BOOK REVIEW

MOTHS. By E. B. Ford. xix + 266 pp., 56 pls. (32 colored). 1955. Publisher: Collins, London. Available from E. W. Classey, 91 Bedfont Lane, Feltham, Middlesex, England, and other British booksellers, at 35s, plus postage. (Also published in America by The Macmillan Co., 60 Fifth Ave., New York, N. Y., U. S. A., at $7.50.)

This is a continuation and supplement of the work entitled "Butterflies", by the same author and publisher. It likewise is intended to present all those biological problems which can be properly shown by the Lepidoptera, but in this case assuming that specifically *moths* are the material of study, and that the interested reader will turn back to the volume on butterflies for the details already presented in it. But enough background is given here so that one can get a clear picture with this volume alone.

In the butterfly volume it was possible to illustrate all the few British forms, incidental to the more biological discussion, but with the many times larger moth fauna this clearly cannot be done; the plates do manage to show a great many of the British moths, both common and rare, — but only those large enough to be shown well by natural size photographs, either in color or in black and white. The micros, while a few are mentioned in the text, do not appear in the pictures.

I might say that the late CLYDE FISHER had made preliminary arrangements with me to prepare a corresponding work based on the American moths. After his death we heard nothing more, and looking on the present volume, I say frankly that I couldn't have done it!

While the butterfly volume illustrated all the British species, the present one only covers a hundred or two of the moth species, so that they serve to a more definite degree as illustrations of the biological laws discussed, than of the fauna as such. The text, as with the preceding volume, is definitely devoted to the laws and the known biological facts: "Moths" means definitely 'the known laws of biology as illustrated by the *British* moths'. Physiology, genetics (including polymorphism), protective devices, pests, geography, melanism and population and extinction are taken in turn, but the two fields presented richly and almost exhaustively are genetics and geography. In these two fields no other work can give anything like so clear a picture of what we know, and so clear a hint of what we can next hope to find out.

Now for a few more specific comments. The first is aimed at the editors: why could not the plates have been given a single numbering? With the double numbering and the irregular placing (no doubt due to the problem of binding) one has to refer back to the two lists of plates every time he wishes to turn from the mention of a moth to its illustration, and to the index every time he makes the reverse shift. There is nothing new about this, we have to do it with almost every book, but it is always a new irritation. Incidentally the plates are beautifully reproduced, and only occasionally the colored ones show the tinted veil so common in three-color work, or the black and white plates less sharpness of detail than we could hope for.

In the author's statement of the reason for neglecting the micro-Lepidoptera, he writes: "less suitable for these studies, being more difficult to handle". I feel this is the reverse of the fact; at least one group of micros (the stored food pests) are on the whole easier to handle, and *Ephestia* at least has been used several times for genetic work just for that reason. There are other reasons that no doubt are the real ones, — they are less often collected by the amateur, with the result that we lack records of distribution and are more often plagued by misdetermined records. If you consider the related fact that many manuals omit them, I think you have two thirds of the story. I grant the other third: they are difficult to handle . . . as dried adults.

I am sorry that the Kloet & Hincks check list was followed for the scientific names. It may be closer to the present rules than names previously used, but none of the familiar works on European moths have used it, and unless one has a popular

English work that gives the more standard English names, he is often completely lost. At least the traditional scientific names should have appeared as synonyms. In the case of "Caradrinidæ" (instead of the traditional names of Noctuidæ, Agrotidæ, or even "Phalænidæ") the word "noctuid" appears on p. 233, but even there there is no indication that the "Plusiidæ" are also noctuid moths, *Plusia* in fact differing from *Caradrina* probably far less than either differs from such a "Plusiid" as *Zanclognatha.* Incidentally both larva and adult show that *Callimorpha* is not a Hypsid but a slightly aberrant Arctiid, hardly more than a subgenus of the American *Haploa,* which all workers put in the Arctiidæ. The superfamily "Notodontoidea" is also a complete mess, for the Notodontidæ themselves are close to the Noctuidæ in egg, larva, and tympanum, while the geometers are something quite different (FORD lists the latter as five families); and the Polyplocidæ which are here listed in the Notodontoidea are hardly more than a subfamily of the Drepanidæ, which stand as a superfamily by themselves. I also see GEOFFROY'S misprint of *"Tinæa"* preferred to the Linnæan and classical Latin *"Tinea".* Incidentally the Psychidæ, which give the name to his Psychoidea, are much closer to the Tineidæ than to the Zygænidæ, which he groups with them. A very little study of *Solenobia* shows the situation.

I think when Dr. FORD discusses the relative uses of collections and studies, he should have emphasized the value of a collection as a *record.* Some one may later ask what you were really studying; a good photograph may tell the story, but a few specimens saved from a genetic study are much safer in such a genus as *Ephestia.* If ancient specimens had not been saved, who would have guessed that the "Army Worm" of western Europe is not one of the Asiatic or South American kinds, but actually the one from North America?

