

# BOOK REVIEWS

*Copeia*, 2004(1), pp. 190–196  
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Ichthyologists and Herpetologists

INTRODUCTION TO HORNED LIZARDS OF NORTH AMERICA. Wade C. Sherbrooke. 2003. University of California Press, Berkeley, California. ISBN 0-520-22825-1. 191 p. \$35.00 (cloth), ISBN 0-520-22827-8. \$16.95 (paper). HORNED LIZARDS. THE BOOK OF HORNY TOADS. Jane Manaster. 2002. Texas Tech University Press, Lubbock, Texas. ISBN 0-89672-495-6. 93 p. \$15.95 (paper).—Let me be clear about one thing: I know Wade Sherbrooke. Wade Sherbrooke is a friend of mine. Jane Manaster is no Wade Sherbrooke. But then, neither is anyone else. Let's face it, Wade Sherbrooke writing about horned lizards is a tough act to follow. Manaster had the misfortune of having her book published at close to the same time as Sherbrooke, thus ensuring that book review editors everywhere (a parsimonious lot) would bundle them, begging comparison. However, such a comparison is really unfair. The books take very different approaches to their common subject and target different audiences.

Having established my professional integrity and objectivity, I can state with some authority that not since Darwin's *Origin* has a better or more important book exploded onto the scientific scene. Okay, a slight exaggeration. Truthfully, though, Sherbrooke's *Introduction to Horned Lizards of North America* is an outstanding book. Although aimed at a general audience, it will be consulted by professionals for its wealth of natural history information and sifted for its many nuggets of original data. Indeed, a great deal of what we know about horned lizard (*Phrynosoma*) biology is because of Sherbrooke's own research. He has spent years in the American southwest as Director of the American Museum of Natural History's Southwestern Research Station in the very of heart horned lizard diversity. He has used this position to advantage, studying horned lizards of all species in the field, in large, outdoor enclosures at the research station, and in the laboratory. There is very little about horned lizards that Wade Sherbrooke doesn't know, and his vast knowledge informs all of his general writing. The style is clear and straightforward, almost light, but always anchored with the weight of authority. It is easily accessible to am-

ateur naturalists but will also serve as an important reference for professionals on the biology of this fascinating genus of lizards.

*Introduction to Horned Lizards of North America* is the second edition of an earlier book Sherbrooke published in 1981, entitled *Horned Lizards: Unique Reptiles of Western North America* (Southwest Parks and Monuments Association, Globe, Arizona). The new edition is revised and expanded to include all the Mexican horned lizard species, as well as new and updated material. It is published as part of the University of California Press' Natural History Guide series. Sherbrooke has maintained the organization and many figures of the original, as well as much of the text, but the new edition is significantly improved, and the change from pamphlet to book form is welcome. A bit too large to put in one's back pocket, it remains small and light enough to carry easily into the field. Its size and organization make it serviceable as a field guide, but the text is dominated by a discussion of horned lizard natural history, rather than species identification.

The book is divided into three main sections: Introduction, Species Accounts, and Natural History. The Introduction provides very nice, brief overviews of biogeography, the role of weather in ecology, evolutionary history, species identification, the diversity of form, and phylogeny. An especially nice feature of this section is a color-coded flow diagram that serves as a key to the species of *Phrynosoma*. Each species is identified by a unique color silhouette of the lizard's head illustrating its particular pattern of cranial horns (or lack thereof). These species-specific icons are maintained throughout the book, as in the range maps and species accounts. The Species Accounts provide concise descriptions of identifying features, explanations of Latin binomials, and information about range and habitat. The taxonomy is up to date, incorporating, for example, the molecular findings and taxonomic recommendations of Zamudio et al. (1997), suggesting that the Pygmy Horned Lizard is restricted to the Pacific Northwest (*Phrynosoma douglasii*, sensu stricto). The remaining, widespread populations formerly included in this species constitute a new taxon, the Short-Horned Lizard (*Phrynosoma hernandesi*). In general, Sherbrooke is conservative in his recognition of taxa, tending to relegate controversial species to subspecific status within bet-

