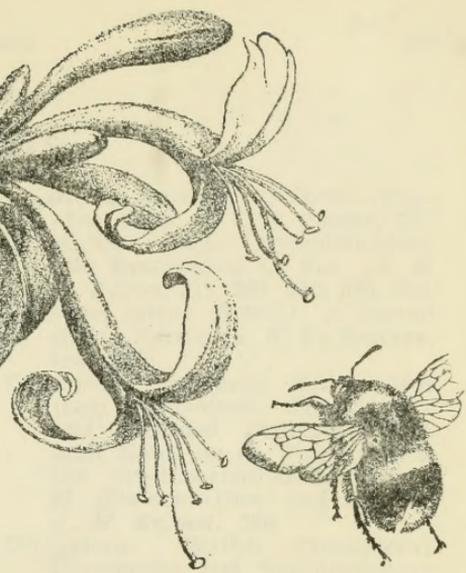
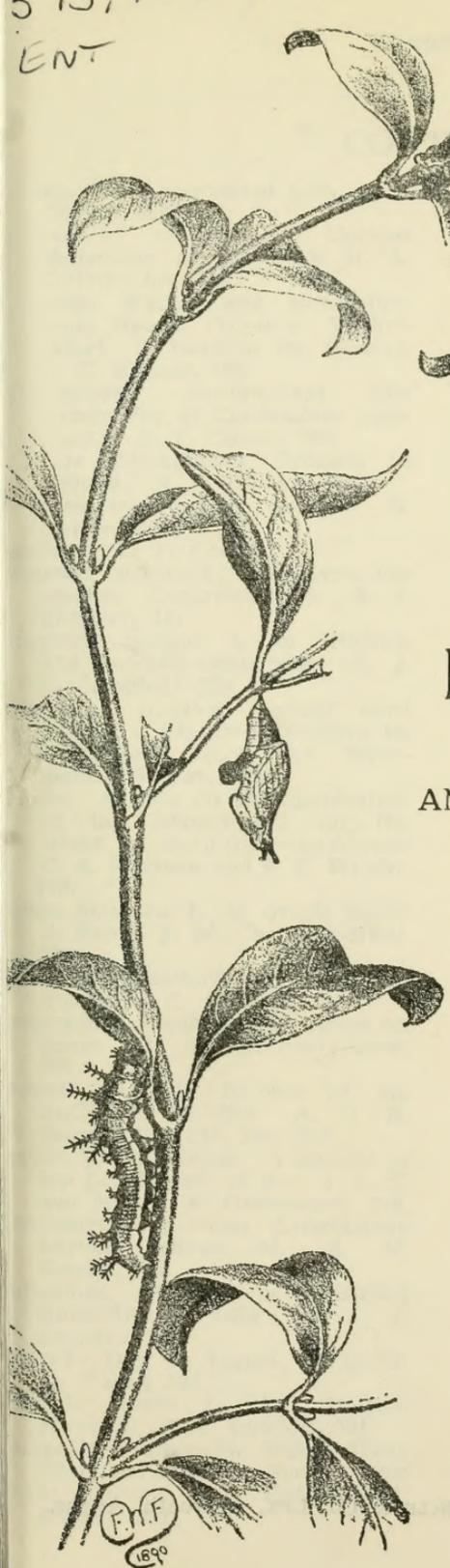






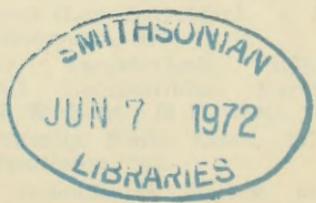
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The
Entomologist's
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AND JOURNAL OF VARIATION

EDITED BY
S. N. A. JACOBS, F.R.E.S.

Vol. 83
1971



Price £1.75 net

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The
Entomologist's
Record
AND JOURNAL OF ENTOMOLOGY
PUBLISHED BY THE ENTOMOLOGICAL SOCIETY OF GREAT BRITAIN

Vol. 83
1971



Printed in Great Britain by T. BUNCLE & Co. LTD., Arbroath, Angus.

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THE ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

Edited by S. N. A. JACOBS, F.R.E.S.
with the assistance of

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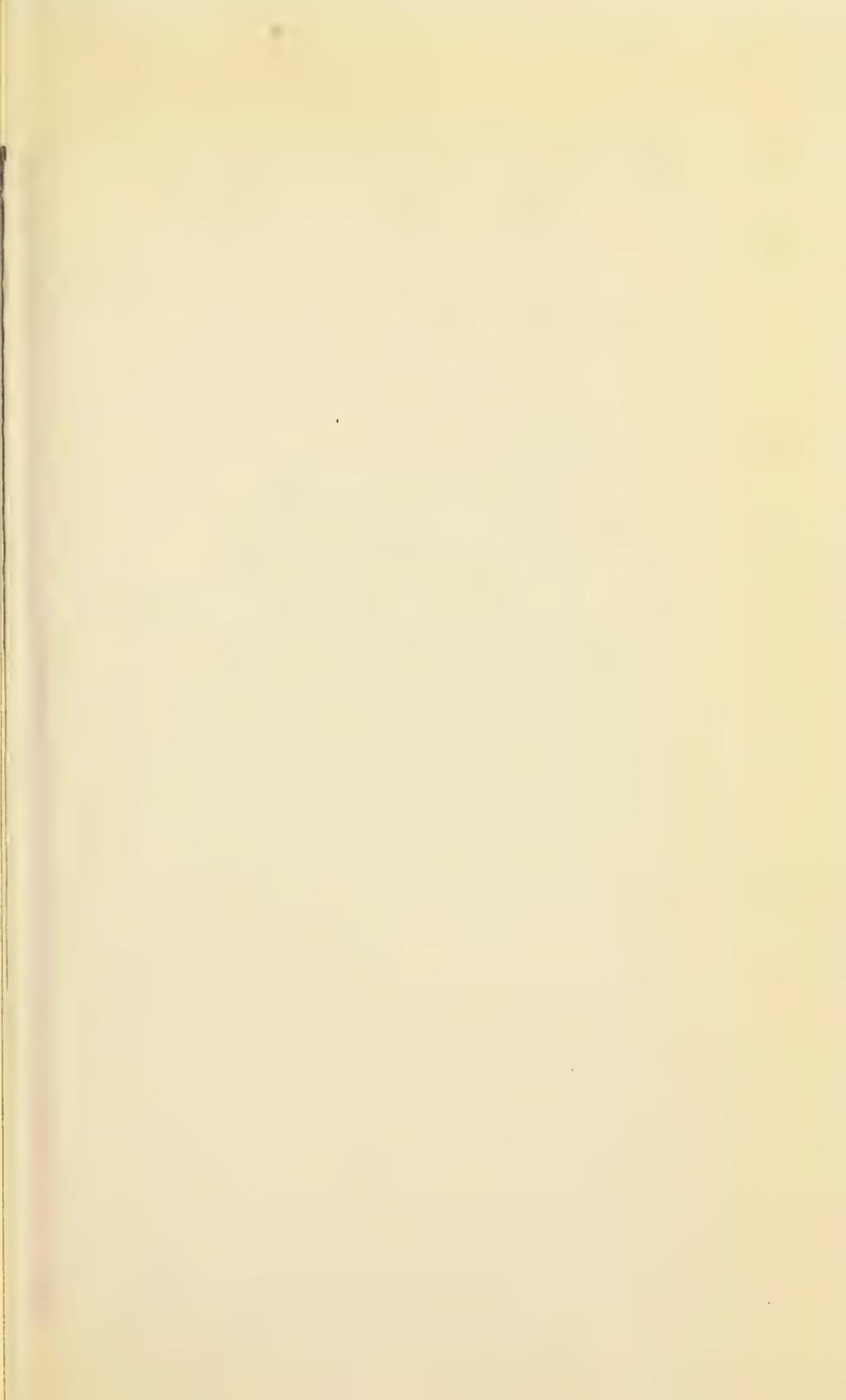


