

BOOK REVIEWS

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Reptiles de Los Andes de Venezuela. Catálogo Zoológico de Venezuela, Volumen 2, by Enrique La Marca and Pascual J. Soriano. 2004. Fundación Polar, Conservación Internacional, CODEPRE-ULA, Fundacite Mérida, BIOGEOS. Available from Enrique La Marca, BIOGEOS, Apartado postal 116, Mérida 5101-A, Venezuela (e-mail: lamarca1@telcel.net.ve). 173 pp. Softcover. US \$35.00. ISBN 980-379-083-8.

CÉSAR L. BARRIO-AMORÓS

Fundación AndígenA, Apartado Postal 210
5101-A Mérida, Venezuela
e-mail: atelopus@andigena.org

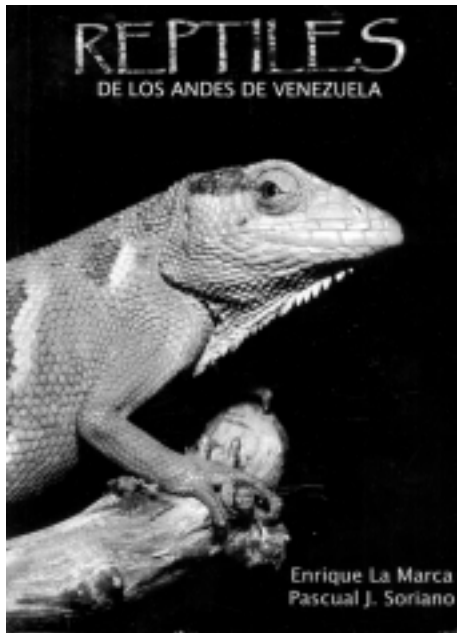
and

GILSON RIVAS FUENMAYOR

Museo de Historia Natural La Salle, Apartado Postal 1930
Caracas 1010-A, Venezuela
e-mail: gilson.rivas@fundacionlasalle.org.ve

Venezuela is considered the ninth most diverse country on earth in reptile diversity (Aguilera et al. 2003) but, as in all tropical countries, much research remains to be done. Venezuela is also one of the most diverse countries with respect to bioregions, having seven (Barrio-Amorós 1998), one of which is the Andes, which in Venezuela reach their northernmost extent. The Venezuelan Andes are approximately 450 km long by 80 km wide in a northeasterly direction, with many peaks reaching almost 5000 m.

Herpetological investigation in this area began in the 19th century, and has continued slowly to the present day. The Venezuelan Andes are in general considered depauperate, especially compared with their southern counterpart in Colombia, which may harbor the most diverse herpetofauna on earth (particularly with respect to amphibians), and is not yet completely studied. The Venezuelan Andes consist of three main ranges (four if the Coastal Range is considered part of the Andes, see Duellman 1999). The principal one is called the Cordillera de Mérida, and is the branch going northeast from the Cordillera Oriental de Colombia. A small part of the Cordillera Oriental de Colombia is also present in Venezu-



ela, where it is called the Tamá Massif. The last range is the Serranía de Perijá, another branch of the Cordillera Oriental which extends northwards. Its watershed constitutes the political border between Venezuela and Colombia. Neither of these two last ranges of the Venezuelan Andes are, however, treated in this book; despite its all inclusive title, the authors considered only the Cordillera de Mérida. Only very briefly, in Appendix II (Registros complementarios de la Sierra de Perijá, el Macizo de Tamá y de bajas elevaciones: “Complementary records from Sierra de Perijá, Tamá Massif, and lowlands”) are some additional species from these areas commented upon.

The book starts with a general physiographic map of northwestern Venezuela and northeastern Colombia. This is followed by a prologue by J. Celsa Señaris, and a presentation by the authors. The introduction discusses the Reptilia as a class, with some generic details. There the authors explain that only reptiles occurring above 1000 m are considered Andean, and thus, treated in the book. Thus, the Andean foothills, with canyons, deep creeks, waterfalls, and other typically montane habitats are excluded. To us, a crystalline, rocky stream, at even 200 m, surrounded by hills and covered by lush forest, where it is possible to find such Andean elements as the dendrobatid frog *Mannophryne collaris*, is indeed part of the Andes, but this definition is up to each author. As a result of this restrictive definition used in the book, many species that are known to inhabit the Andes are not represented in the book. However, strangely, some species that are only known from below 1000 m in the Andes have their own account, like *Hemidactylus palaichthus*, *Bachia heteropa*, *Ameiva ameiva*, and *Liophis reginae zweifeli*.

