

fixed," since genes are neither indelible nor fixed. Urquhart implies that evolution of butterfly coloration eons ago stopped. The fossil record does not answer the question, but industrial melanism demonstrates that, at least for some Lepidoptera, such evolution continues. When Urquhart does address the literature, he becomes polemical (p. 190):

The scientific literature abounds with attempts to justify the mimicry theory as it applies to birds feeding on butterflies. These papers contain an impressive array of tables, charts and graphs resulting from experiments carried out in the crowded confines of cages in a laboratory. By the use of abstruse terminology the research assumes an aura of highly qualified investigations, but, when carefully analyzed, contains nothing of real value and no meaningful conclusions.

Much of the information Urquhart presents may be found in his earlier book (Urquhart, F. A. 1960, *The monarch butterfly*, Univ. Toronto Press, Canada, 361 pp.). That work contains an extensive bibliography, which the current book lacks. More recent findings are described in Urquhart's other publications, which he lists in his current book.

Fred A. Urquhart made perhaps the most spectacular discovery in the field of lepidopterology this century. This book will interest anyone who wonders what he has to say about monarch butterflies and his studies of them. However, to find out what others have to report about this species, readers will have to consult sources other than Urquhart's book.

KENNETH D. FRANK, 2508 Pine St., Philadelphia, Pennsylvania 19103.

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THE GEOMETROID MOTHS OF NORTH EUROPE (LEPIDOPTERA: DREPANIDAE AND GEOMETRIDAE), by Peder Skou. Translated from Danish edition by Elisabeth Folino. Entomograph Vol. 6. 1986. 348 pp., 24 color pls., 358 figs. E. J. Brill/Scandinavian Science Press, Leiden & Copenhagen. 17 × 25 cm, hard cover. \$100.00.

This book covers all moths of the families Drepanidae, Thyatiridae, and Geometridae known from Norway, Denmark, Sweden, and Finland. After a brief section introducing categories of information to follow, the author moves directly to species treatments. These consist of scientific name, author and year citation, plate and figure references, description, range, habitat, flight period, and biology. Descriptions are usually brief, with emphasis on variation. The color plates are among the best I have seen in sharpness and color value, comparing favorably with those in Skinner's 1984 *Moths of the British Isles*. Color plates include both sexes and sometimes additional varieties; they accomplish well the identification of most species. Genitalia drawings for some species are included, especially in difficult genera such as *Eupithecia*. Similar species are discussed when separation is difficult, and the author has added text figures showing useful body parts such as wing patterns, heads, and abdomens, with arrows pinpointing diagnostic features.

The worldwide range for each species is given, followed by detailed locality information for the four countries featured. The habitat section gives variably detailed characteristics of known sites, with black-and-white photos of typical habitats for many species. Flight periods are general ("From late April until mid-May."), and the biology section features larval foodplants, time of year in larval stage, place of pupation, and other information. Larvae and pupae are not described, but the book is generously illustrated with large black-and-white photos of the caterpillars, usually on their foodplants. A final line tells how the adult is best collected (at light, usually).

Following the species treatments are a selected bibliography and a table of distribution for all species in the four northern countries.

The arrangement of taxa anticipates a new catalogue of European moths in preparation by K. Schnack. Thus Thyatiridae are treated as a subfamily of Drepanidae. The subfamilies of Geometridae are named as we now recognize them in the North American fauna, but

they are arranged in the same order as in the McDunnough 1938 *Check List*: Archiearinae, Oenochrominae, Geometrinae, Sterrhinae, Larentiinae, and Ennominae. The Hodges et al. 1983 *Check List* is the same except that Ennominae are moved to a position between Oenochrominae and Geometrinae.

This book builds on several previous works, and appears to be an excellent identification guide for species. Taxa above species are not described or defined, and there are no keys. Recent expansions of European species to North America were missed (the establishment of *Hemitheta aestivaria* (Hübner) in Canada was published in 1979); so range information outside Scandinavia and Finland is questionably thorough.

The English composition is awkward in only a few places—forgivable, considering the nationalities of the book's producers. Some typographical errors were found; and a number of words were broken in mid-syllable—irritating to a former English teacher! The print on coated paper is generally sharp, but there are numerous poorly impressed or broken characters which mar an otherwise lavishly produced book.

The expense of this book will unfortunately preclude its addition to the bookshelves of many amateur lepidopterists in North America and other parts of the lepidopterological world outside Europe. This is sad because it is a first-rate work, and is just one of many fine works on European moths that have recently come out. Those who specialize in Geometroidea should certainly find it a valuable investment.

CHARLES V. COVELL JR., *Department of Biology, University of Louisville, Louisville, Kentucky 40292.*

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NOCTUELLES ET GÉOMÈTRES D'EUROPE. DEUXIÈME PARTIE. GÉOMÈTRES. Volume IV—1919–1920. Jules Culot. Reprint edition, 1987. Apollo Books, Svendborg, Denmark. Order from: Apollo Books, Lundbyvej 36, DK-5700 Svendborg, Denmark. Vols. III–IV, DKK 1380.00; Vols. I–IV, DKK 2550.00.

This is the fourth and last volume of the set, with 167 pp. and color plates 38–70 (Figs. 772–1403). It covers part of Larentiinae (beginning with *Eupithecia*) and Ennominae, although neither of these subfamily terms are used, much less defined. Having worked with *Eupithecia* of North America and Chile, I found the 45 pages and 140 figures devoted to this group particularly frustrating, as there are no descriptions or figures of genitalia; to me, a study of these structures is almost a necessity to correctly name many of the species. The same can be said about the species grouped together in *Boarmia*; in this case a number of different generic names are in use today.

Having reviewed Vol. III (J. Lepid. Soc. 41:239), I need not repeat comments made there, except to add that the text is in French in the entire set. This volume can be useful to determine some of the more obvious and distinct species, but the scientific names date from 1901. Much more up-to-date works are available and, to me, they could very well prove more useful than the volumes of this set.

FREDERICK H. RINDGE, *Department of Entomology, American Museum of Natural History, New York, New York 10024.*