PLATE I



Photo by H. N. Wykeham

Poccilmitis violescens spec. nov.

Fig. 1. ♂ Holotype (upperside)

Fig. 2. Holotype (underside)

A Further New Member of the *Poecilmitis thysbe* (L.) Group (Lepidoptera: Lycaenidae) from the Roggeveld Mountains

By C. G. C. DICKSON

No. 23

This beautiful little insect was discovered on the Roggeveld Escarpment in November 1969, and it is so distinct from other taxa of the *P. thysbe* group that its treatment as a separate species appears to be quite justified. The male (the only sex identified as yet) shows affinity to *Poecilmitis beaufortia* (described by the present writer in *Ent. Rec.*, **78**: pp. 109-110, Pl. IV, 15th May 1966—see also *idem*, **82**: pp. 93-95, Pl. V, 15th April 1970, for particulars of *P. beaufortia* from the Roggeveld Mountains) but, amongst other features, can be distinguished at once from this species by the considerably reduced expanse of the silvery violaceous-blue in the forewings. It is also a smaller butterfly. The male genitalia have been found to be very similar in closely allied members of the *thysbe* group.

Poecilmitis violescens spec. nov.

Male. Upperside

Forewing. Blue extends up to (or at least partially up to) the black spot in cell, but leaves a prominent space of orange between this spot and the black discocellular mark; it then runs outwardly, in area lb. and either stops short of (as in the holotype) or reaches the black spot in this area and, extending along innermargin, finally reaches the lower end of the black border of the distal-margin. Costal black edging narrow; the usual black spots of the *thysbe* group clearly developed, and the discocellular one the largest; the black border of the distal-margin fairly broad. Cilia chequered black and white or whitish (worn in the holotype), with the white spaces mostly very small but (in the paratype) sharply defined. A shifting violaceous-pink lustre extends over part of the orange area of the wing, beyond the violaceous-blue itself.

Hindwing. Blue area spreads out from the base up to about two-fifths of the length of the wing (a little more in the paratype); the violaceous-pink lustre widespread over the orange field and (in the paratype at least) extending to within 1 mm. of the wing-margin. The black spotting in the orange area very poorly developed; wing-margin partially edged with black, with a definite, narrow border down to about vein 5. Innermarginal concavity dark greyish. Cilia black at the ends of the veins, with white intervening spaces, mixed with orange below the definite black border (but the cilia frayed in the holotype).

Underside.

Forewing. The black spotting in the orange area characteristic of the group (but very well developed in the holotype—as is the submarginal dark streak) and all details of marking, etc., practically as in the description of *P. beaufortia* (*op. cit.*).

Hindwing. Substantially as in *P. beaufortia* but in the holotype the dark marking again very pronounced; the general background pale. In the holotype there is (in addition to the more basal dark marking) a specially conspicuous, dark, curved zone of markings beyond the middle of the wing

and confluent with the pale lituræ (not actually metallic) which are present here.

Details relating to the body, etc., are essentially as described for *P. beaufortia*.

Length of forewing: 13-14 mm. (the first measurement that of the holotype).

♂ Holotype, WESTERN CAPE PROVINCE: Summit of Komsberg Pass, S.S.E. of Sutherland, Komsberg Escarpment, 27.xi.1969 (C.G.C.D.); British Museum Reg. No. Rh. 17199.

Paratype in the author's collection, W. CAPE PROVINCE: Roggeveld Escarpment, 18.xi.1969, 1♂ (C.G.C.D.).

In *P. violescens* the distal-margin of the forewing is unusually rounded for a male of this group of *Poecilmitis*.

The first specimen of this butterfly to be caught was taken in a mountainous spot in which the more usual Roggeveld form of *P. beaufortia* was out in considerable numbers; while the later example, which has been used for the holotype, was caught a good many miles to the S.E. of this locality, when the area at the head of the Komsberg Pass was being searched. A species of *Mesembrianthemum* with bright pink flowers to which this specimen had been attracted was also being frequented by *P. beaufortia* and *P. turneri* Riley, but in decidedly small numbers, as conditions were very far from favourable owing to a stiff breeze which was blowing from the south west. This had increased by the following day when, after several hours' intensive search without finding more specimens of *P. violescens*, it was necessary to leave the locality altogether.

This small butterfly is a particularly attractive member of its group, with its beautiful silvery violaceous-blue from the wing-bases and extensive violaceous-pink glow beyond the blue colouring. (The coloration is fully apparent only in the paratype which, although torn, is in fresher condition than the holotype.)