Next follows a chapter on ecological units of the Andes, by M. Ataroff and L. Sarmiento, which explains the situation of the area, provides a brief geological history, and formally presents the different ecological units, such as humid submontane forest, dry montane forest, cloud forest, Páramos, dry evergreen montane forest, and thorny shrub. Thereafter follows the section containing the species accounts, beginning with Amphisbaenia and Sauria. The use of dichotomous keys is explained and the accounts follows in the familial order: Amphisbaenidae, Gekkonidae, Iguanidae (we are not sure if they regard Iguanidae in the same sense as Schulte et al. (2003), as they do not recognize the families Polychrotidae and Corytophanidae (sensu Frost et al. 2001); when alternative classifications are in use the authors should justify their usages), Gymnophthalmidae, Teiidae and Scincidae. Snakes follow, in the order: Boidae, Colubridae, Anomalepididae, Leptotyphlopidae, Elapidae, and Viperidae. A very short literature section of just 37 titles, without any link to the principal text, but rather chosen subjectively as the best references for Andean reptiles, is given. Finally, there are three appendices: one on snake venoms and their treatment (very basic and obsolete), with no mention of the particular venomous species that can be a problem in the Andes!; the above mentioned appendix II on complementary species from Perijá, Tamá and the lowlands (we will treat this below); and a short glossary of technical terminology.

We found a variety of inconsistencies in the species accounts. Treating *Anolis jacare*, the authors say that it is known from Colombia; this is possible, but we are not aware of any published records. They may be referring to specimens found in the Tamá Massif and earlier considered to be *Phenacosaurus nicefori* (La

Marca 1995). Information on color change and altitudinal range in this taxon is also lacking. When treating *Polychrus marmoratus*, the text claims that its change of color is in consonance with the color of the substratum, which obviously is false. The Andean Chamaleon (*Polychrus* sp.) cannot change the color to match its substrate, but rather does so in relation to emotional state, from the original emerald green to dark brown or gray.

In the introductory text to the family Gymnophthalmidae three genera are mentioned, while in the account and key there are four (*Anadia*, *Bachia*, *Gymnophthalmus* and *Proctoporus*). *Bachia heteropa* does not live exclusively in the Sierra de Perijá and Cordillera Oriental de Colombia; Dixon (1973) reported it from Grenada Island, Trinidad and Tobago, and from the northern Venezuelan coast to the Andean Piedmont. *Proctoporus inanis* (Doan and Schargel 2003) is a species from 1450 m in the Cordillera de Mérida, clearly described and stated to be an Andean species. However, the authors treated this species with only a short comment. *Ameiva provिताe* (sic!) is a typical case of nomenclatural confusion. The first use of the name was in Rodríguez and Rojas-Suárez (1995), as *A. provitai* sp. nov., and a beautiful color drawing accompanied the text. Thus the authors should be Rodríguez and Rojas-Suárez (1995) and not García-Pérez (1995). La Marca and Soriano incorrectly spell the specific epithet *provिताe* and *provitae*. In any case, further investigations must be done in comparison with *A. bifrontata*.

A more extended comment on the *Cnemidophorus lemniscatus* complex, especially about the apparently parthenogenetic Andean populations is lacking and would have been appropriate. We do not understand why the authors state that *Atractus univittatus* is similar to *A. badius*, as the two have proved to be quite different (see Hoogmoed 1980; Starace 2000).

