Population viability analysis was discussed in chapter 6. Use of computer software (VORTEX) suggests that in the absence of threats from diseases and hybridization, the wolf population appears to have a positive growth rate. The population viability analysis also recommended population supplementation with translocated or captive-bred females. Although conserving prime habitat from human alteration and reducing the number of domestic dog populations to avoid future interbreeding are the priorities of the conservation organizations to ensure the survival of wolves in Ethiopia, the book also recommends a sound captive breeding program (chapters 8 and 9). In fact, the New York Zoological Society initiated a proposal in 1992 to captive breed Ethiopian wolves in the United States, but the Ethiopian government was reluctant to provide animals necessary for a captive nucleus; thus, the plan did not prosper. However, the authors state that a new proposal has been developed in collaboration with Born Free Foundation to set up a wolf breeding center in Ethiopia, an effort that certainly deserves support from the local government.

Details of the Ethiopian wolf conservation action plan are outlined in chapter 10. About 25 issues have been discussed in the action plan ranging from community conservation education to fund raising and from habitat conservation to genetic management of Ethiopian wolves. At the end of the book are six appendixes which include a listing of literature pertaining to the Ethiopian wolf (115 citations), population-viability-analysis assessment techniques, a list of members of the IUCN/SSC canid specialist group, a resolution favoring a captive breeding program, and a list of boxes, figures, and tables. There are over 250 citations listed in the reference section of the book. The Ethiopian Wolf is the 41st in the series from the IUCN/SSC action plans for the conservation of biological diversity. The last page of the book contains a list of the other 40 volumes.

In summary, this book synthesizes all information pertaining to the conservation biology of Ethiopian wolves. It is also sufficiently illustrated and well designed with good quality printing, including an attractive color photograph on the cover. It is an excellent addition to the conservation biology literature and a valuable reference for all university libraries. We strongly recommend this book to all those concerned about the conservation and management of biological diversity and endangered species. —MINNA J. HSU, Department of Biological Sciences, National Sun Yat-sen University, Kaohsiung 80424, Taiwan, Republic of China and GOVINDASAMY AGORAMOORTHY, Department of Wildlife Conservation, National Pingtung University of Science and Technology, Pingtung 91207, Taiwan, Republic of China.

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This exceedingly useful and informative book covers the mammals of mainland Neotropical lowland (<1,000 m) rainforests. Some non-rainforest species are also purposely included. No one is better qualified to write such a book than Emmons. In spite of its modest size, the work is encyclopedic in scope and is much more than an identification guide. It is by far the best single source of information on the natural history of a sizable number of Neotropical mammals. Unlike most "field guides," it is of great value to serious research specialists on the fauna. Emmons has digested a myriad of primary sources and also utilized her own valuable first-hand observations.

Like the first edition, this one contains a very helpful section on use of the book; species (or genus) accounts; appendices, including a glossary, keys to families and genera, one on the study and conservation of rainforest mammals, outline drawings of "Tracks of [Some] Large [and Medium-sized] Mammals," a checklist and index of technical names, and an "Index of Genera and Common [English] Names." Each species or genus account may include an English name; technical name(s); identification pointers, including measurements; variation; differences from similar species; sounds; miscellaneous natural history; geographic range; conservation status; local names; and relevant primary references. The species accounts include not only
synopses of what is known, but also statements about what is not known.

The larger and/or more visible and easily identifiable animals are covered in individual accounts at the species level and are generally figured at that level, while bats and the smaller rodents are so treated at the generic level. One strength of the book is that Emmons deals explicitly with uncertainties and disagreements about species-level classification. Intraspecific classification and variation in primates is treated in greater detail than in other groups, no doubt owing to monkeys' greater visibility and frequently bold and subspecifically diagnostic color patterns.

The "General References" section of the first edition is omitted in the second. A map in the first edition showed the distribution of Middle American rainforest in (apparently) pre columbian times to range into northwestern Veracruz. The new edition's map shows contemporary distribution after deforestation, with no rainforest northeast of easternmost Chiapas (the map ends in western Chiapas)—is this correct?

Lutreolina crassicaudata and Cerdocyon thous are newly included in the new edition, although they are not, strictly speaking, rainforest mammals. Bauerus dubiauquerus, omitted as an apparent oversight in the first edition, is also treated. Two families are added to the second edition, Ursidae (Tremarctos ornatus) and Geomyidae (Orthogeomys spp.). The above are provided with new figures, although the following four species are not depicted. Marmosops impavidus, stated in the first edition to doubtfully occur below 1,000 m, has its own new species account in the second, as does Marmosops dorothea. Abravayaomys ruschii is newly included along with Sciurus argentinus, although the latter is certainly not a lowland rainforest species.