"Blencathra". Cambridge Avenue, St Michael's Estate, Cape Town.

In Search of Lepidoptera, 1970

By DAVID BROWN

My Butterfly season opened on 26th March with *Aglais urticae* (Linn.) L. at Charlecote—a considerable number of days later than previous years and even as I write these notes in late October the same species is still on the wing near the Michaelmas Daisies.

As regards Moths, although I had run the m.v. trap at home throughout the winter I commenced a series of excursions with the Heath traps covering the whole summer. The first of these was at Oakley Wood (near Warwick) on 30th March when until midnight in predominant birch *Achlya flavicornis* (Linn.) L., *Erannis marginaria* (Fabr.) L., *Biston strataria* (Hufn.) L., *Alsophila ascularia* (Schiff.) L. and *Cerastis rubicosa* (Schiff.) L. were all common. One *Orthosia munda* (Schiff.) L. and a female *A. ascularia* (Schiff.) L. were found on inspection of the tree trunks and herbage with the aid of a torch.

A further visit on 11th April produced the same species but in smaller numbers. On this night, due to the very low temperature, the expedition was abandoned early at 11.20 p.m.

A venture into Yorkshire at Ripon on 17/18th April, hoping to capture *Orthosia advena* (Schiff.) L., proved unsuccessful.

Another local wood (Chesterton) was blacklighted on 1st May. This particular wood has a wide variety of trees with large and recently made clearings and a few coniferous plantations. The only satisfactory moth taken was a nice dark variety of *Lycia hirtaria* (Clerck) L., the markings of which were similar to those of the December moth. The following evening conditions were more favourable for over 50 *L. hirtaria* (Clerck) L. were taken but no varieties. *O. munda* (Schiff.) L. was extremely common and one *Polyphoca ridens* (Fab.) L. was taken. Two days later on 4th May this wood produced about 80 moths, including seven *P. ridens* (Fab.) L.

It was indeed pleasant during this period to collect the trap in the freshness of each morning in wonderful spring sunshine with carpets of daffodils and primroses providing a yellow panorama in the clearings. Satisfactory, too, to note that the colonies of *Pyrgus malvae* (Linn.) L. seemed to be on the increase hereabouts. Later on in June the morning flying *Aegeria sphaeciformis* (Schiff.) L. was seen in this same clearing.

I was amazed to find in my emergence cage on 11th May a perfect gynandromorph, *Anthocharis cardamines* L. This was one of a dozen *A. cardamines* L. pupae I had purchased during last year.

After travelling down to Brockenhurst in the New Forest on 15th May, I set up the Heath trap and within minutes I took *Odontosia carmelita* (Esp.) L. followed by a second before midnight. Also attracted were very good numbers of all the common prominent including a dozen *Notodonta trepida* (Esper) L., many *Drepana lacertinaria* (Linn.) L., two *Cosymbia albipunctata* (Hufn.) L., one *Ligdia adustata* (Schiff) L., and three *Cleora cinctaria* (Schiff.) L.

During this trip the only Butterflies on the wing were *Pararge aegeria* (Linn.) L., *Nymphalis io* (Linn.) L., and *Gonopteryx rhamni* (Linn.) L.,—the fritillaries not yet having emerged. On the 16th, the afternoon was spent searching the birch trunks on the heath at Lyndhurst for *C. cinctaria* (Schiff.) L. but without success. I ran two traps well in Hollands Wood on the 16th, about half a mile apart, one being operated in a large beech clearing and the other in a wide ride—predominantly Oak and Birch. Results were the same—*N. trepida* (Esper.) L. being very common, a late *P. ridens* (Fab.) L., a very fresh *Smerinthus ocellata* (Linn.) L. and the usual common species.

The following day at Lulworth found *Callophrys rubi* (Linn.) L. plentiful as well as the usual common downland species. A few *Aspitates ochrearia* (Rossi) L. were noted. I collected a dozen *Lasiocampa trifolii* (Schiff.) L. larvae before leaving at 7.00 p.m.

The Heath traps were operated each night until 20th May, but only two further species came to the lights—*Stauropus fagi* (Linn.) L. and *Clostera curtula* (Linn.) L.

Back in Warwickshire on the 25th, I visited the disused railway line between Kineton and Stratford upon Avon. The beating of the herbage produced great numbers of *Anaitis plagiata* (Linn.) L., *A. efformata* (Guenee) L. and a single *Lampropteryx suffumata* (Schiff.) L. A freshly emerged female *S. ocellata* (Linn.) L. was found on a willow trunk. Thirteen species of Butterfly were recorded including one not previously seen at this particular site—a solitary *Pyrgus malvae* (Linn.) L.

On 28th May the Heath trap was operated in Tile Hill Wood on the outskirts of Coventry but conditions were not good. However, many *Drymonia dodonaea* (Schiff.) L. were attracted. This species is certainly absent from the Warwick and Stratford localities some 10 miles away. Before leaving at midnight a single *Ectropis extersaria* (Hubn.) L. made an appearance.

During this period at Charlecote I used the trap in local woods but the results were disappointing.

June 5th found me staying for a few days at my favourite collecting ground at Crickley near Cheltenham. Warm sunshine accompanied the search of the surrounding hills. *Pseudopanthera macularia* (Linn.) L. was extremely plentiful, as was *Phytometra viridaria* (Clerck) L. One very worn *A. plagiata* (Linn.) L. was seen together with a few *Procris statices* (Linn.) L., and one *Macrothylacia rubi* (Linn.) L. I had hoped to see *Hamearis lucina* (Linn.) L., but I was out of luck. I have visited these hillsides every year since 1963 but it was only in 1969 that I have seen this Butterfly and at that time three appeared in the space of ten minutes and that in an area of less than a quarter of an acre. Many other downland butterflies were seen but I noticed a sad decline in the numbers of *Aricia agestis* (Schiff.) L. Many *Bapta bimaculata* Fabr. were flushed by beating hawthorn shrubs in the nearby woods. Again the two Heath traps were used on each night of the stay. One in a beech wood some two miles from the second situated in the more open aspect of the steep hillside, yet the results from each were very similar except for *Bena fagana* (Fab.) L. from the Wood. *Horisme vitalbata* (Schiff.) L. visited both. I am afraid I then played truant to the cause by foregoing a further evening with the traps to ensure being home for the England/Brazil World Cup game!

