

## BOOK REVIEWS

THE MONARCH BUTTERFLY: INTERNATIONAL TRAVELER, by Fred A. Urquhart. 1987. xxii + 232 pp., 24 pp. color photographs. Nelson-Hall, Chicago. Hard cover. \$31.95.

To his everlasting credit Fred A. Urquhart showed that the monarch butterfly migrates from Canada to overwintering sites in Mexico. In his most recent book Urquhart gives an enlightening account of his pioneering investigations of North America's most famous butterfly, including its morphology, development, behavior and ecology.

Urquhart documents the migration of the monarch butterfly in historical and personal terms. He writes in the first person and selects information intended for a popular audience. The result is informative and exciting. He describes how he developed the tagging technique for following monarchs. He reveals the clues that ultimately led to the discovery of the Mexican overwintering sites. His conversational, informal style allows him to include anecdotal digressions that enrich the factual account.

Often when writing about the biology of the butterfly, Urquhart poses a simple question and then describes an experiment which he conducted looking for answers. What determines which trees monarch butterflies choose for roosting? Do pheromones help monarch butterflies aggregate? How does a monarch caterpillar which has fallen off a milkweed plant find its way back to that plant or another? The question-and-experiment format generates a certain suspense and captures the reader's attention. The experiments are intriguing even when inconclusive.

Few entomological authors dare to write about the emotions which their love of insects arouses. Scientific papers require a tone of objectivity, and expressions of pleasure come as a surprise. In this book Urquhart overcomes the inhibitions which desiccate more scholarly treatises. Urquhart understands that his audience wants to know why a person would go to the extremes he did in pursuit of a common butterfly (p. 153):

Those who have had a dream and have lived to see that dream come true will have some conception of my feelings when I first entered the Mexican forest and there, before my eyes, was the realization of a dream that had haunted me since I was a lad of sixteen.

On the negative side, Urquhart's personal approach overemphasizes his own work at the expense of others. For example, in the opening chapter about the monarch butterfly's foodplant, he ignores the ecological chemistry of milkweeds. Later he alludes to the transfer of milkweed toxins to monarch butterflies, but only to dismiss its importance.

Urquhart's failure to recognize the work of others leads him to farfetched speculation. His attempt to explain control of sexual maturation of migrants is an example (p. 121):

As our small planet earth travels in its elliptical orbit around the sun, it is possible that twice each year it passes through an area rich in some sort of radiation that impinges upon animal life. The radiation cycle might affect in some manner the cells of the body, causing reproductive organs to abort in the fall and develop in the spring and to initiate the migratory response. Perhaps our astronomy researchers may add a missing part to the migration puzzle. Perhaps animal life on our earth is being controlled by what is happening in outer space more than we now consider feasible. . . .

Urquhart could have avoided this fantasy if he had discussed hormonal control of monarch butterfly development, and photoperiodic regulation of the timing of this development (reviewed in Rankin, M. A., M. L. McAnelly & J. E. Bodenhamer 1986, The oogenesis-flight syndrome revisited, pp. 27-28 in Danthanarayana, W. (ed.), *Insect flight: Dispersal and migration*, Springer-Verlag, Berlin, 289 pp.).

Urquhart makes generalizations that violate basic biological principles. He writes (p. 194): "The characteristics of size, shape and color that we now see in different species of butterflies were indelibly fixed in the hereditary gene complex millions of years ago and have persisted to the present time." It is doubtful whether any trait can be "indelibly

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.

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*Journal of the Lepidopterists' Society*  
42(4), 1988, 296-297

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