New taxonomic judgments and newly named species are thoroughly treated in the new edition. Newly included species and/or ones with new separate species accounts are Didelphis aurita, Philander mchihenni, Micoureus regina, Micoureus phaeo, Micoureus constantiae, Micoureus alstoni, Marmosops neblina, Marmosops paulensis, Gracilinanus kalinowski, Diaenomys youngi, Callithrix emiliae, Callithrix maesi, Leontopithecus chrysopygus, and Leontopithecus chrysomelas. Micoureus cinereus (sensu stricto) of the first edition is now called Micoureus demararuae. All Bassaricyon are no longer lumped as gabbii.

The first edition stated that there are about three species of Tylomys. The second gives their number as about seven, but none are mentioned by name in the main text. Saimiri ustus is newly included in S. sciureus and Ateles fusciceps in A. geoffroyi. A doe (Mazama nana) is the only species which, owing to taxonomic considerations, appears for the first time in the new edition and which is provided with a new figure. Coendou nychthemera, referred to only as the "Black Dwarf Porcupine" in the first edition, is identified as Coendou koopmani in the second. Coendou sneideri is newly omitted for reasons not stipulated.

This book is the best extant source on the classification of echimyids, for Emmons has here informally published a much-needed de facto partial revision of the group. Echimys grandis is now Makalata grandis, Echimys rhipidurus now Makalata rhipidurus, Echimys occiasius now Makalata occiasius, and Echimys armatus is now Makalata didelphoides. In the sequence of species accounts, two species assigned to Echimys are interposed between two groups of species assigned to Makalata.

Outline drawings of tracks of Herpailurus yaguarondi, Cerdocyon thous, Didelphis marsupialis, Dasypus novemcinctus, and Coendou prehensilis are now included, along with new and better Tapirus terrestris track drawings, new additional Tayassu pecari tracks, new Mazama americana tracks, and a newly included M. gouazoubira track (with apparent mixup in caption).

The main text contains very few contradictions or errors of fact or interpretation, although there are occasional ambiguities and frequent inelegancies of expression. It may reflect less familiarity with Central American mammals than South American ones. Considering the scope of this work, the infrequency of errors is very much to the author's credit. Errors are treated in this review primarily as an aid to those who will use the book.

According to the text (pp. 24, 25), Micoureus alstoni is "apparently absent from Panamá," but it is mapped as being there. The text (p. 89) also states that Desmodus rotundus ranges to "S Argentina" (does it?) and central Chile, but the map doesn't show this. In the text, Trichechus manatus is stated to range south to the mouth of
the Amazon, but its map shows it as ranging much farther. The map more correctly depicts the original range. Emmons seems unable to decide whether to call *Rhinophylla* "Little Spear-nosed Bats" or "Little Fruit Bats (pp. 76, 77)."

On page 223, capybaras are said to have litters of up to eight young, but page 224 gives litter size as 1-6. In a place (p. 152) where it is unclear exactly which procyonids are being discussed, Emmons writes "No other mammals in region except spotted cats have black and pale rings on tail." She forgot *Callithrix jaccus*. On page 154, she writes that "cat tails ... are irregularly spotted with pure black and white," apparently as opposed to being ringed. *Metachirus* is stated (p. 35) to be "often common; lives at low population densities." *Monodelphis soares* (p. 22) is not typically a "dull-colored" opossum. Does *Eumops perotis* (p. 101) really specialize on butterflies and moths? The snout of *Conopatus semisriatus* is, for the most part, furred rather than completely naked. Should *Bassariscus sumichrasti*, which gets up to a meter in length, be referred to (p. 157) as a "small" animal? *Macrophyllum macrophyllum* is said to have lines of "dots" on the interfemoral membrane; actually, these are raised papillae, at least distally. To state that vampire bats never suck blood but "lick up drops" of it (p. 88) is a misleading account of the mechanics of how vampires imbibe blood. Not all dolphins have a dorsal "fin" (p. 170), and not all peccaries have three toes on the hind foot (p. 175). *Sciuridae, Geomyidae, and Heteromyidae are called Old World monkeys really best described as having "flat, naked faces" (p. 104)? What is implied by calling *Cebuella pygmaea* the "world's smallest true monkey" (p. 105)? Does vigorous purely defensive behavior on the part of *Micoureus* spp. and *Choloepus hoffmannii* warrant their being called "aggressive" (pp. 23, 45)? To state (p. 70) that "the tip of the lower jaw [is] overshot" in nectar-feeding bats is a contradiction in terms. *Saginus fuscicolis* "run actively through the vines..." and *Microsciuus flaviventris* is described as "searching actively" (emphases mine). *Procyon lotor* (p. 152) "have whitish forelegs and usually feet." *Platyrhinus* "roost in small groups of 6-20, probably harems"; what do the males do? *Peccaries* (p. 175) are said to have "litters" of one or two young. *Tayassu tajacu* "mark trails by scraping the ground in front of a pole." It would be more correct to say that manatees (p. 182) have the tail in the form of a horizontal paddle than to say that the "rear of the body" assumes this form. A consistent and grating usage throughout the book is such wording as "Diet like black rat," rather than "Diet like black rat's" or "Diet like that of black rat."

