



Fig. 1. Male (upper left dorsal, and upper right ventral, surfaces of same specimen) and female (lower left dorsal, and lower right ventral, surfaces of same specimen) *Apodemia mormo* near *dialeuca* Opler & Powell, Sugarloaf Ridge 8500' (2600 m), San Bernardino Mountains, San Bernardino County, California, 5 June 1958, leg R E Stanford.

genetic continuity between the presently disjunct populations. Future studies will be necessary to clarify the taxonomic status of this new population, its geographical distribution and relationship to contiguous elements of the *mormo* complex. For the present, *Apodemia mormo* near *dialeuca* can be added to the butterfly fauna of California and the United States. (Thanks to Keith Hughes, Paul Opler and Jerry Powell for assistance in preparing this note, and to Louis Brunelle of Fort Dix, New Jersey for the illustration.)

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BOLORIA SELENE (NYMPHALIDAE) AMBUSHED BY A TRUE BUG (HETEROPTERA)

Predator-prey relationships between butterflies and other insects have been infrequently noted in the literature. An instance of a robber fly eating *Papilio eurymedon* Lucas is known to me (correspondence with T. Rogers) and dragonflies have been seen to capture and consume butterflies. But the following account is the first observation of which I am aware of a true bug preying upon a butterfly.

On 20 August 1970, I visited the Moxee Bog Reserve in Yakima County, Washington. This site, protected by The Nature Conservancy through the efforts of

Society member David McCorkle, nurtures one of the few known colonies of *Boloria selene* Denis and Schiffermueller in the state. The habitat here is an anomaly—a quaking bog in sagebrush desert. Both the bog and the insect seem to be glacially relict features. Various boggy pockets in the Columbia River Basin serve as refugia for formerly widespread species of plants and animals. These species were largely wiped out by regional flooding of the basaltic coulee country which happened following melting of the Pleistocene ice dams on Glacial Lake Missoula.

I was aware of the historic enigma of Moxee and was visiting it as a general exercise in nature perception. My specific objective was to photograph *selene* and to observe its behavior for a work on Washington butterflies. I first encountered the insect along the ecotone where cattail marsh and sedge bog meet a drier, alkaline bench dominated by a native iris. Throughout the afternoon, *selene* was uncommon and perched infrequently after long, sustained and fairly strong flights. As sunset approached, the butterflies became suddenly very abundant (or rather, much more in evidence). Scores of fresh individuals of both sexes were now on the wing deeper into the wettest parts of the bog. Flights grew shorter and slower, perching occurred more frequently. Many of the Silver-bordered Fritillaries clung to grass blades, while others fed on five species of flowers: A *Verbena*, Rabbitbrush (*Chrysothamnus nauseosus*), two yellow daisies and a mint (*Mentha*). *Coenonympha tullia* was also abundant, but I observed no encounters between the two species of butterflies. Mating activity became intense during the last half hour of direct sunlight. Many pairs of *selene* were observed courting and copulating, the latter accomplished *in situ* and never in flight. Immediate precopulatory behavior consisted of a gentle, slow fluttering of the wings as the two partners orbited one another by crawling around the grass blades to which they both clung.

At about 1800 (PDT) I noticed an individual of *selene* in an unusual position. A fresh female, it was wedged upside down between two flower heads of Rabbitbrush, with its wings spread open as if mounted. Thinking at first it was simply a strange feeding posture, I set about exploiting the excellent photographic opportunity thus afforded. Soon I noticed that the butterfly moved only feebly and indeed appeared to be immobilized. Looking closely, I was astonished to see several true bugs clustered on the same flower heads that bore the butterfly. Three of the heteropterans were visible, and two were in contact with the butterfly at the time. Their refined camouflage (yellow, mottled with black) accounted for my initial failure to see them against the Rabbitbrush florets. As I watched, the bugs clambered over the butterfly, presumably imbibing its fluids with their probosci, which often came into contact with the hapless *selene*. A small yellow crab spider occupied the same flower head, but did not appear to be implicated in the entomophagy. I collected the butterfly (which soon died) and one of the suspected assassins. When the *selene* became desiccated, its abdomen clearly showed a small hole in its side where it had been pierced.

