

ography, and a summary of conservation efforts in the Florida Keys all contribute to the completeness of the introductory material.

The main body of the text details the 106 species of butterflies and skippers recorded from the Keys. At the beginning of each family, there is a brief summary of the morphological, biological, and behavioral features that characterize that family. Each species account consists of five subheadings: Description, Distribution, Natural History, Flowers Visited, and Status. Both common and Latin names are provided, and all taxa are considered at the subspecific level. In addition to the full color plates illustrating spread specimens of all of the species (including upper and under surface, males and females where necessary), there are photographs of larvae and pupae of select exemplars of each family in their natural habitats. Most of the color plates are crisp and clear, and all are shadow-free. However, some are a bit too dark and two of the plates of the Pieridae are a little fuzzy. [What kind of a review would this be if I didn't find *something* to criticize?]

In addition to the standard data provided in the species accounts, for some of the more "interesting" species there is considerably more information. For example, the species account for the monarch (*Danaus plexippus*) is augmented by a map of North America illustrating the major migration routes of this species. The species account for the barred sulphur (*Eurema daira*) includes two half-page black and white photographs illustrating the seasonal forms and sexual dimorphism exhibited by this highly variable species.

Butterflies of the Florida Keys may find a spot on your coffee table, in your research library, or in your suitcase if you have the opportunity to visit the Keys. It is an outstanding and thorough faunal (butterfly) survey of a unique place in North America.

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BUTTERFLIES OF BAJA CALIFORNIA: FAUNAL SURVEY, NATURAL HISTORY, CONSERVATION BIOLOGY, by John W. Brown, Herman G. Real, and David K. Faulkner. 1992. The Lepidoptera Research Foundation, Inc., 9620 Heather Road, Beverly Hills, California 90210. v + 129 pp., 9 text figs., 8 color plates, 155 species distribution maps. Softcover, 21.3 × 27.5 cm, ISBN 9611464-4-3. \$25.00.

Baja California is a land of fascinating mystery and intriguing natural history. It is hard to believe that the first butterfly from Baja California was reported as early as 1875, by no less authority than Samuel Scudder (mentioning *Vanessa carye* from Isla Guadalupe off the western coast of Baja California). Just eight years later, Henry Edwards described the first endemic subspecies (now called *Phoebis agarithe fisheri*) from near La Paz. And in that same year, William Greenwood Wright published a brief description of a field trip listing 23 species taken along the northwestern coast of the peninsula. Since those early studies, many authorities have visited Baja California and collected there, involving at times some very adventurous expeditions.

Now, three noted modern lepidopterists have combined forces to publish this exciting new treatment of the whole butterfly fauna of the Mexican states of Baja California Norte and Baja California Sur. John Brown and David Faulkner of the Entomology Department of the San Diego Natural History Museum worked on a preliminary manuscript assembled by Herman Real, who had earlier done a Master's thesis on the Pieridae of Baja California. Together, these three authors gathered thousands of records from museums and private collections across the United States and abroad. Many unpublished notes were provided by those who had the most experience with collecting various butterfly groups in Baja California. The product is this truly impressive and biologically important book.

After a brief introduction to the purpose of the book, the authors trace the fascinating history of the pursuit of butterflies up and down Baja California, including names and dates of every known significant collecting expedition (through 1990). This historical section is followed by a detailed description of each of the phytogeographic regions in these two Mexican states. The authors include diagrams of average monthly temperature and average monthly precipitation for six representative sites distributed across Baja California. The description of each biological province includes representative plants, geographical and geological notes, and typical annual changes in the climate.

The peninsula of Baja California, one of the longest (1300 km) yet narrow "linear" peninsulas in the world, is an excellent natural laboratory for the study of peninsular biogeography. The authors review three models that have been proposed for the origin of the peninsular fauna in general, and then present a scenario for the origin of the butterfly fauna itself. Although the peninsula probably was separated from the west coast of mainland Mexico about 15 million years ago, there is also evidence that the opening of the gulf may have not begun until about 5.5 million years ago. Further evidence suggests that elevated sea levels once submerged much of what is now the peninsula, leaving the higher regions exposed as large islands. Some of these areas may have served as refugia from which many species later spread northward. The impacts of these geological changes on the peninsular fauna have indeed been manifold.

Following this general discussion of biogeography is a short but detailed section on endemism in Baja California, from which 21 butterfly taxa have been described. The introductory material concludes with two short sections on butterfly phenology and conservation biology, in which the effects of human development on this sparsely populated peninsula are reviewed, together with their apparent impact on butterfly populations.

