

work of predictive hypotheses on which to structure empirical investigation. And still others will use the turn of the century as a time to take stock, summarize what we now know, and abstract current knowledge with an eye to the future.

This book of contributions on various topics in fish morphology takes the latter approach. As promised on the jacket of this volume, "The techniques and methodology used in this book represent the knowledge prevailing at the end of the twentieth century"; and the editors further explain in their introductory chapter (p. xxv) that "the twenty-first century awaits a much higher level of research in functional morphology, some for which foundations have already been laid in this book." These are indeed lofty goals; and given the wealth of recent contributions on the experimental morphology of fishes, historical patterns of morphological traits as revealed in current phylogenetic analyses, and the increasing sophistication of descriptive morphological analyses of individual characters, one might look forward to a treatise that deftly summarizes current knowledge while clearly outlining needed directions in the next century.

Unfortunately, this book falls well short of meeting those expectations. Only a few individual authors adequately summarize the state of current research in their chosen area, and even fewer enumerate new directions that should be taken as we move forward into the next century. There have been so many recent technical advances in functional morphology, and so much progress has been made on the descriptive morphology of fishes that it is particularly noteworthy how idiosyncratic some of the chapters are and how limited their coverage is.

The topics covered in this overview of fish morphology are widely varied and include a study of one aspect of the head of cichlid fishes, an analysis of some aspects of catfish morphology, descriptions of gill morphology and function, vascular organization in lungfish, and studies of the effect of pesticides on fish. One noteworthy and positive feature of this book is that extensive coverage also is given to many aspects of internal anatomy, especially of the gastrointestinal tract. For example, there are chapters on the ontogeny and function of digestive caecae; the morphology and function of the liver, gallbladder, and biliary tract; and morphology of the swimbladder, ovary, and eggs. In general, this is an area that does not receive much coverage in studies of fish anatomy, and it is welcome to have even brief overviews in this book.

However, despite solid chapters on the lungfish vascular system and fish gill morphology,

most of the chapters are disappointing in failing to present either novel data or syntheses of the current literature. Indeed, several of the chapters ignore much of the recent literature of the last 10 years and, hence, could hardly be synthetic even under the best of circumstances. In particular, the chapters on fish locomotor muscle and head morphology are especially deficient in their coverage of the many novel recent advances. And, by taking a rather peculiar approach to their respective subjects, manage to leave the reader with an incomplete view of research on fish trophic and locomotory systems, both of which have been especially active areas of work in recent years. Neither chapter gives a sense of the technical advances that have contributed so greatly to the study of function in these systems; and in common with many other chapters, neither places morphological data in a historical context or presents new directions for research. In the chapter with the greatest phylogenetic content, Shrivistava uses his reconsideration of various aspects of catfish morphology to argue for new phylogenetic position for catfishes: removing them entirely from the Ostariophysi. He indicates three possible placements for catfishes, including one at the very base of the Actinopterygii as the sister clade to the Cladistia plus other actinopterygians.

Given the recent extensive use of morphological data for both phylogenetic and functional research in fishes and the many technical and analytical advances that have occurred concomitantly, the possibility for an exciting book giving an overview of morphological methods, data, and results still exists. There is certainly a need for a modern summary of fish morphology (perhaps with a focus on the musculoskeletal system from which so many phylogenetic characters have been taken), as well as a volume that incorporates recent results on the function of these morphological systems. These books could point the way to new directions for research in the next century.

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AMPHIBIANS AND REPTILES OF NEW MEXICO. W. G. Degenhardt, C. W. Painter, and A. H. Price. 1996. University of New Mexico Press, Albuquerque, New Mexico. ISBN 0-8263-1695-6.

450 p. \$35.00 (hardcover).—When I first picked up this book and thumbed through it, I thought to myself “now this is a nice book.” After spending some time reviewing it more carefully, my first impression was not only supported but greatly enhanced. Degenhardt, Painter, and Price have certainly succeeded in putting together what should prove to be the benchmark by which other books on the herpetofauna of a state or region will be judged.

The first two chapters on the physiogeography and herpetological history of New Mexico provide a useful and interesting introduction to the species accounts, which form the bulk of the text. The physiogeographic sketch of the state at the beginning of the book provides the reader a foundation necessary for a complete understanding of the herpetofaunal zoogeography of New Mexico. In this chapter, the authors describe how physical characteristics of the various vegetation zones affect the distribution of amphibians and reptiles. Color maps illustrating elevational contours and vegetation zones together with 11 excellent color plates of various habitats found in the state assist the reader in picturing the associations among elevation, vegetation, and herpetofaunal habitat.

A brief history of New Mexican herpetology is interesting reading and provides the reader with a good understanding of the history of the field in the state. It begins with Native Americans, who were undoubtedly the first New Mexican herpetologists, and proceeds chronologically describing historical herpetological figures and discoveries in New Mexico. This chapter, together with the physiogeographic sketch, provides a background for the heart of this book, the species accounts.