The bug turned out to be a member of the family Phymatidae, probably of the genus *Phymata* Latreille. These bugs are known, most aptly, as Ambush Bugs. W. S. Blatchley (*The Heteroptera of Eastern North America*, Indianapolis, 1926) wrote this account of Ambush Bugs and their tactics: "Only about 80 species of the family are known, 14 from North America. They are all predacious in habit, hiding themselves in the heads of flowers, especially Compositae, where they await the coming of bees and other nectar-seeking insects. When the prey is within reach the bug makes a quick stroke with its sabre-like fore tibiae, draws the victim within reach of its beak and then leisurely sucks it dry." The behavior of my predator obviously matched the family characteristics, and the means of actual capture, which had baffled me, is explained. Surely the Ambush Bug deserves its name if it can seize and overpower an insect so relatively large, strong and fleet as a Silver-bordered Fritillary. However, one bite from a *Phymata*, quickly executed and well placed, might well disable an even larger prey than *selene*. I know. As I was

returning to my car after this hot, damp adventure in Moxee Bog, I felt an excruciating pain in my foot. Cursing, I tore off my boot and found the vector of my intense discomfort: an Ambush Bug. I had shared *selene's* fate, and came out only slightly better: my foot swelled and throbbed for hours afterward.

Was there ethological significance to the prey-positioning? Do heteropterans usually prey communally when butterflies are the target? I would be most interested in reactions to these questions, and in reports of insect predation on butterflies in general. Thanks be to Dr. Dennis Paulson of the Department of Zoology, University of Washington, and to the library staff of the Royal Entomological Society of London, for aid in identifying the Ambush Bug.

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BOOK REVIEW

SOUTH'S BRITISH BUTTERFLIES, by T. G. Howarth, illustrated by A. D. A. Russwurm and R. B. Davis. 1973. xiii + 210 p., 48 colour plates, 26 drawings, 57 maps. Cased. Frederick Warne & Co. Ltd., London and New York. Price £10.50 UK.

PROVISIONAL ATLAS OF THE INSECTS OF THE BRITISH ISLES: PART 1 LEPIDOPTERA RHOPALOCERA, BUTTERFLIES, edited by John Heath. 1970. iii p., 57 maps. Natural Environment Research Council. Agent: E. W. Classey Ltd., Middlesex, England. Price 50 p. UK.

PROVISIONAL ATLAS OF THE INSECTS OF THE BRITISH ISLES: PART 2 LEPIDOPTERA (MOTHS—PART ONE). LASIOCAMPIDAE: SATURNIIDAE: ENDROMIDAE: DREPANIDAE: THYATRIDAE: SPHINGIDAE: NOTODONTIDAE: LYMANTRIIDAE: ARCTIIDAE: NOLIDAE, edited by John Heath and Michael J. Skelton. 1973. iii + 3 p., 102 maps. Natural Environment Research Council. Agent: E. W. Classey Ltd., Middlesex, England. Price £1.00 UK.

The butterflies of Britain must be the most intensely studied butterfly fauna in the world. The tradition of butterfly collecting is probably stronger there than anywhere else, extending back to the parson-naturalists and other curious people in the eighteenth century, who have had to deal with a fauna of only 61 resident species (fewer than Long Island, and five of them now extinct), 3 regular migrants and a total of 41 assisted and unassisted strays and immigrants. This great band of bug-hunters has successfully recorded the distribution of the butterflies of most of England, about half of Scotland and scattered areas of Ireland; compiled by computer these records provide intensive distribution maps of all 56 residents, plotted on a 10 kilometre grid covering the whole area. Intended as the basis for conservation of dwindling species (they clearly show the decline of many, and the apparent extinction of one moth), these maps, now published provisionally for the butterflies and many of the more spectacular moths, are a triumphant combination of amateur natural history with professional data-processing; they will be of particular interest to the zoogeographer, and invaluable to the collector, observer or photographer, who with the aid of British Ordnance Survey maps or the *AA Book of the Road*, all bearing the same reference grid, can now pinpoint his quarry to within 100 square kilometres. Discreet enquiries with the Nature Conservancy can often produce the exact spot for the really localised species.

The butterfly maps re-appear, considerably improved by new records for the common or secretive species, and for the less scenic parts of the North and Scotland,