The real local name for *Chironius monticola* in the Andes is “perica.” The names presented in this book (lora, verdegallo, machete) are perhaps applicable in other regions or to other green snakes. The authors claim that the type locality of *Dipsas latifrontalis* is the only record known from Venezuela (Aricagua, Mérida state, Venezuelan Andes), although their close collaborators recently published several new localities (Manzanilla et al. 2001) and Fig. 46 shows a specimen of *D. “latifrontalis”* from Cerro Platillón, Guarico (central coastal range). More investigation is needed to clarify the taxonomic status of this snake. We do not know any reference to a *Drymarchon melanurus* of 4 m. The record for the species is 2950 mm (Duellman 1960). If such a reference does exist, it would be valuable to cite it explicitly.

The key for *Erythrolampus* is wrong as the term “triad” is used improperly. A triad-type coloration consists of set of three black rings separated by white-yellow, usually narrower, rings; each triad is separated from the following by a red band (Roze 1996). Both species of *Erythrolampus* in the Andes lack triads, and while *E. pseudocorallus* has black single rings surrounded by narrow white rings and separated from the next white-black-white set by a wide red band, *E. bizona* has the contrary coloration, white single rings surrounded by black narrow rings and equally separated from the next set by a wide red band (Roze 1966; see pictures in Campbell and Lamar (2004) and Murphy (1997), for example). The *E. “bizona”* photographed by them is, in fact, an *E. pseudocorallus*.

In the generic information about *Imantodes*, the authors say that there is only one species in Venezuela (*I. cenchoa*); they must not

be aware of the citation of *I. lentiferus* by McDiarmid and Paolillo (1988) from Neblina, and by Donnelly and Myers (1991) from Guaiquinima. Contrary to what the authors state, *Lampropeltis triangulum andesiana* (as all species in the genus) are aglyphous snakes, not opisthophous (e.g., Williams 1988). On the other hand, the authors neglect to mention that *Liophis* is capable of causing severe envenomations (e.g., Barrio-Amorós 2003 for a case or an envenomation by *Liophis poecilogyrus* in Venezuela; Salomão et al. 2003 and Santos Costa and Di Bernardo 2001 about envenomation by *L. miliaris* in Brazil), stating that *Liophis* is unable to bite. Not to mention a subject so important in a popular book, addressed to people who could be attracted to handling snakes (including children), shows a grave lack of judgement.

The key for *Liophis* is useless; the dorsolateral line in the posterior part of the body mentioned is present in *L. melanotus* (depending how one defines this character) and is not present in *zweifeli* (not the contrary, as stated); one of the important characters to separate species is the immaculate venter of females, but they do not specify how to distinguish between sexes! Although the authors state that *L. reginae zweifeli* can be present at 1000 m, there are no published references to support this.

Later the authors state that there is no information about feeding habits of the species in the genus *Oxyrhopus*. However, Cunha and Nascimento (1993), Duellman (1978) and Murphy (1997), among others, report lizards and small mammals in the diet of snakes of this genus.

Regarding *Liotyphlops albirostris*, in the text the authors say (our translation): “The aspect of this animal is very similar to the previous species”. The previous species in the book is *Tantilla semicineta*, a species with no similarities to *L. albirostris*. Perhaps “the next” species, which is *Leptotyphlops affinis*, was intended.

They also seem to defend the old interpretation of not accepting the genus *Leptomicrurus* (see a modern view in Campbell and Lamar 2004). In another coral snake account they state that *Micrurus mipartitus anomalus* ranges in altitude from 500 to 2000 m, although Barrio-Amorós and Calcaño (2003) previously reported three specimens from 250 m asl.

Bothrops asper just reaches central Mexico, not northern, as the authors state (Campbell and Lamar 2004). Lastly, a surprising species to comment on is *Crotalus maricelae*, which was synonymized with *C. durissus cumanensis* by the first author and collaborators recently (Esqueda et al. 2001); furthermore, in the introductory text about the genus *Crotalus*, the authors say that there is only one species of rattlesnake in South America; thus, we don’t understand why they recognize the specific status of a “subspecies” that has already be relegated to synonymy. We note the absence of at least three species: *Leptophis ahaetulla*, a species known to inhabit both slopes of the Andes, up to 1400 m, *Thamnodyastes* sp, which occurs in the Lagunillas area (about 1000 m) and *Typhlops reticulatus*, known from the area of La Azulita, at 1400 m. *Norops biporcatus*, mentioned from the Andes of Táchira and Sierra de Perijá (Williams 1966), and recently reported from the Cordillera de Mérida (Rivas and Barrio-Amorós 2003), was not even mentioned in the lowland section.