ter supported species (e.g., *Phrynosoma cerroense* and *Phrynosoma boucardi* are included within *Phrynosoma coronatum* and *Phrynosoma orbiculare*, respectively). The number of recognized subspecies within each species is noted, but only rarely are they named; thus, most such taxonomic lumping is not explicit and must be inferred. This practice streamlines the text, presumably as a concession to general readers, but it might frustrate professionals. Finally, the Natural History section, the best and longest part of the book, covers diverse topics including daily and seasonal cycles of behavior, thermoregulation, defensive behavior, feeding behavior, and reproduction, to name a few. Sherbrooke particularly shines in his account of horned lizard biology. Although brief, each section is jammed with incredible tidbits, original observations and remarkable insights. I was struck, as I often am by good natural history writing, by the awesome precision of natural selection in shaping such wonderfully adapted organisms. Background matching is an obvious example of this, but when one considers the subtleties associated with camouflage in horned lizards, one is awestruck: cryptic colors and patterns are embellished by fringes and horns that blur the animal's edges; disruptive patterns obscure its shape and outline. Behaviors often amplify these morphological features—lizards lie flat to ground to avoid outline-betraying shadows; hunching, coupled to a small or contrastingly colored tail, provides some species with an uncanny ability to mimic rocks. Yet, despite the incredible specialization of these animals, their tanklike bodies and stubby limbs, some species, such as the Texas Horned Lizard (*Phrynosoma cornutum*), climb adroitly into shrubs to avoid superheated substrates or to sleep. They would hardly seem to be adapted for this particular behavior—rather the opposite, in fact. And therein lies an important lesson for armchair biologists, an example of the irreplaceable value of field observation. The Natural History section concludes with a short essay, “On Humans and Lizards,” which includes discussions of the horned lizard in Native American culture and art, as well as a plea for conservation.

*Introduction to Horned Lizards of North America* is thoroughly and beautifully illustrated. It is populated by dozens of exceptional color photographs, all but one taken by the author. The number and quality of the illustrations, as well as the clean and attractive design of the book, enhance its utility, as well as the esthetic pleasure in reading it. Range maps are large and clear, though lacking in the detail a professional

might desire. Professionals will also fault the absence of literature citations in the text, but, as noted above, such streamlining seems to be the price one pays for books aimed at a wider market. In any case, the lack of citations is somewhat mitigated by the excellent index and bibliography included at the end of the book. Finally, production value and editorial oversight are exceptionally high. I found only two small errors (a mismatching color in the main distribution map and a typo in the legend for plate 13) and one bit of confusing text (the taxonomic history of *Phrynosoma douglasii* in relation to *Phrynosoma hernandesi*). These trivialities do nothing, however, to detract from the outstanding utility, clarity, readability, and authority of this small book. It is an exceptional volume that every herpetologist, amateur, or professional will want.

Jane Manaster's book, *Horned Lizards*, will probably interest a somewhat different audience than Sherbrooke's, and in many ways it is its complement. Manaster begins her small volume with three short chapters summarizing the biology of *Phrynosoma*, following this with chapters on American Indians, Folklore, Mexico, Modern History, Extended Range (describing the history of interest in horned lizards outside the southwest) and Conservation, devoting nearly twice as many pages to the latter part of the book than to the former. And this is as it should be. Manaster is a freelance writer and historian, not a scientist. Where the biological chapters are weak, those dealing with popular culture, folklore, and history are strong. Her summaries of early explorers and their horned lizard encounters are especially fascinating. She devotes particular attention to the Spanish explorers of Mexico and their earliest, formal descriptions of *Phrynosoma* (Francisco Hernández provided the first known scientific description of a horned lizard in 1651!). Many of these early accounts, as well as folk-knowledge about the lizards, are remarkable for their accuracy. Native Mexicans, for example, knew about the propensity of some horned lizards to squirt blood from their eyes long before this was believed in scientific circles. Manaster's emphasis of the Spanish and Mexican contributions to American herpetology is refreshing. She also provides us with extensive information about the cultural impact of horned lizards in the United States and Europe, a particularly novel feature of the book. Her account of the depredations wrought by the curio trade, particular by one William Blakely in 19<sup>th</sup>-century California, is an eye-popping read.