I journeyed down for a further week-end at this site on 20th June, mainly in the hope of boxing *Horisme tersata* (Schiff.) L. which in the event proved very common. By beating Old Man's Beard, good numbers were obtained together with a few *Melanthia procellata* (Schiff.) L.

Meanwhile at Charlecote *Strymonidia w-album* (Knoch) L. had appeared very early and was out in good numbers well before the end of June, becoming quite worn by their usual emergence time in mid July. In 1968 I had saved the colony with the willing co-operation of the local landowner. He did not pursue his original intention to fell the Wych Elm and envelop a flourishing privet hedge and waste ground into his adjoining field.

The unfortunate necessity of sitting for examinations hereabouts prevented other than local collecting but having completed them I had a short expedition into Derbyshire but results in the trap were uninteresting. However, during an early evening walk at Chinley, Chapel en le Frith, I came across a very strong colony of *Odezia atrata* (Linn.) L.

A pleasant visit to Princethorpe Wood on 11th July found *Limenitis camilla* (Linn.) L. plentiful, but its condition was already below collection standard. *Thecla quercus* (Linn.) L. was very abundant.

On Saturday, 24th July, I was again camping in Hollands Wood, Brockenhurst, for a stay of ten days, and curiously within minutes of setting up the trap, *Boarmia roboraria* (Schiff.) L. was taken. The Heath traps were operated each night about a mile and a half into the wood. It was interesting to compare the results of the traps with that

of the fluorescent camp building lights. The latter, as other visitors to the wood will no doubt have experienced, attracted quite numerous good species. On the 24th the traps and camp lights attracted very large numbers of all the common prominents, including *Notodonta dromedarius* (Linn.) L., swarms of *Lymantria monacha* (Linn.) L., one *S. fagi* (Linn.) L., many *Mitochrista miniata* (Forst.) L. and a single *Apatetele leporina* (Linn.) L. Other species taken during the stay were *Dasychira fascelina* (Linn.) L., *Lycophotia varia* (de Vill) L., *Geometra papilionaria* (Linn.) L., *Lithosia deplana* (Esp.) L., *Cosymbia albipunctata* (Hufn.) L., *Mesoleuca albicillata* (Linn.) L., *Horisme vitalbata* (Schiff.) L., *Pachycnemis hippocastanaria* (Hubn.) L., plus a whole hoard of commoners.

I was very pleased to see *Celastrina argiolus* (Linn.) L. in such good numbers for in past years I thought there was a decline. As usual, *Argynnis paphia* (Linn.) L. and *T. quercus* (Linn.) L., were very common. On the adjacent heath at Blacknowle a few *Anarta myrtilli* (Linn.) L. were found at rest on the heather stems. *Plebejus argus* (Linn.) L. were plentiful.

Dusk collecting on the more boggy parts of the heath area (1st August) produced a specimen of the local *Scopula emutaria* (Hubn.) L. and *Gnophos obscurata* (Schiff.) L. with several *Selidosema brunnearia* subsp. L.

Perhaps the biggest reward of the summer's collecting occurred in the late evening of Friday, 31st July, after many hours of searching score upon score of pine trees I was delighted to come across *Hyloicus pinastris* (Linn.) L. nestling low down on a very elderly and large cedar tree. Such an exhilarating moment is full compensation for the inevitable disappointments throughout the season.

During a day spent over at Lulworth on 30th July *Thymelicus acteon* (Rott.) L. and *Argynnis aglaia* (Linn.) L. were as plentiful as in other years. Two *Cupido minimus* Fuessly L. were seen and I located a single *Cleorodes lichenaria* (Hufn.) L. at rest on a wall.

On 1st August White Parish Wood was visited in the hope of catching a glimpse of the most alluring sight of all—*Apatura iris* (Linn.) L. but alas in spite of detailed surveillance of the sites where I saw it last year it did not appear. However, before leaving the wood I netted var. *Valezina A. paphia* (Linn.) L., which later obliged me with a fair quantity of eggs.

After five days in the local haunts at home I set off again, but this time Northwards into the Lake District, staying in the first place adjacent to Arnside Knott in Borrowdale Wood. Here again two traps were used, but apart from a few *Colostygia salicata* subsp. L. little of interest was caught. *Erebia aethiops* (Esp.) L. was again very prolific on the Knott as was *Argynnis adippe* (Schiff.) L. A move to near Lake Windermere was hardly more successful, yet two *Tholera cespitis* (Schiff.) L. and *Plusia gracilis* L. were boxed and although the hair-raising ascent through the Hard Knott Pass was in itself an experience, the insects at the summit were very mediocre in range despite having hoped to find *Xanthorhoe munitata* (Hubn.) L. and *Entephria caesiata* (Schiff.) L.

My final expedition for the summer commenced on 25th August when I journeyed down for a few days' collecting at Box Hill and primarily to add *Hesperia comma* (Linn.) L. to my collection, and I was not disappointed as they were found in numbers. A few *Aspitates gilvaria* (Schiff.) L. were on the wing, together with the usual downland butter-

flies. An interesting day on the downs at Shoreham on Sea on 27th August found *Lysandra coridon* (Poda) L. and *Lysandra bellargus* (Rott.) L. common. The blacklight produced little exceptional at Box Hill, except a single specimen of *Paradiarsia glareosa* (Esp.) L. and *Amathes castanea* (Esp.) L.

Generally, I suppose the collecting season proved quite satisfying but variations in the weather were not conducive to success. I am always at a loss to understand why the favourable weather always seems to occur when I have to be indoors with my books preparing for examinations. Had I not found myself day-dreaming of *Atropos* I might even have passed!

MACRO-LEPIDOPTERA CANNAE

The Butterflies and Moths of Canna

By J. L. CAMPBELL

(concluded from 82: 299)

GEOMETRIDAE

Geometrinae

168. *Geometra papilionaria* L. (Large Emerald). Two only, one near the trap on 7/7/52, the other in my garden on 22/7/56.