In several places the authors repeatedly state that data on reproduction do not exist for some species, such as *Leptodeira annulata ashmeadi*, *Liophis reginae zweifeli*, *Masticophis mentovarius suborbitalis*, *Ninia atrata*, *Tantilla melanocephala* and *Epicrates*

maurus, even though that information (hatchling periods and reproduction in captivity) is well known in the literature for Venezuelan populations of these species (Battiston 1996; Silva and Valdez 1989; Muñoz et al 1997), and for others species outside the country (e.g., Censky and McCoy [1988] for *Oxybelis aeneus* and Savage [2002] for *Gonatodes albogularis*).

A book about Andean reptiles would be much more useful if altitudinal ranges for all species are provided (with references to vouchers). A last incongruence we found is the photo of an *Ameiva a. ameiva* from Suriname, although this subspecies is very abundant in many parts of Venezuela. Although the use of photos of extralimital specimens of rare or difficult to find animals is understandable, it is strange that a local guide would not use photos of common species from the area covered.

After all these errors and evidence of misinformation (we could be even more critical!) we doubt that this book accomplishes its aims. Perhaps it is a good introduction for non-professionals, students and the general public, but it is of almost no interest for professionals. In some cases, the authors give some advice about captive feeding, and almost always animals (especially lizards) are fed with *Tenebrio mollitor* larvae, which are known to be a very poor food source.

A major highlight (perhaps the only original highlight) of the book are the pictures, some of very good quality, others not so good, but enough for a visual recognition. We think that a price of about US \$35 (plus shipping) is not justified, given the end product. In the future, if these authors want to work on other projects, we suggest that they acknowledge and incorporate a good deal more of the relevant information available in the literature.

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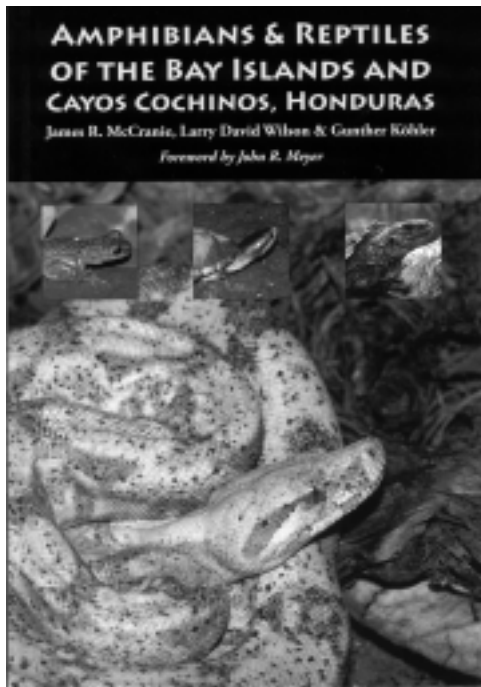
Amphibians and Reptiles of the Bay Islands and Cayos Cochinos, Honduras, by James R. McCranie, Larry David Wilson, and Gunther Köhler. 2005. Bibliomania!, Salt Lake City, Utah (www.herpllit.com). xiv + 210 pp. Hardcover. US \$29.95. ISBN 1-932871-05-5.

ELI GREENBAUM

Division of Herpetology

*Natural History Museum & Biodiversity Research Center and
Department of Ecology and Evolutionary Biology, 1345 Jayhawk Boulevard
The University of Kansas, Lawrence, Kansas 66045-7561, USA
e-mail: elig@ku.edu*

The Honduran department of Islas de la Bahía consists of two groups of islands—the Bay Islands (258 km²) and Cayos Cochinos (2.28 km²), both of which lie just north of the northern coast of Honduras. The authors of *Amphibians and Reptiles of the Bay Islands and Cayos Cochinos, Honduras* (hereafter abbreviated as BICC) discuss 55 species, of



which 12 are endemic to the islands. The main goal of the book is to increase local understanding and awareness about the ecological value of the amphibians and reptiles that occur on the islands. Written in the style of a field guide, the authors explain that, “the descriptions we provide are as untechnical as possible” to allow lay readers to understand and use the book to identify species. Because tourism, development, and the human population are increasing on the islands, all of the endemic species are potentially threatened with extinction. The authors bring decades of expertise with the Honduran herpetofauna (e.g., McCranie and Wilson 2002) to an informative and well-illustrated book that showcases the beauty of the animals with a simultaneous plea for measures to conserve them.