There is a good chapter on industrial melanism; but I wish some one would give us a similar picture of the same phenomenon over here, known for many years about Pittsburgh, but now showing in hundreds of species well over the Northeast.

I am not clear why the compound eye should be considered "rather inefficient." Considering its size and the size of insects in general, it could hardly be more efficient.

I should hardly say that butterfly antennæ usually end in a "knob"; much more often there is merely a gradual swelling, and even this may be slight in some Satyrs. The combined character of swollen antenna and no frenulum will doubtless define a butterfly in Europe and the U.S., but I have often been embarrassed by some beginner who had got hold of a specimen of *Urania.*

I think the question of bright colored hind wings and under sides, concealed at rest, is much more complicated than FORD would make it. Consider the Catocalas, night fliers but some of them easily flushed by day, and even more the yellow-winged Agrotids, so common in Europe, and so nearly absent in America, with no obvious explanation.

Note that a couple of moths from Kerguelen Island alone have lost their wings in both sexes. They are only micros, but are believed to belong to at least two families winged in other parts of the world.

The production of diffraction colors seems somewhat misstated or at least will be almost certainly misunderstood; for the bright structural colors, such as the blues and the green Foresters, are produced not by the minute striation, but by piles of thin superimposed plates; the striation colors are never conspicuous, and usually overlooked. They can be seen however in some species by illuminating a specimen with a narrow beam of light, such as a ray of sunlight, in a dark place. It is easily distinguished by the fact the color changes with a small change of angle, while the thin-plate type remains about the same unless actually glancing viewing and illumination are used.

As to killing, I understand that conditions are quite different in England, where it is traditionally hard to get cyanide, but I find it safe even with such very delicate greens as our *Dichorda iridaria,* while ammonia kills erratically and changes many other colors.

The *Colias* "blue" mutant is called bright blue; in fact it is merely blue-green, rather than the usual grass-green. My impression is that there is merely a failure to deposit carotin-type pigments.

I think that the girth of *Papilio* and Pierid pupæ is not the vestige of a cocoon, for both coexist in many Skippers, if not perhaps all. I was interested to discover a few years ago that *Papilio* has all the instincts of a Nymphalid in shedding its skin without losing its hold on the silk button. I had a *P. philenor* larva fail to spin the usual girth. It pupated perfectly, hanging by its tail like a *Vanessa.*

Cocoons are stated to be a protection against damp and mould. No doubt they are in a highly humid country like England, but I am sure that in more of the world they are a protection against drought, which is the chief killer when an entomologist over here gets careless. This is certainly true of our Cecropia, Promethea and Polyphemus, which soon dry up if removed from their heavy cocoons, and I think equally if a Sphinx is dug up without precaution. I think species from the humid tropics are much more likely to have open-mesh cocoons like the *Cingilia* group of geometers and *Urodus.*

For the record, the Gypsy Moth was not "accidentally" introduced to America, but brought in purposely by TROUVELOT, who thought it might produce a useful silk (not need such delicate treatment as the Chinese silkworm). The story is that a maid swept the cocoons with egg-masses out the window, and not all were recovered. In any case there seems to have been only a single introduction, and we never have the flying females that FORD mentions.

As *Panaxia dominula* is not a Hypsid but a somewhat aberrant Arctiid, one can say of the group of moths listed on p.11 which have the same scent: "all Arctiidæ".

As to light-perception in insects, shouldn't the Diptera be mentioned as having a range of visibility much like our own, which is stated curiously as approximately 4000 to 7800 Å; I think 3800 to 7000 is closer to an average person's range? On the last line of p. 15, apparently "repulsion" is accidentally written for "attraction"; of course the repulsion sphere is the smaller, since most moths approach a light pretty directly until close, and only then begin to circle or even fly away.

The same reversal of our experience appears again on the next page; and I can only wonder if moths may not actually behave differently in the Old and the New World. If one seeks a reason why they might, there is always the problem of the effect of primitive man and his fires. He certainly existed and used fire untold millenia in the Old World, before he got over to America perhaps only some ten thousand years ago. The European moths that should have behaved like American ones about the lights, may all long since be extinct.

Well, this is my reaction to only a few pages of this fascinating FORD book. My copy has many more notes on its margins, and I wish I might write a book of comment; but our editor would certainly behead this review if I did (and justly). So I will end by saying it is a "must" for any one interested in moths beyond the pinned collection, even though it has kept almost too strictly to the limitation of "British Moths" and Macrolepidoptera.

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NOMENCLATURE NOTICE

An application for suppression, for purposes of type selection, of *A guide to an arrangement of British Insects* (1837), by J. Curtis, has been received by the International Commission of Zoological Nomenclature. Any specialist who may wish to comment on this application should write the Commission Secretary, FRANCIS HEMMING, 28 Park Village East, Regent's Park, London, N.W. 1, England, as soon as possible and no later than July 1956. The application may be seen in full in *Bull. Zoological Nomenclature,* vol.9: part 12 (January, 1956).

C. L. REMINGTON