Acidaliinae

169. *Acidalia aversata* L. (Riband Wave). Two only, in trap, on 31/7/63, 20/7/65.
 170. *A. bisetata* Hufn. (Small Fan-foot Wave). Quite common, in trap, earliest, 21/7/65; latest, 25/8/67; most, 16 in 1969; 13 in 1968.
 171. *A. fumata* Steph. (Smoky Wave). One only, in Tighard garden on 17/7/45.

Hydriomenidae

172. *Ortholitha limitata* Scop. (Shaded Broad-bar). Common around cliffs and southern slopes inaccessible to sheep. In trap, earliest, 3/8/55; latest, 4/9/61, most, 8 in 1967, 6 in 1955, '56. Several specimens of *O. limitata* were seen on Heisheir on 28/7/70.
 173. *Anaitis plagiata* L. (Treble-Bar). Common, in similar situations to *O. limitata*. In trap earliest, 2/7/63; latest, 13/9/67; most, 37 in 1969; 29 in 1966.
 174. *Carsia paludata* Thunb. (Manchester Treble-Bar). Two only, in good condition, 10/8/56, 11/8/63.
 175. *Lobophora polycommata* Hübn. (Barred Tooth-striped). One specimen, in trap on 6/5/69. Identified by Mr E. C. Pelham-Clinton.
 176. *L. carpinata* Borkh. (Early Tooth-Striped). A comparatively newcomer, probably owing to the planting of birches and alders since 1949. The first occurred in the trap on 19/4/64, and was later identified for me by Mr E. C. Pelham-Clinton. No more were taken until the spring of 1969, when the moth turned up several times, first on 25th April, then on the 29th. Specimens were also taken on the 5th and 6th of May. Most of these are of form *fasciata* Prout.

177. *Cheimatobia brumata* L. (Winter Moth). Common in gardens. On calm nights in December and January, particularly the former, the males are often seen at lighted windows. I have seen these moths at them when there was snow on the ground. The trap is very seldom used at this time of the year, but an early record is 21/11/66.
178. *Eustroma silaceata* Hüb. (Small Phoenix). First in trap on 2/6/68; another on 16/8/69. Probably a consequence of the introduction of willow-herb here.
179. *Lygris testata* L. (The Chevron). Common in the same kind of places as *O. limitata* and *A. plagiata*. In the trap, earliest, 28/7/68; latest, 24/9/67; most, 99 in 1955; 40 in 1969.
180. *L. populata* L. (Northern Spinach). Occurs in similar places to *L. testata*, but not so common. Few taken in trap; earliest, 26/7/55; latest, 27/8/64. On 27/7/68 a smallish specimen with the central bar much reduced, approaching the next species in appearance, was taken, later identified as *populata* by Mr A. L. Goodson, at Tring.
181. *C. fulvata* Forst. (Barred Yellow). Seen and taken in gardens and plantations. Few in trap; earliest, 25/7/52; latest, 27/8/64.
182. *Cidaria truncata* Hufn. (Common Marbled Carpet). Common. Double brooded. Of the three forms shown on plate 13 of *Moths* by E. B. Ford. No. 14, *nigerrimata*, the dark form, is considerably the commonest; *perfumata* the grey form, seems to occur mainly in the autumn brood; *rufescens* with the orange central area on the forewings is rare.
- Earliest, 10/5/66; latest, 23/10/56; most, 188 in 1966; 94 in 1968. The form *concinata* Steph. is also here and has been confirmed by Mr R. J. Colins, but I have made no attempt to count the different forms separately.
183. *C. citrata* L. (= *immanata* Haw). (Dark Marbled Carpet). Common, variable, single brooded; earliest, 6/7/66, '68; latest, 28/9/67; most, 188 in 1969; 115 in 1966.
184. *C. siterata* Hufn. (Red-green Carpet). Occasionally found on veronica blossoms in the autumn; in the trap, earliest, 6/6/65; latest, 4/10/51, '68 (hibernates); Most in the trap, 22 in 1969; 5 in 1968.
185. *C. miata* L. (Autumn Green Carpet). Occurrence similar to that of *C. siterata*, but rather commoner. In the trap, earliest, 2/5/69; latest, 20/10/62; most, 12 in 1966; 8 in 1969.
186. *Thera obeliscata* Hüb. (Grey Pine Carpet). Common, double-brooded. Often found on blossoms of thyme, ragwort, or veronica in the autumn. In the trap, earliest, 3/5/57; latest, 20/10/58, '66; most, 49 in 1956; 19 in 1969. A dark specimen of this species has been identified by Mr D. S. Fletcher as var. *pseudovariata*.
187. *T. cognata* Thunb. (Chestnut-coloured Carpet). Found on cliffs and rocky places where creeping juniper grows. In the trap, earliest, 6/6/59; latest, 13/10/64; most, 26 in 1968; 21 in 1969.
188. *T. firmata* Hüb. (Pine Carpet). First taken in the trap on 26/8/55; earliest, 2/8/66; latest, 24/9/61; most, 5 in 1965 and '66. Also noticed around the pine plantation below Compass Hill.
189. *T. juniperata* L. (Juniper Carpet). A specimen was taken at a lighted window on 18/9/69.