Following a brief foreword by John Meyer, who accompanied Larry David Wilson on his first trip to the Bay Islands in 1967, the book begins with two brief (1–2 pages) Introduction and Materials and Methods sections. These sections are followed by 18 pages of brief descriptions of the islands (with excellent maps), climate, habitats, and very interesting social history. Archaeological sites suggest the islands were first inhabited in pre-Columbian times,

and subsequent occupants included Columbus (1502), slave-raiding Spaniards (1516), French, English and Dutch raiders (starting in 1536), British pirates (ca. 1640), British military (1742), and 4000 “Black Caribs” (marooned in 1797) whose English-speaking descendants live on the islands to this day. In 1872, the Islas de la Bahía officially became a department of Honduras, but many residents continued to claim British nationality as recently as 1955.

A six-page section with two tables entitled “The Herpetofauna” summarizes the taxonomic and geographic composition of the 55 species. The following 136 pages include general information for classes, orders and families, keys to major groups (e.g., lizards), and species accounts for the herpetofauna, including seven anurans, one crocodile, five turtles (of which three are marine), 23 lizards (of which seven are endemic), and 19 snakes (of which five are endemic). The keys utilize excellent line drawings and photographs to illustrate specific morphological features used for identifications. Because the University of Kansas collection has numerous specimens from Islas de la Bahía (many collected by Larry David Wilson), I was able to successfully test the keys with the following 25 species: *Hyla microcephala*, *Smilisca baudinii*, *Leptodactylus melanonotus*, *Rana berlandieri*, *Kinosternon leucostomum*, *Phyllodactylus palmeus*, *Sphaerodactylus millepunctatus*, *S. rosaurae*, *Anolis allisoni*, *Norops sagrei*, *N. lemurinus*, *Basiliscus vittatus*, *Ctenosaura oedirhina*, *C. similis*, *Gymnophthalmus speciosus*, *Cnemidophorus lemniscatus*, *Leptotyphlops goudotii*, *Boa constrictor*, *Coniophanes bipunctatus*, *C. imperialis*, *Mastigodryas melanolomus*, *Oxybelis wilsoni*, *Pseudelaphe flavirufa*, *Tretanorhinus nigroluteus*, and *Micrurus ruatanus*.

Each species account is 1–2 pages long and includes subheadings for common names, description, similar species, general geographic distribution, distribution on Las Islas de la Bahía, natural history comments, and remarks. The descriptions are one paragraph in length, and include sufficient detail (e.g., modal webbing formulas and scale counts) to be useful to professional herpetologists. The natural history comments involve observations of breeding, diet, predation, and habitat preference from Islas de la Bahía, and the remarks sections include comments about introductions and exploitation by humans, recent taxonomic changes, and local myths—my personal favorite is that *Micrurus ruatanus* will become venomous only after eating toads. Although they are not necessarily incorrect, two taxonomic recognitions in the species accounts require some comments. First, on pg. 138, no citation is provided for the recent recognition of *Drymarchon melanurus*, but it is consistent with taxonomic changes suggested by Wüster et al. (2001). Based on a Principal Components Analysis that included eight Central American specimens (one from Honduras), these authors recognized *D. corais melanurus* as a distinct species. This change was not recognized by Köhler (2003). Second, Dixon and Tipton (2004) recognized *Mastigodryas* as the valid genus for all species of *Dryadophis*, but this change was not incorporated into the BICC; perhaps the authors do not agree with this change, or the paper was not published in time to be incorporated into the book.