The amount of meticulous work that went into the compilation of records for the book is evident when one examines the species accounts. Degenhardt, Painter, and Price describe, in detail, the 123 species of amphibians and reptiles found in the state of New Mexico. The well-referenced accounts are arranged phylogenetically to the family level (alphabetically by genus and species), and each order is preceded by a well-prepared and illustrated dichotomous key. A separate key for larval amphibians was prepared by Ronn Altig. Each species is illustrated in at least one color plate (only two or three to a page), which is referenced at the beginning of each species account. The species accounts include complete descriptions of type localities, thorough descriptions of the species' distributions within the state, and complete descriptions of morphological variation that might be encountered. Additionally included are

well-referenced summaries of the systematic history of each species. Major sections of each species account are devoted to descriptions of their habitat, behavior, reproduction, and food habits. A remarks section includes important comments that do not seem to fit in the other categories, including conservation status, questionable observation records, previous reviews of the species, and explanations of taxonomic nomenclature the authors chose to use.

Dot distribution maps with demarcated county boundaries for each species are very well done. It is important to note that each dot represents the location within the county of one or several adjacent records and does not merely indicate a record of the species somewhere in that county. I assume that each dot represents one or more of the 55,000 museum records mentioned in the preface (as opposed to observation records), but this is not made entirely clear in the text. It is also not clear what criteria were used to deal with questionable records on the maps, although they are discussed in each account. Open symbols or question marks would seem an appropriate way to illustrate questionable records but such symbols are not used. Despite these “quibbles,” the distribution maps appear to be some of the most carefully prepared maps of this type that I have seen and should be extremely useful to any herpetologist working in New Mexico and especially those responsible for nongame management in the state.

Several appendices that appear after the species accounts add to the usefulness of the book. The first appendix concerns species of equivocal occurrence and addresses the status of 21 species that have either been questionably reported to occur in the state or potentially occur there. A list of common and scientific plant names used in the text, a list of museum symbolic codes used following Leviton et al. (1985), and a glossary are also included. The bibliography is extensive and includes pertinent references anyone might need who is interested in New Mexico's amphibians and reptiles. Not only does it include peer-reviewed literature but also many hard to find government reports and unpublished theses and dissertations. The last section of the book is an index of common and scientific names.

Although most aspects of this book contribute to its overall quality, several minor problems should be noted. The authors admirably correct many of their own errors in a corrigenda published in early 1997 (Price et al., 1997), and I will not reiterate those here. Although the authors explain in the preface the rationale for

not following Collins (1993) exclusively in their choice of "standard" common names, they do not necessarily adhere to their rationale throughout the book. For example, they state that they chose to use "Yaqui black-headed snake" rather than "Yaqui black-head snake" because the latter is both bad grammar and politically incorrect. However, they still use "Black-neck garter snake" and "Narrowhead garter snake." Another potentially confusing item is the ordering of the figures (fig. 15 is the second figure in the book).

Amphibians and Reptiles of New Mexico will undoubtedly prove a indispensable resource to many herpetologists of the southwest. In addition, it is an essential guide for any person or agency responsible for conservation of non-game wildlife resources in New Mexico. Degenhardt, Painter, and Price have certainly produced what will be the first place to which anyone turns for quality information on the reptiles and amphibians of New Mexico.

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tively accurate and fair in its judgments and urges readers to take sides in the many disagreements between authors and to take their own stands on the controversies discussed. It is in that spirit that I write this review, but before I start arguing, I must surely praise. Rose and Lauder recruited a fabulously select group of leaders in the study of adaptation and assembled their contributions into a stimulating and informative book well worth study by any biologist. I might add especially by ASIH members because cold-blooded vertebrates provide many of the examples discussed.

The authors and cited works show little agreement on the definition of adaptation. Some would define it as any attribute of an organism that has a positive effect on its fitness. Would they consider an acorn's vulnerability to gravity to be an adaptation? Most of the authors seem to agree that an adaptation can be defined as something evolved by natural selection for demonstrable fitness enhancements. Modern biologists do explain adaptation by invoking natural selection, but I think it is a mistake to make selection a part of the definition. Consider a protagonist in one of David Hume's 18th-century dialogues. In commenting on biological adaptations, he exclaims: "All these various machines, and even their most minute parts, are adjusted to each other with an accuracy which ravishes into admiration all men who have ever contemplated them. The curious adapting of means to ends, throughout all nature, resembles exactly, though it much exceeds, the productions of human contrivance" (Hume, 1969:297).

The rest of the dialog shows that Hume agreed with this view of adaptation, if not with its usual theological extensions. Aristotle, Galen, and many other ancient scholars expressed similar views, as did the 19th-century natural theologians. None of these people had ever heard of natural selection. In a fantasy dialog with any of them, I prefer to let them define adaptation and then listen to a better explanation of it than they could offer. I would expect Hume to anticipate T. H. Huxley's anger at himself for not having thought of natural selection.

Galen wrote a superb treatment of the human hand's design for manipulative versatility (May, 1968). In his chapter, Lauder would have us believe that Galen did not demonstrate adaptation but merely assumed it. If recognizing the hand's capabilities as adaptive requires showing that natural selection is responsible for its high level of performance, then Galen indeed did not show that the hand is an adaptation. One of Lauder's arguments is that the hand's conformity to some a priori design features of manipulative machinery is not a valid reason for rec-

ADAPTATION. Michael R. Rose and George V. Lauder (eds.). 1996. Academic Press, San Diego, New York, Boston. ISBN 0-12-596420-X. \$69.95 (hardcover), \$34.95 (softcover).—The editors' Introduction to this splendid collection can serve nicely as a book review. It is descrip-