Manaster's background as a historian is

clearly evident in her writings about early exploration and cultural history. She writes with grace, her prose interesting and sometimes quirky in a good sort of way. It is these chapters, the major part of the book, that make it well worth reading. The same cannot be said of the biological chapters, however. Although her great affection for horned lizards is everywhere manifest, Manaster lacks a clear feel for the animals and evinces a certain naiveté about their modern scientific study. Most of the biological information is paraphrased directly from Sherbrooke's 1981 book and not always accurately. The taxonomy employed is never made explicit (there is no species list) and, in any case, is out of date, including, for example, species names no longer recognized. The biology is certainly adequate for the amateur naturalist who might like the briefest of introductions to horned lizard biology, but it will not satisfy anyone with a deeper interest in the science behind the lizard.

Although Manaster lauds much of the current scientific study being pursued with horned lizards, collections-based work is subtly portrayed in an unflattering light. For example, she writes "One enraptured scientist laboring in his California laboratory got quite carried away with the task in hand, solemnly reporting that the material on which his study was based 'consists of a good working collection of some sixty alcoholic specimens.'" Silly scientist! My sense of the pejorative in this sentence might have been dismissed as paranoid until I read that "Several species [of horned lizard] are exhibited in European natural history museums, and those reserved for research lie quietly on dusty shelves, catalogued, stuffed, or embalmed." I would like Manaster to know that the shelves on which *my* jars of preserved horned lizards lie are dusted regularly (thanks to a fastidious graduate student). Joking aside, the general readership deserves to be educated about the centrality of natural history collections in systematic and morphological research. Such collections are neither stale, nor quiet. They are at the core of modern evolutionary and conservation biology (how else would we know, for example, about the historical range of endangered populations?). Manaster has squandered an opportunity to enlighten her public about collections-based research in a book that is otherwise very supportive of scientific efforts to understand and save these unique lizards.

How can one *not* be fascinated by creatures that look like mythological beasts from hell, squirt blood from their eyes, eat some of the most venomous and pugnacious insects on the

planet, sniff each other's butts, copulate missionary style, bluff most predators, and skewer the throats of those who have the audacity to swallow them and yet remain cute as a button? Horned lizard enthusiasts of all stripes will want to own both of these small books. For the biologically inclined, Sherbrooke's outstanding book is the clear choice, but for those disposed to enjoy cultural history, Manaster's book is highly recommended. I am pleased to have both books in my library, but as a herpetologist, it is Wade Sherbrooke's *Introduction to Horned Lizards of North America* that I know I will turn to time and again.

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ESTADIOS TEMPRANOS DE PECES DEL PACIFICO COLOMBIANO. Beatriz Susana Beltran-Leon and Raul Rios Herrera. 2000. In Spanish. Instituto Nacional de Pesca y Acuicultura-INPA, Buenaventura, Colombia. ISBN Tomo I 958-9356-04-4, Tomo II 958-9356-05-2. Two volumes, consecutively paged 1-358 and 359-727. \$70.00 (paperback). (Further information: B. Beltran, P.O. Box 10742, Buenaventura, Colombia; E-mail: bbeltranleon@yahoo.com or on the web [www.inpa.goc.co](http://www.inpa.goc.co)).—This book, with a title that translates into English as *Early Life-History Stages of Fishes of the Colombian Pacific*, is a top-quality regional larval-fish guide and an excellent contribution to the larval taxonomy and ecology of the Colombian Pacific. The region addressed is among the least studied areas in the eastern Pacific but has one of the highest indices of biodiversity. The book consists of detailed descriptions and illustrations of the larvae of 236 species of fishes collected in the Colombian Pacific together with species distribution charts of the specimens collected. The material described was collected between 1991 and 1998 on 16 oceanographic cruises supported by the Colombian Fisheries and Aquaculture Institute (INPA) and the regional fisheries program (VECEP) of the Eu-

ropean Union. Orders, families, and species are the topical levels.