190. *Coremia munitata* Hübn. (Red Carpet). Two specimens, one taken in the trap on 16/7/68.
191. *C. spadicearia* Schiff. (Red Twin-spot Carpet). Two specimens. Separated from the following by Mr E. C. Pelham-Clinton.
192. *C. ferrugata* Clerck. (Dark Twin-spot Carpet). Four specimens. Of these two, the first was caught in the trap in 1955 and the last in 1964. Earliest, 6/6/63; latest, 22/8/55.
193. *C. designata* Rott. (Flame Carpet). Found in plantations. In trap, earliest, 3/5/57; latest, 7/9/56; most, 8 in 1968; 7 in 1966. Double-brooded.
194. *Amoeba viridaria* Fabr. (Green Carpet). Quite frequent in mixed plantations, but not taken in the trap until 18/7/56, and thereafter only singly in the years 1963-67. Earliest, 30/6/66; latest, 31/7/63.
195. *Malenydris salicata* Hübn. (Striped Twin-spot Carpet). Only taken three times in the trap, 7/8/57, 24/8/60, and 16/8/69.
196. *M. multistrigaria* Haw. (Mottled Grey). The earliest spring geometer, apart from *P. pendaria*, and liable to be missed if March weather is unfavourable for use of the trap. Earliest, 13/3/56; latest, 8/4/69; most, 23 in 1969; 16 in 1960.
197. *M. didymata* L. (Twin-spot Carpet). Common on the cliffs and sand-hills, especially in places and with weather when midges are plentiful. Rare in the trap; singly, 18/8/56, 2/9/65. Very common in plantations and sheltered grassy places in August 1969, when several were taken in the trap on calm nights.
198. *Venusia cambrica* Curt. (Welsh wave). Two only, in trap, 23/7/65, 16/8/65.
199. *Entephria caesiata* Lang. (Grey Mountain Carpet). One only, in trap in 16/7/56.
200. *E. flavicinctata* Hübn. (Yellow-ringed Carpet). One on a wall in my garden on 11/9/69; another in the same place on 16/9/69, and a third picked up dead in the porch of my house on 20/9/69. Identified as *ab. flavopriva* Scha. by Mr D. S. Fletcher.
201. *Xanthorhoe montanata* Bork. (Silver-ground Carpet). Common in plantations and on grassy slopes inaccessible to sheep, above the shore; in the trap, earliest, 30/5/64; latest, 8/8/66; most, 23 in 1968; 19 in 1966.
202. *X. fluctuata* L. (Garden Carpet). Common, double brooded, larvae sometimes a pest on cabbages. In trap, earliest, 13/4/67, latest, 22/9/66; most, 118 in 1968, 96 in 1966.
203. *X. galiata* Hübn. (Galium Carpet). Not common. Found on cliffs and sometimes around my house. First taken on 10/7/45, the G.U.C.E. record that took me longest to confirm. Nine specimens in all taken in trap, the first on 26/7/55. Earliest, 30/5/61; latest, 3/9/66; most, three in 1968.
204. *X. sociata* Borkh. (Common Carpet). Common around the plantations. The var. *obscurata*, which was frequent on Barra, is rare here. In trap, earliest, 5/5/69; latest 29/8/60. Double brooded in some years; most, 28 in 1968; 22 in 1969.
205. *Eulype hastata* L. (Argent and Sable). One only, in trap on 13/6/66.
206. *Mesoleuca albicillata* L. (Beautiful Carpet). Occasionally seen in gardens and plantations; a surprise when first observed. Two on 9/6/45; taken earlier. In the trap only on 15/7/51, 25/6/53, and

- 13/7/53. I have not noticed this moth here for a considerable time.
207. *M. ocellata* L. (Purple Bar). Quite common in mixed plantations. In the trap, earliest, 29/6/53; latest, 1/9/58; most, 8 in 1963 and 1969.
208. *Perizoma affinitata* Steph. (Rivulet). Fairly common around plantations. In the trap, earliest, 17/5/59; latest, 27/8/64; most, 19 in 1968, 13 in 1966.
209. *P. alchemillata* L. (Small Rivulet). Commoner than the preceding in similar places. In trap, earliest, 21/6/66; latest, 23/8/67; most, 63 in 1968; 52 in 1969.
210. *P. flavofasciata* Thunb. (Sandy Carpet). Occasionally around plantations. Not taken in the trap until 27/5/64, thereafter only on 2/6/65, 2/6/68, 16/6/68, and 19/6/69.
211. *P. albulata* Schiff. (Grass Rivulet). On sandhills and cliffs, not often in the trap. Earliest, 8/5/53; latest, 21/7/55 (a record for 12/10/62 must be considered doubtful).
212. *Camptogramma bilineata* L. (Yellow Shell). Common, especially in places not grazed by sheep, but very seldom taken in the trap, of four specimens taken in the trap over the years, the earliest was 11/8/64, the latest 4/10/61; but the moth is out in the last week of June. I do not find that dark forms predominate.
213. *Hydriomena furcata* Thunb. (July Highflier). Common in the plantations. Earliest, 12/7/56; latest, 27/9/66; most 28 in 1966; 19 in 1955.
214. *H. impluviata* Hübn. (May Highflier). Also common in the plantations. In the trap, earliest, 8/5/53; latest, 26/7/55; most 14 in 1964, 12 in 1952.
215. *Anticlea badiata* Hübn. (Shoulder Stripe). Larvae found on wild rose in August. Moth seen in the spring, sometimes at lighted windows. In the trap, earliest, 13/4/68; latest, 30/5/56; most, 10 in 1969; 4 in 1966.
216. *A. nigrofasciaria* Göze. (The Streamer). Less often seen than the preceding. First taken on a tree in the wood behind my house on 14/5/52. Only twice in the trap, on 9/5/53 and 21/5/69. [*Eupithecia* sp. In view of the difficulty in distinguishing between many of the species of this genus, and of the impossibility of setting all the specimens caught in the trap, I give statistics only in the cases of the easily recognisable ones].
217. *Eupithecia oblongata* Thunb. (Lime Speck). Often seen in garden, also found at ragwort blossoms. In the trap, earliest, 26/6/63; latest, 26/8/66; most, 8 in 1956, 4 in 1968.
218. *E. pulchellata* Steph. (Foxglove Pug). Found in plantations and garden where there are foxgloves. In the trap, earliest, 6/6/64; latest, 15/7/56; most, eight in 1956.
219. *E. venosata* Fabr. (Netted Pug). On cliffs. Only four specimens in the trap, first on 28/5/59. Earliest in trap, 28/5/59; latest, 21/6/64.
220. *E. distinctaria constrictata* Guen. (Thyme Pug). Caught in the trap in 1966 and identified by Mr D. S. Fletcher. Also taken at Garrisdale at the west end of Canna.
221. *E. assimolata* Doubl. (Current Pug). Two specimens, identified by Mr E. C. Pelham-Clinton.