The species accounts are followed by several short sections (2–6 pages each) that explore the geographic distribution, habitat preference, conservation status, and future of the islands’ herpetofauna. The first section, entitled Ecological Distribution and Relation-

ships of the Herpetofauna, includes a table that lists each species with respect to the following habitats: hardwood forest, pine forest, mangrove forest, coconut groves, ironshore formation, swamps and marshes, estuaries, marine, and urban. A second table uses a Coefficient of Habitat Resemblance (CHR) to compare these major habitats. In the section on Biogeographic Relationships and Significance, a third table is used to compare Coefficients of Biogeographic Resemblance (CBR) among the Bay Islands, Cayos Cochinos, and mainland Honduras. The authors do a good job of discussing trends in similarity among the islands and mainland Honduras, although some biologists might question whether other variables such as the target area effect, rescue effect, and small island effect could also influence island diversity and endemism (Brown and Lomolino 1998). In this same section, the authors point out a close affinity to mainland Honduras in their discussion of the “closest relationships” of the 12 endemic species of the islands, but at least some of these hypotheses have not been subjected to a modern phylogenetic analysis and statements that suggest sister relationships should be interpreted with caution. In the next section on Conservation Status, the authors use the environmental vulnerability score of Wilson and McCranie (2004) to categorize each species as low, medium, or high vulnerability. Their results are mostly consistent with threat classifications of the Global Amphibian Assessment (IUCN et al. 2004) and IUCN Red List for Honduras (IUCN 2004). It was alarming to see that all 12 endemic reptile species were listed in BICC as “high vulnerability,” a fact that is made more troubling by the lack of management plans, personnel, and research in most protected areas of the islands. An additional high-vulnerability species, *Ctenosaura melanosterna*, has a limited distribution on mainland Honduras. The Conservation Efforts section describes the formidable challenges faced by proponents of functioning protected areas, although some private landowners have managed to preserve crucial hardwood forest habitats. Two sections entitled Conservation Project Utila Iguana and Cayos Cochinos Biological Reserve explain conservation efforts to protect *Ctenosaura bakeri* and the Cayos Cochinos archipelago, respectively. The last section on the future of the herpetofauna involves a sobering discussion of unchecked human population growth on the islands and Honduras as a whole, and the inevitable effects on natural habitats and the animals that need them to survive. Tourism, land speculation, and transmigration from mainland Honduras are putting increasing pressure on existing protected areas. The ten-page glossary preceding the index is an excellent source for explanations of terms that may be unfamiliar to non-biologists. All citations in the 14-page index were cross-referenced to the text.

My overall impression of the book is very positive. However, I would be remiss if I didn't mention a few minor problems and errors. Several of the photographs are fuzzy, accompanied by captions in colors that make them difficult to read, and the color correction is off in some places, resulting in a dark bluish hue. I noticed some color ink smudging on the text and edges of some photos on my copy. On page 128, pythons are listed as members of the family Boidae. Although the authors do not provide a citation, this view is shared by Pough et al. (2004), who considered Pythoninae as a subfamily of Boidae. However, the BICC authors list ten genera (41 species) for Boidae and cite McDiarmid et al. (1999), who considered Boidae (8 genera, 41 species) and

Pythonidae (8 genera, 26 species) as separate families. Grammatical errors and typos were difficult to find, but I noticed a few: pg. 5: “The group consist of two major islands...”; pg. 15: “without monuments, are almost always are found on”; pg. 105: “*Norops lemurinus* a diurnal species...”; lower caption on pg. 81 says *S. millipunctatus* instead of *S. millepunctatus*; and pg. 165 “swamps and marches.” In Table 4, I believe the N symbol should be Coefficient of Habitat Resemblance (not Coefficient of Biogeographic Resemblance) to make it consistent with the table legend. However, the CHR is based on the CBR formula.

These minor problems aside, *Amphibians and Reptiles of the Bay Islands and Cayos Cochinos, Honduras* is reasonably priced for the excellent information and wonderful illustrations (over 200 color photos). The sturdy binding and small size (6.25 × 9.25 in) make it ideal for use in the field. This book will make a fine addition to the libraries of herpetologists interested in Central America and island biogeography. With luck, the book will generate renewed interest in conserving the Bay Islands, which are in need of urgent protection if their endemic species are to survive.

