenesis and mutagenic substances occurring naturally during the preparation of food.

Three papers are devoted essentially to mammalian tissue culture assays. One covers the mutational assays. Another, by A. T. Natarajan and G. Obe, deals with cytogenetic assays. It is quite global, reviewing not only testing applications but basic cytogenetic theory, the use of cytogenetics to detect certain inherited human diseases, and certain applications to basic research. The third paper in this group reviews an end point not so obviously genetic, the in vitro transformation of the sort often referred to as "neoplastic."

Five papers deal with the detection of effects in exposed people. There are three on cytogenetic end points in lymphocytes; one on chromosomal aberrations, one a particularly nice discussion by Anthony V. Carrano and Dan H. Moore of the sister chromatid exchange assay, and one dealing with both end points as applied to monitoring occupational exposures. Albertini *et al.* review the mutational assay they have recently developed for thioguanine-resistant lymphocytes. The final paper in the group discusses the possibly controversial use of changes in numbers and form of spermatozoa as a means of detecting human exposures to genotoxic agents.

The final three papers deal with in vivo tests on higher eukaryotic organisms. In the first, Paul B. Selby describes his work with the dominant skeletal mutation method in the mouse. Another paper describes the use of plants as in situ detectors of atmospheric mutagens, and the last describes the similar use of fish for detecting aquatic mutagens.

It is perhaps not surprising in a volume subtitled "New Horizons" that coverage of genetic toxicology is quite uneven. Many currently important systems, for example those using *Drosophila* and many using mice, are not discussed at