The book is divided into two volumes. Volume one deals with the descriptions of larvae from 18 orders and volume two with three large orders—Perciformes, Pleuronectiformes, and Tetraodontiformes. An introduction to the orders provides general information on adults, the numbers of taxa (families, genera, and species), and the families studied in the region. Each larval description occupies one page of text and is accompanied by a map showing the distribution of the species along the Colombian coast and a table of meristic and morphometric data. Another page contains illustrations of the different larval developmental stages (preflexion, flexion, and postflexion). The illustrations are of excellent quality, both technically and artistically. However, very elongate larvae are drawn with flexures to maintain a horizontal perspective. This negates the possibility of counting myomeres and in some cases fin elements because these features are obscured by bends. Flexures were used in illustrating several of the eel leptocephali, *Idiacanthus antrostomus*, two paralepidids, and *Echiodon exsilium*.

The title of the book is somewhat misleading because the material analyzed covers only a fraction of the fish fauna of the highly diverse Colombian waters. It is a difficult process to identify fish larvae, especially from tropical areas where the fauna is large and diverse. It would have been very advantageous to have included more information on how to identify larvae from this area by providing species lists and useful identification characters for all species such as tables of meristic values.

These volumes are of high quality and are products of incredible dedication, perseverance, and tenacity by two young and enthusiastic scientists who, with very few resources, put forth enormous effort to publish this extraordinary book based on compilations of material and information collected during a span of more than 10 years. This valuable work should be useful and enjoyable to both taxonomists and ecologists not only to those studying the Colombian Pacific but also to those engaged in other geographical areas.

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SHOREFISHES OF THE TROPICAL EASTERN PACIFIC/PECES COSTEROS DEL PACÍFICO ORIENTAL TROPICAL. D. Ross Robertson and Gerald R. Allen. 2002. Version 1. Smithsonian Tropical Research Institute, Balboa, Panama. ISBN 9962614-02-3. CD-ROM. \$10.00.—This pioneering marriage of ichthyological knowledge with the rapidly evolving technology of data storage and retrieval has provided a remarkable opportunity for field and laboratory researchers. The authors, both experienced field biologists, systematists, photographers, and prolific researchers, have transformed their experience into the equivalent of a suitcase full of references and papers concerning tropical eastern Pacific shorefishes. But it is the interactive nature of data retrieval and analysis that is most intriguing. SFTEP includes separate Spanish and English interfaces. Based on their tropical eastern Pacific guidebook (Allen and Robertson, 1994; the minor errors of which, identified by Bussing, 1996, have been corrected), as well as the FAO identification guide for eastern tropical Pacific fishes (Fischer et al., 1995), and other sources, this disc incorporates the systematic, biological, and ecological data for 1195 shorefishes, ranging from the Sea of Cortez, Mexico, to Cabo Blanco, Peru, including Clipperton, the Revillagigedos, Malpelo, Cocos, and the Galapagos islands. (Species that occur in the southern, central and northern Gulf of California are included, but those that are restricted to the northern Gulf are excluded.) Species included live in coastal waters less than 100 m depth (hagfishes, chimaeras, and several other near-shore but deepwater representatives didn't make the cut). More than 2200 mostly superb color images (depicting 82% of the fauna) of fresh and live specimens are presented and represent the first color portrayal of many species. By their own admission, the authors confirm that most of the images were digitally enhanced. We found such cosmetic surgery (e.g., fin repair and snout sharpening) to improve their utility without detracting from reality.