The bulk of the book is devoted to a systematic account of all species of butterflies (178) for which the authors were able to personally examine specimens known to be from Baja California. A separate section of unverified records includes 25 species. Nomenclature throughout follows that of the Hodges (1983) checklist. Common names, when used, were taken from either Opler and Krizek (1984) or Emmel and Emmel (1973) or Pyle (1981). Each species account starts with the scientific name, author, and common name, followed by a citation of the color plate and figure number illustrating the species. A brief synonymy includes only the original description and references that actually cite that species' occurrence in Baja California. The abbreviated citations here are amplified in the extensive Literature Cited section at the end of the book. A subsection on Peninsular Distribution includes the type locality for each taxon described from Baja California, and detailed habitat and geographical notes on the locations, including islands, where it occurs in this Mexican region. The following section, Flight Period, gives the months that the butterfly flies in each section of Baja California, along with notes on the number of broods. This is followed by a section on Larval Hosts, including published and unpublished citations for each record. Most species accounts then include a Remarks section, which presents interesting facts about the species' distribution or absence from certain places, the taxonomic status of the species or subspecies, or other notes. Finally, many accounts end with a section on Specimens Examined, which includes detailed localities and dates for each unusual record (or all capture records if the species is known from less than 25 specimens or fewer than 5 collecting localities).

Accompanying each species' description is a map of the peninsula with distributional records indicated as black dots. The topographic features are sufficient to locate each of these localities in coordination with the "Specimens Examined" list of records. The book's text concludes with a thorough Literature Cited section, in which all references dealing with butterflies from Baja California are listed in full. Eight crisp, clear color plates showing specimens at almost life-size accompany the text. These color plates illustrate at least one specimen of every species from the peninsular fauna. Where sexual dimorphism occurs, or ventral color pattern elements are important in the identification, two to four specimens of such species are shown to illustrate these differences. The color reproduction is excellent and accurate. The only slightly distracting feature is the presence of shadows cast between specimens by the lighting arrangement used. (This reviewer understands

that the foreign printer was to have used computer masking to eliminate shadows, and that both the publisher and authors were surprised at this result.)

Every lepidopterist interested in the faunas of southwestern North America and the neotropics will want to buy a copy of this inexpensive and beautifully produced book. Its comprehensive, indeed exhaustive, treatment of all the significant collections of Baja California material, and the outstanding combination of authoritative authorship and editorial care by the publisher, guarantee that this work will remain the standard reference on the butterfly fauna of Baja California for many decades to come. The work will also be of interest to those who study the biogeography and evolutionary history of butterflies. Baja California, because of its isolation and relatively well-known geological history, offers insights that are widely applicable and of interest to the worldwide community of lepidopterists. I recommend this book enthusiastically.

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BUTTERFLIES AND SKIPPERS OF OHIO, by David C. Iftner, John A. Shuey, and John V. Calhoun. 1992. Bulletin of the Ohio Biological Survey, New Series, Volume 9, Number 1. The Ohio Lepidopterists Research Report No. 3. College of Biological Sciences, The Ohio State University, Columbus, Ohio 43210. 212 pp., 40 color plates. Softcover, 21.5 × 28 cm, ISBN 0-86727-107-8. \$40.00 (plus \$5 p & h). Order from Ohio Biological Survey, 1315 Kinnear Road, Columbus, Ohio 43212-1192.

This well-designed book (the cover painting and design are by John V. Calhoun) consists primarily of 144 species accounts arranged according to family. It is an unusually thorough text and could well be used as a model for future regional or state books of butterflies and skippers. The book is dedicated to Ohio lepidopterists, who likely will supply the bulk of the sales; however, this is an excellent reference volume for every lepidopterist.

Butterflies and Skippers of Ohio begins with a foreword by Paul A. Opler of the United States Department of the Interior Fish and Wildlife Service. A subsequent preface by the authors tells the reader that one of the major goals of the book was to make this publication as complete as possible so that it could be used as a foundation for the study of Ohio lepidoptera. In this they have certainly succeeded.

The introductory section is completed with a brief introduction and a section on the history of butterfly study in Ohio, accompanied by the names and photographs of some of the more significant researchers and collectors (the massive butterfly net of Homer F. Price surely must have cast fear into the hearts of butterflies within his reach!). All joking aside, this is an interesting, historically worthwhile section, and something that is lacking in most regional books about butterflies and moths.

The authors then provide us with an overview of previous research on Ohio's butterflies and skippers, a section on education and conservation (well-done, but too short), and an overview of the ecological and historical factors that influence the distribution of species in Ohio. These sections are well done and highly readable, in particular the section concerning the ecological parameters of Ohio's butterflies. Here they discuss the geological setting of Ohio, the influence of the glacial periods, the physiographic regions of Ohio, the botanical communities of Ohio (forest types, prairies, wetlands, and modified habitats), and postglacial biogeography.

A subsequent methods section details the sources and handling of data presented, and describes the format used in the species accounts. A checklist of species reported from Ohio completes the introductory material.