There are some noteworthy omissions. *Marmosa andersoni* is not mentioned, even as a synonym. Under *Marmosa robinsoni*, *M. mexicana* is not listed as a similar species, and *Oryzomys* spp. are not listed as similar species to *Rattus* spp. or vice versa. The tail being dark both above and below should have been noted for *Rattus rattus*. The bald area on the top of the head of *Didelphus* (Cytarops also?) is not mentioned, nor the semen-like smell of *Carollia*, nor the strong characteristic odors of the different molossids.


Errors and questionable statements are more common in the maps and their captions, in the illustrations and their legends, and in the appendices than in the main text. Many, perhaps most, of these errors were carryovers from the first edition. The genus *Sturnira* is mapped, in error, as distributed in the Bahamas, but not the Lesser Antilles. A similar criticism might be made of
the map for *Glossophaga*, *Chiroderma* and *Natalus* are shown as absent from the Lesser Antilles, and the Florida range of *Eumops* is not indicated. There are errors in the legend/symbol matchups in maps 14, 152, and 179. Overall, the usefulness of the maps tends to suffer from their small scale—in part necessitated to keep the size of the book within reason for a “field guide.” The problem is unnecessarily exacerbated in some cases, however, by far more unoccupied real estate being included in a map than is necessary [e.g., maps 30, 82 (especially), 88, 89, 90, 125, 131, 141, 145, 158, 159 (especially), 174 (especially), 176]. The scale of maps 7 and 120 is an improvement over that of the first edition, however.

The legends accompanying the plates indicate the occurrence of a taxon in three major regions of the New World ("NA, CA, SA")—the West Indies should have been included. There are numerous errors in these legends and all are found in both editions. Contrary to the information given, all of the following are found in North America sensu Emmons, although, admittedly, some only marginally: *Didelphis virginiana*, *Nasua narica*, *Mustela frenata*, *Herpiailurus yaguarondi*, *Leopardus wiedii*, *Leopardus pardalis*, *Panthera onca*, *Odocoileus virginianus*, *Natalus stramineus*, *Lasiurus cinereus*, *Eumops perotis*, and *Molossus molossus*. *Marmosa lepida* occurs outside of the western Amazon Basin. *Oligoryzomys fulvescens* does occur in Central America, *Rethrodonotomys sumichrasti* does not occur in North America sensu Emmons, although *Ichthyomys pittieri* and *Promops nasutus* do not occur in Central America (but perhaps the ranges given were intended for the genera), *Tykomys watsoni* and *Vamyrades major* are not found in South America (genera meant?). No *Rhinophylla* and no *Molossops* sensu Emmons are in Central America. According to an explanation at the beginning of the plates, “In . . . bats, murid rodents . . . features listed are . . . for . . . the genus, not the species . . . Likewise, for those examples only, distributions refer to the genus in the rainforest region.” The inconsistencies that follow this statement keep me from divining its original intent. In some cases, it is clearly stated that the range of the genus is meant—which would be unnecessary and redundant under one interpretation of the above-quoted attempted explanation, but in other cases it seems as if only the species is intended—at least the range as given applies only to the species. Also, if distributions refer only to “the rainforest region,” why is North America, as delimited in the book, mentioned at all?

Also in the captions to the illustrations, *Saguinus mystax* is described as having a white “mustache,” but the illustration correctly shows a white area including the nose and completely surrounding the mouth. Certain prehensile-tailed monkeys are described as having tails “naked below the tip” or “naked under the tip,” which implies that the ventral surface of the tail cannot be considered part of the tip. *Lontra longicaudis* is incorrectly stated to have a “cylindrical” tail. In the caption to Plate F, *Natalus stramineus* is said to have a “funnel-shaped” mouth. What can this mean?