Also included are a glossary, 1014 literature citations, and dichotomous keys for the families Sciaenidae (after Chao, in Fischer et al., 1995) and Gobiidae (prepared by James Van Tassel and D. R. Robertson). Useful line drawings of each character state are included and color or black-and-white illustrations of species are within the keys, which are for the most part easy to use; however, the user can't go backward within a key without starting over. It is unfortunate that many of the other keys from the FAO guide

weren't incorporated; we hope they are included in the next version.

The heart of this disc is, of course, the individual treatments of 1195 species. Most species are illustrated in one or more color photographs or a black-and-white drawing, and accounts include common name, key diagnostic features, coloration, maximum size, habitat and range, and a map illustrating confirmed and unconfirmed locations. A single key stroke can bring up images of similar species or different color phases, although each image will need to be closed individually. The user can also query additional data for each species, including a complete systematic treatment (from phylum to species), zoogeographic data, age and growth data, feeding habits, notes on reproduction, and references. References can be searched by taxon, by author, by title, and by other means and can be exported or printed. By incorporating all the assembled data, the authors have provided zoogeographers and ecologists with an opportunity to quickly assemble color-coded maps of regional species richness and comparative ranges, as well as lists of species from a variety of insular and coastal locations. These comparisons are useful to discover patterns of endemism at a variety of scales and at several taxonomic levels.

Errors are few. The authorship, dates, and some content of a few species require correction, but for the most part SFTEP is well vetted. We did discover one misidentified photograph, for which the authors can be excused; the photograph of a live moray at Malpelo is not of *Gymnothorax castaneus* but rather of *Gymnothorax angusticeps*, which is the first color rendition of that species as well as a new record for Malpelo.

The authors have attempted to also make this useful to recreational fishers and amateur fish-watchers and, in doing so, have not significantly diluted its value to ichthyologists (other than a few compromises in jargon, such as their usage of "gill spines" rather than "gill rakers"). With difficulty, an amateur can identify a dead or slow-moving species using the "Find-a-fish" section, which gives choices concerning location, fish form, coloration, or habitat.

Included on this disc is Melvin H. Wilson's "Checklist of Fishes—Tropical Eastern Pacific" (CLOFTEP). Wilson, a lawyer by vocation, worked laboriously on this list until his death in 1999. The list contains taxonomic and distributional information for approximately 1400 species of cartilaginous and bony fishes that live in the upper 200 m of the same region covered in SFTEP. This information complements the biological information in SFTEP; however, oth-

er than providing brief mention of the habitats, distribution, maximum size, and a listing of useful illustrations, it is far less comprehensive than the *Catalog of Fishes* (Eschmeyer, 1998), which is also in CD-ROM format. A field biologist needing access to the information in CLOFTEP would be wiser to bring along Eschmeyer's disc or to access the Catalog online ([www.calacademy.org/research/ichthyology/catalog](http://www.calacademy.org/research/ichthyology/catalog)).

The software system, Vagabond Odyssey, employs a graphical user interface, which provides intensive query and analysis capabilities. It is designed to run under Windows 95 or later Microsoft operating systems, or Windows NT 4.0 with Service Pack 3. One of us (JMc), neither an incurable Luddite nor a wonk, had some difficulty navigating this system, whereas DC, more youthful and technologically adept, had few such difficulties. Undoubtedly, the younger generation of ichthyologists will have no difficulty with this and future versions. The system requires a PC with at least a 500 MHz processor and 64 mb of RAM. Two installation options are offered depending on available memory. The full installation requires 750 mb of disk space to accommodate the software and all associated files. This option provides the fastest response time. The minimal installation leaves image files on the CD and requires 70 mb of space. Queries take longer because accessing the CD is slower than using a local hard drive. Full installation on the two computers we tested (network and stand-alone) took 10–15 minutes. It was necessary to reset the screen resolution on both machines to 1024 × 768 (as specified) for the program to function. This is bothersome and resulted in text that is a bit small for comfortable reading, particularly in the many sections whose text (Introduction, Biology, Ecology, Zoogeography, Features, and How to Use) is in single-wide columns. Accessing the various topics was quick and easy using the tool bar. Moving through the taxa is slowest in book mode, however, and there is no opportunity to search for a species other than by scrolling through the entire list of 1195 entries from *Ablennes* to *Zapteryx* (or scrolling through the 475 genera or 133 families and then through the species therein). Attempting to move beyond the first or last record crashes the application. This deserves correction.