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Les Tortues de l'Indochine avec une Note sur la Pêche et l'Élevage des Tortues de Mer par F. Le Poulain [Facsimile Reprint], by René Leon Bourret, with an Introduction by Indraneil Das. 2005. Society for the Study of Amphibians and Reptiles (www.herplit.com/SSAR/). i-xiv + 1–235 pp., 48 black and white pls., 6 color pls. Hardcover. US \$65.00. ISBN 0-91684-64-8.

CHARLES R. CRUMLY

*Museum of Paleontology, University of California
Berkeley, California 94720, USA
e-mail: chuck.crumly@ucpress.edu*

By the standards of today, Bourret's book is odd. It might have been odd even when it was originally published over 60 years ago. And yet there is much to recommend the book. Furthermore, because of the crisis now facing the turtles of Southeast Asia, it is especially appropriate that it is reprinted now. The well-intentioned description of new species that are now known to be hybrids provides another rationale for reprinting Bourret's idiosyncratic volume (Parham et al. 2001; Dalton 2003).

What makes this book odd? Most obvious is its organization, beginning with the position of the table of contents at the end of the book. Strange choices and redundancy provide the reader with all the different ways that information on turtles could be organized. Thus, when identification keys could be provide in one form, Bourret provided keys in at least five different contexts – overkill, but still useful. This redundancy would be eliminated today.

The first half of the volume is a review of the turtle fauna of southeastern Asia. The historical introduction is a mostly chronological recitation of names from relevant sources. The literature section for the entire work appears next. The third chapter is a morphological description of turtles customized by reference to the particular turtles under consideration. More on skulls and limbs is included than in most other studies of this vintage. Next, Bourret included a short chapter that today would be entitled "Distribution." This peculiar chapter starts with description in outline form appended by three tables differently describing the distribution of the same species. Another table summarizes the regional compo-

sition of the fauna. A tabulation of the altitudinal distribution of turtles in northern and southern Indochina ends the chapter. Bourret ends the first section with dichotomous keys. Separate keys are provided for external characters, heads and limbs, carapaces, plastra, and skulls.

The second major section of the book is arranged species by species. All the accounts are numbered but the system of numbering is hard to discern and on the surface seems both inconsistent and unnecessary. The accounts themselves are loaded with information that is, to this day, very useful. Although museum specimen numbers are lacking, Bourret often provides locality information on the specimens he examined and identifies the institution from whence they came. Each account includes a synonymy, a description, measurements taken (usually from a specimen with a known locality), and information on the location of the type(s) and other specimens figured or referenced by earlier authors. A plate was provided for all species including line drawings of the animal in life, the plastron with and without scutes, the dorsum of the manus, a dorsal and lateral view of the head, a lateral view of the skull and mandible, a ventral view of the cranium, and a dorsal view of the carapace without scutes. Scale bars are provided for the shell drawings, but not for other figures. A dotted line indicates the position of the orbits in the drawings of the ventral cranium.

A short note by Poulain on sea turtles is appended to Bourret's main work, followed by a systematic index, a list of figures and, finally – I said the book was odd, a table of contents. I have taken more trouble than usual to describe the contents of this volume even though the strangeness of the book is only partly revealed in description. The introduction by Das indulges in some of the same description, but in a gentlemanly way, he avoids calling Bourret's book strange. Das has kindly included a table that provides current names for all the names used by Bourret. I hope I am right in noting that Das and I share an admiration for what Bourret did.

Critically speaking, this book could be significantly shorter if various redundancies were omitted and if the data were reported in a more economical layout. But the book would lose its unique qualities and some of its quaint charm (which I believe it had the day it was published). Even some of its scientific importance would have been dissipated if it had been a bit more critically crafted. This book is so useful partly and precisely because it is an anachronism. It is for this reason that the SSAR should be congratulated and the sponsors and patron thanked for bringing Bourret's work to a 21st century audience. It will benefit all those interested in the turtles of Southeast Asia to obtain and refer to Bourret's odd book.

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