Feer’s illustrations, although, for the most part, adequate, are not up to the quality of Emmons’ text. The transparent watercolor technique employed for some illustrations is not up to the task of making mammals look furry. The black and white drawings of the manatees make them look heavily blotched, and the dolphins, as drawn, seem to have prominent color patterns. The opossums appear to have been drawn to scale (although this is not stated). The animals in the remaining plates are not drawn to scale—and this should have been stated. The proportions of some of the short-tailed opossums make them look like weanlings rather than adults. The three-toed sloths appear to be neckless; the hair of two-toed sloths resistant to gravity; the legs, feet, and claws of the fish-eating bat (Pl. 5) too small; and the nose of living white-nosed sakis actually appears reddish, rather than white. The hairy-legged vampire’s legs are not depicted as particularly hairy, and the thumb pads of *Didelphis virginiana*, *Pteronura brasiliensis*, and *Chrotopterus thysanum* are poorly drawn and not mentioned in the caption. *Lasiurus cinereus* is shown with unnaturally elongated ears. The angles at which the ears of the phyllostomines are held are not true to life, and the tail of *Chrotomys montanus* is omitted. The text says that the ears of pocket gophers are hidden in the fur, but the ear is completely exposed in the drawing. The tail of *Rattus norvegicus* is too long and slender, the caption for *Chinchilla lanigera* says that the tail looks naked, but the illustration doesn’t make it appear so. The “projecting scutes” on the “hind knees” of *Dasypus kappleri* do not resemble what is shown in the illustration. The flattening of the tail of *Pteronura* is overdone. The wing...
The "Checklist and Index of Scientific Names" was to include all species or genera mentioned in the text. Whether rainforest denizens or not, but omits some (e.g., Catagonus wagneri, Otoicercus bezoarticus, Mazama rufina). Lowland rainforest species were to be indicated by being in boldface, but some so designated are clearly not lowland rainforest species or are questionably so (e.g., Monodelphis kunsi, Carolina subrufa, Artibeus hirsutus, Artibeus inopinatus, Isthmomys flavidus, Oligoryzomys fulvescens)—of more open and/or drier and/or disturbed habitats; Gracilinanus dryas, Artibeus aztecus, Sturiniura mordax, Vampyressa melissa, Eptesicus fuscus, Lagostrixis flavicauda, Sciurus argentinianus, Syntheseosciurus brochus, Reithodonmyos creper, Oligoryzomys vegetus—of higher elevations). In the main text, Lasiurus is stated to contain eight lowland rainforest species but only seven are listed—one of which, L. atratus, is not indicated as a rainforest species in the checklist. The main text also seems to treat Lonchophylla hesperia as a rainforest species, but not the checklist. Nelomys kerrei appears in the checklist of both editions but apparently nowhere else in either. Oecomys rex and Oecomys regalis are both listed, but the names are objective synonyms. Ichthyomyos tweetii, stated to be a lowland rainforest species in the main text in both editions, is for the first time so designated in the "Checklist" of the second edition. In both the "Checklist and Index of Scientific Names" and the "Index of Genera and Common Names," only one page number (the first page of the formal account) is given for each species. In the latter, names of forms only for which there are formal accounts are included.

Emmons uses a previously-existing or newly-coined English name for each species for which there is a special account and, otherwise, for each genus. Some of these seem inappropriate or objectionable, e.g., calling Monodelphis sored the "Shrewish Short-tailed Opossum" ("shrewish" implies ill-tempered; certain other Monodelphis much more shrew-like), calling Ectoophylla alba the "Honduran White Bat" (Little White Fruit Bat would be better), Vampyrum spectrum the "False Vampire Bat" (Spectral Bat would be better), Chrotopterus auritus the "Woolly False Vampire Bat" (Great Woolly Bat would be better). All Myotis are designated as "Little Brown Bats," all Eptesicus as "Big Brown Bats," and all Lasiurus as "Hoary Bats." Oecomys are termed "Arboreal Rice Rats." Abrawayaomys ruschi should not be called "Abrawaya's Spiny Rat" because it was named after J. P. Abravaya, whose name is correctly spelled immediately above its species account. I hope someone someday soon can come up with an alternative to calling various caviomorphs "rats." Tremarctos ornatus is called the "Andean Bear," rather than the more familiar "Spectacled Bear." The designation of Gracilinanus dryas as the "Wood Sprite Opossum" (p. 283) was a stroke of aesthetic genius.