Despite the mechanical difficulties we encountered, we find this to be a remarkable and inexpensive product that all ichthyologists and marine ecologists should acquire. Its usefulness as a field and laboratory tool is unsurpassed and will surely be improved with the addition of more images and keys in future versions.

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MANUAL OF FISH SCLEROCRONOLOGY. Jacques Panfili, Helene de Pontual, Herve Troadec, and Peter J. Wright (eds.). 2002. Ifremer-IRD Coedition, Brest, France. (Multimedia DVD included.) ISBN 2-84433-0670-3 (English edition). 464 p. \$139.00. (softcover).—Finally, an appropriately illustrated text has been written about basic techniques for aging fishes. The DVD media include an abundance of videos, interactive and animated images, and a guide for structuring aging protocols. I am aware of nothing since Stevenson (1992) that provides such a synopsis of fish aging mechanics. The *Manual of Fish Sclerochronology* introduces the reader to those calcified structures (scales, otoliths, and skeletal elements) most commonly used to estimate fish ages and explains both economic and logistic procedures for the use of each in fisheries applications. Although nonbony fishes are mentioned, this book is concerned almost entirely with teleosts, those bony fishes making up the bulk of the world's finfish resources.

With world fisheries in demonstrable decline and biologically meaningful management strategies of obvious importance, this text is timely. Although meant for management applications, this account of both recent and time-tested techniques and strategies for fish aging should be of great utility for many life-history studies.

Those familiar with the European Fish Aging Network (EFAN; efan.org) will recognize the authors' names. This work synthesizes findings of the five cells that composed this former European multinational network of fish aging scientists. The volume's overall layout roughly reflects the function of each EFAN cell (method-

ologies, age validation, information processing, information exchange, and training/research applications).

The book is broken into eight chapters, each detailing various aspects of the calcified structures found to be most useful for estimating fish ages. The accompanying multimedia DVD is organized like the text and contains a multitude of photographs and short videos that wonderfully supplement the text descriptions.

Chapter one explains the general layout of the book and gives a brief history of the study of the calcified structures commonly used for aging. Chapter two details the morphology and physiological development of each of those structures. The third chapter discusses the types of studies that commonly use age determinations. This chapter and the next deal with the most perplexing problem faced by all investigators of fish age—validating age interpretations. Validation is a universal problem in fish aging studies, and although addressed in this work, it is unfortunate that Campana (2001) is not cited because that work provides additional insight on this issue. The single major flaw in this volume is a lack of emphasis on ensuring accurate age assessment (interpretation of the first valid mark). Accurate assessment is critically important for fish population management—the overall goal of this treatise.

Computer interpretive assistance (computer-assisted age and growth estimation [caage]) and the chemical composition and microstructure of otoliths make up chapters six and seven. The first seven chapters serve as a prelude to the last, the most comprehensive synthesis available for techniques of preparation and observation of calcified structures. This is by far the most useful part of the book (this chapter alone is worth the price of the text). When this information is supplemented with examination of the DVD, it is quite possible that a universal standard for processing and examining fish aging structures can be established. That would be very good, because many fish-aging laboratories rely primarily on parochial teachers, who are not always the most gifted instructors.

Two other comments seem necessary: there is an inconsistent sequential listing of calcified structures among the chapters, and there appears to be an absence of references to recent literature. The first is the product of multiple authorship; the second is artifact.

This important book is sure to be widely used in Europe but deserves broader attention. Ultimately, fisheries science could only benefit. The text was dedicated to H. Troadec who was

killed in an air crash a few months before the book's release.

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