222. *E. absinthiata* Clerck. (Wormwood Pug). In plantations. Confirmed by Mr R. J. Collins and Mr D. S. Fletcher. The few moth trap records are dated 7/8/56, 7/8/61 (two), 21/7/65.
223. *E. goosensiata* Mab. (Ling Pug). On moorland. Confirmed by Mr R. J. Collins. No certain trap record.
224. *E. vulgata* Haw. (Common Pug). Common in the garden and plantations. In trap, earliest, 22/5/61; latest, 14/7/68; most, 10 in 1966.
225. *E. virgaureata* Doubl. (Golden-rod Pug). Identified by Mr D. S. Fletcher; taken on trap in 1966.
226. *E. lariciata* Freyer. (Larch Pug). First taken in trap in 1954, identified by Mr W. H. T. Tams. This moth has become much commoner in recent years with the growth of the new plantation on the brae east of Canna House, the majority of trees there being Japanese larches. Most in the trap, 11 in 1966, when the moth first appeared on 15th July and last on 20th August. Confirmed by Mr D. S. Fletcher.
227. *E. castigata* Hübn. (Grey Pug). Identified by Mr D. S. Fletcher from a few specimens taken in the trap in 1966 and subsequently. Others taken in 1969 identified by Mr E. C. Pelham-Clinton. Much commoner in recent years.
228. *E. satyrata* Hübn. (Satyr Pug). Found in the plantations. Confirmed by Mr R. J. Collins. Occasionally in the trap. Also confirmed by Mr D. S. Fletcher in 1966, who identified a specimen of subsp. *callunaria* Dbedy., the same year (not typical here).
229. *E. innotata* subsp. *fraxinata* Crewe. (Ash Pug). Associated with ash trees in my garden and in the plantations. Confirmed by Mr D. S. Fletcher. Occasionally in the trap, earliest 17/5/59, latest, 21/7/65.
230. *E. nanata* Hübn. (Narrow-winged Pug). Common, widespread. In the trap, earliest, 3/5/57; latest, 29/7/64; most, 8 in 1968, 6 in 1966.
231. *E. sobrinata* Hübn. (Juniper Pug). Associated with the creeping juniper that grows on the cliffs here. In trap, earliest 31/5/68; latest, 23/8/67; Most, three in 1964 and 1966.
232. *Gymnoscelis pumilata* Hübn. (Double-striped Pug). A specimen was taken in the trap on 11/8/52, identity later confirmed by Mr D. S. Fletcher. This remains the only certain record.
233. *Chloroclystis rectangulata* L. (Green Pug). Common. In the trap, earliest, 21/6/64; latest, 31/8/57; most, 26 in 1968, 19 in 1966.
234. *Coenocalpe vittata* Borkh. (Oblique Carpet). Only three records. One taken in Tighard wood on 17/7/45, identity confirmed by Mr R. J. Collins. Otherwise only two in trap, 30/7/55 and 23/7/57.
235. *Phibalapteryx lapidata* Hübn. (Slender-striped Rufous). One only, in trap on 8/10/56.
236. *Percnoptilota fluviata* Hübn. (The Gem). Three only, one in trap on 22/9/66, two (male and female) on 20/10/69.
237. *Abraxas grossulariata* L. (Magpie). Common in gardens, but not found on moors here. (The small burns lined with heather and sallow, where it is found in South Uist and Barra, hardly exist on Canna). In the trap, earliest, 25/6/53, '59; latest, 25/9/66; most, 21 in 1968, 19 in 1966.
238. *Lomaspilis marginata* L. (Clouded Border). One only, in trap, 30/5/69.
239. *Cabera pusaria* L. (Common White Wave). Common in plantations, sometimes found on the moorland. In the trap, earliest, 23/5/51; latest,

- 11/8/65; most, 23 in 1968, 14 in 1966.
240. *C. exanthemata* Scop. (Common Wave). Two, in trap on 23/6/66 and 26/6/69. Confirmed by Mr E. C. Pelham-Clinton.
241. *Ellopija prosapiaria* L. (Barred Red). A newcomer, apparently now settled in the pine plantations. First taken, in the trap, on 2/8/66. Two more specimens were taken in 1966, one in 1967, five in 1968, and two in 1969. Earliest, 2/7/68; latest, 23/8/67.
242. *Metrocampa margaritaria* L. (Light Emerald). Common in plantations. On the trap, earliest, 24/4/56; latest, 22/8/63; most, 46 in 1968; 16 in 1969.
243. *Selenia bilunaria* Esp. (Early Thorn). First taken in the trap on 17/5/52, and occasionally since. Earliest, 25/4/65; latest, 17/6/66; most, 6 in 1969; 5 in 1968.
244. *S. lunaria* Hufn. (Lunar Thorn). Rare. First taken, in trap, on 30/5/64. Earliest, 26/5/65; latest, 30/5/68; most, three in 1968. (Confirmed by Mr E. C. Pelham-Clinton).
245. *Gonodontis bidentata* Clerck. (Scalloped Hazel). Occasionally found around plantations in May; in the trap, earliest, 8/5/53; latest, 18/6/66; most, 7 in 1966, 6 in 1964.
246. *Himera pennaria* L. (Feathered Thorn). At lighted window, Canna House, on 27/10/51. In trap, 12/10/64, 3/10/66 (two), and 19/10/69. A specimen was taken by the head lighthouse keeper at Heiskeir in 1949.
247. *Crocallis elinguaris* L. (Scalloped Oak). First taken, in trap, on 30/7/55; not again until 1/8/63 (two specimens). Two more so taken in 1965, and one in 1967. Earliest, 30/7/55; latest, 28/8/67. One in 1969, on 1st August.
248. *Opisthograptis luteolata* L. (Brimstone). Common; double brooded. In the trap, earliest, 10/5/66; latest, 18/9/66; most, 63 in 1968, 60 in 1966. Larvae have been found on alders.
249. *Semiothisa notata* L. (Peacock Moth). First taken, in trap, on 17/5/59. Others on 9/6/63, and 28/5/68. (Originally wrongly reported as *S. alternata*.)
250. *Hybernia aurantiaria* Esp. (Scarce Umber). One only, at lighted window in the winter of 1953-54. Confirmed by Mr D. S. Fletcher.
251. *H. marginaria* Borkh. (Dotted Border). One only, the same winter. Confirmed by Mr D. S. Fletcher.
252. *H. defoliaria* Clerck. (Mottled Umber). First noticed at lighted windows in the late autumn of 1951. Has become decidedly commoner in recent years. Very variable, some handsome strongly marked forms taken. In the trap, earliest, 3/10/64; latest, 29/1/69, but trap is not often on in winter. (Males only). Most, 19 in winter of 1966-67; 17 in winter of 1968-69.
253. *Phigalia pedaria* Fabr. (Pale Brindled Beauty). Males at lighted windows in January and February. The first specimen taken was captured in the moth trap on 1/3/52. In trap, earliest, 1/12/55; latest, 1/4/69; most, 10 in 1956 (January and February).
254. *Nyssia zonaria* Schiff. (Belted Beauty). Common. Under suitable conditions always appears in the trap during the last week or ten days of March. Earliest, 21/3/63; latest, 18/5/64; most, 128 in 1965, 74 in 1969. Larvae common, have been seen feeding on iris and wild cherry.