The glossary fails to include some important terminology that needs definition if this field guide is to be intelligible to a wide range of users. Examples of undefined terms include petiolate, pp. 31, 254, and "phalange" = phalanx, p. 65. "Tail membrane" is not in the glossary but is indicated in a figure on p. 4, where it is also referred to as the uropatagium. To write of tailless stenodermatines as having "tail membranes" (p. 78) seems nonsensical. Some definitions are deficient, idiosyncratic, or misleading. "Hispid" is defined as "Bristly or spiny, or appearing that way because of coarse streaks of black in fur." "Form" is unclearly defined as "One or a population of variant individuals..." The definition of "home range" does not make it sufficiently clear that it is possessed by an individual, rather than a kind of animal. "Meatus" is defined as an "opening" or "hole," rather than as a passage, and the [external] auditory meatus is said to lead to the inner ear, rather than merely to the eardrum. The definition of melanistic seems to imply that a black individual of a species that is normally black is melanistic.

The "Key to the Families and Genera of Rainforest Mammals" seems generally clear and workable. Some statements seem odd or difficult to understand—monkeys are said to have "mouth wide and short," marsupials to have "tip naked for at least terminal one-third" (emphasis mine), phyllotomids to have "noseleaf behind nostrils"—for me, the nostrils are openings in the noseleaf.

Appendix C. "Classification, Study, Biogeography, and Conservation of Neotropical Rainforest Mammals," could be read with profit by
anyone. The discussion of speciation, however, is so involved that a lay reader can come out of it unable to succinctly define the word. To say that Darwin and Wallace “discovered” natural selection “during voyages among islands” is misleading. The word “variation” is used in a confusing fashion to refer to both character states and to subspecies (pp. 268, 269). The discussion of “splitting” and “lumping” on p. 270 should be followed by a statement that makes it clear that all the splitting and lumping leads to a more and more consensual and useful classification which reflects the natural world better and better, allows better predictions and is, in a sense, truer.

Emmons seems to regard the word “conservation” (p. 274) as applying only to preserving species, rather than natural resources across the board. Emmons’ final summary statement, “Although the rainforest is of great economic importance to man . . . the chief reason to save it is a philosophical one: for the species themselves,” falls a bit flat and might benefit from a somewhat less passionless and less intellectually remote amplification. Yet, Appendix C is especially valuable because it sums up, in one brief chapter (and perhaps better than I’ve ever seen it done anywhere else), what taxonomy is all about, the role of museum research in science, and the necessity for collecting specimens and maintaining collections.

In spite of its (mostly minor) imperfections, I recommend this fine book enthusiastically and wholeheartedly for anyone with a general interest in mammals. It is simply indispensable for anyone with a broad interest in Neotropical rainforest mammals. As to its price, that of the hardcover seems high.—RONALD H. PINE, Illinois Mathematics and Science Academy, Aurora, Illinois 60506-1000 and Field Museum, Chicago, Illinois 60605-2496.


The American Southeast is a vast area with many diverse ecosystems, both terrestrial and marine, and over 132 mammal species, both native and introduced. It is an area where development is occurring at a rapid pace and where there are enormous problems preserving the remaining flora and fauna. There are books on the mammals of several southeastern states, including Georgia (Golley, 1962), Louisiana (Lowery, 1974), the Carolinas, Virginia and Maryland (Webster et al., 1985), and Florida (Brown, 1997; Gingerich, 1994), as well as regional books on the mammals of the south-central states (Choate et al., 1994). In addition, there is a new (third) edition of Mammals of the Eastern United States (Whitaker and Hamilton, 1998). These books provide excellent in-depth analyses of the mammals of these southeastern states, as well as the region as a whole. However, there is clearly a need for a broad book on the mammals of the region, especially one with the goals of making an understanding of the mammals available to a wide spectrum of people. The present book by Larry N. Brown is designed for laypersons as well as professionals and proposes to keep technical terminology to a minimum. The stated goal of the book is to use clear terminology, text and illustrations to help identify and understand the mammals of the 11 southeastern states (plus Louisiana) east of the Mississippi River.

The new book by Brown falls short of its stated goals in several important areas. The geography and major characteristics of the Southeast are poorly described and defined, and there is no general map of the area anywhere in the book. The major habitat types and most important features of the region are described in just three pages. With numerous blank spaces, a frequent shortcoming in the layout of the book, only two pages of actual text are devoted to describing the region. Therefore, the reader is left with a poor understanding of natural diversity and ecology of the region.

Another stated goal of the book is to provide clear identifications of the mammals of the region. The book falls short in this area also. The illustrations are generally of poor quality. The black-and-white photos are sometimes too small to be easily seen and are poorly reproduced and frequently too dark. They often fail to show important diagnostic features of the species being discussed or of the major taxonomic groups to which they belong. This is especially true in the case of the small mammals, and of shrews in particular. The author does provide additional