255. *Pachys betularia* L. (Peppered Moth). First taken on Sanday, sitting on a rock, on 7/6/58. Later in the trap on 15/5/59, 3/5/61, 29/5/64 and 2/6/67. All typical specimens.
256. *B. repandata* L. (Mottled Beauty). Very common, found everywhere. In the trap, earliest, 9/6/52; latest, 2/9/63; most, 135 in 1968, 85 in 1966. Var. *conversaria* was caught for the first time on 16/7/66, another on 30/7/66.
257. *Gnophos obscurata* Schiff. (The Annulet). On south facing cliffs and steep slopes. Not caught in the trap until 20/7/55. Earliest, 17/7/56, '65; latest, 9/9/66; most, 5 in 1969; 4 in 1966.
258. *G. myrtillata* Thunb. (Scots Annulet). Commoner than *G. obscurata*. On the moor. In the trap, earliest, 29/6/53; latest, 9/9/56; most, 17 in 1956, 16 in 1955, '68, '69.
259. *Ematurga a'omaria* L. (Common Heath). On the moorland in May. Day flier, only two taken in the trap, on 16th and 17th May 1959.
260. *Selidosema ericetaria* de Vill. (Bordered Grey). Day flier, on the moor and on southern cliffs; only once taken in the trap, a very worn male on 14/8/69.
261. *Lozogramma petraria* Hübn. (Brown Silver-line). Often to be found amongst bracken in early summer. In the trap, earliest, 16/4/53; latest, 26/6/63; most, 37 in 1959; 28 in 1953.
262. *Scodiona fagara* Thunb. (Grey Scalloped Bar) Rare. I have only one Canna specimen, taken on the moor behind Lamasgorr, 3/6/45. Never in trap, day flier.

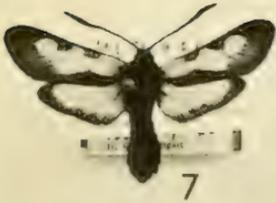
ZYGAENIDAE

263. *Zygaena purpuralis*, Brun. (Transparent Burnet). First found on an inaccessible steep grassy cliff on Sanday by Dr Michael Harper in 1957. Another colony was found in an even more inaccessible situation near the south-west end of Canna, to be reached only by sea, by the Rev. Malcolm MacLellan and myself on 13/7/63. Both these places are inaccessible to sheep. Specimens from the second colony are sometimes very dark. One of these has been presented to the Tring Museum.
264. *Z. filipendulae* L. (Six-Spot Burnet). Widespread, occurring mixed with *Z. purpuralis* in these colonies, and scattered elsewhere, especially on Sanday. Specimens found on the Sanday *purpuralis* colony ground sometimes approach *ab. cytisi* Hübn., the pairs of spots running together. Burnets, being day fliers, are never found in the trap.

HEPIALIDAE

265. *Hepialus humuli* L. (Ghost Moth). Often common in the garden. In the trap earliest, 14/6/67; latest, 27/7/65; most, 13 in 1953, 8 in 1966. *H. humuli*'s first appearance in the trap are fairly punctual, having all taken place between June 14th and 26th, in nine years between June 22nd and 26th.
266. *H. sylvina* L. (Orange Swift). Associated with bracken. This species has not much in evidence lately; only two specimens taken in the trap since 1956, on 16/8/65 and 31/7/69. Earliest, 16/6/55; latest, 7/8/52; most, three in 1952.
267. *H. fusconebulosa* de Geer (Map-winged Swift). Common, associated with bracken. In the trap earliest, 2/6/54; latest, 14/8/69; most, 32 in 1953; 26 in 1968. A specimen of var. *gallicus* Lederer was taken in the trap on 24/6/69.

PLATE II



On *Zygaena (Mesembrynus*)graslini* Lederer near Tel Aviv in Israel (Lepidoptera, Zygaenidae)

By HUGO REISS and GÜNTHER REISS, Stuttgart

In the year 1932 Hugo Reiss (1932) wrote on *Zygaena graslini* Lederer and its range in Syria, Mesopotamia and Asia Minor, and figured the nominate race from Beirut, Lebanon. The ssp. *pfeifferi* Reiss from Bscharre, Lebanon, 1600-1850m, 15-30.vi.1931, leg. E. Pfeiffer & H. Kulzer, Munich, the ssp. *kulzeri* Reiss from Zebdani, Anti Lebanon, 1100m, 29.iv.-17.v.1931, leg. H. Kulzer, Munich, and the ssp. *rebeli* Reiss from the Yüksesk Dagh, Amanus Mts., beginning to the middle of April, 1932, leg. native collectors, were also described and figured. Paratypes of all the above mentioned races are in coll. Reiss and have been compared with the new subspecies described below. As the name *rebeli* Reiss is preoccupied, it was replaced by *rebeliana* Reiss & Tremewan (1964). *Z. graslini* was placed in the subgenus *Zygaena* Fabricius by Reiss (1933) and Reiss & Tremewan (1967).

We acquired from Mr Heinz Czipka, Fürth, Odenwald, 3♂♂, 2♀♀ of a *graslini* race, labelled Israel, Nir Elijahu Kibbutz, 100m, 25.iii.-9.iv.1969, leg. Czipka. The locality lies near Tel Aviv. From the same locality and with the same data Mr Czipka sent us a further 26♂♂, 3♀♀, so that we have a total of 29♂♂, 5♀♀ before us. The low elevation of the biotope is rather significant when compared with the early flight period.

The wingspan is as follows: ♂♂, 23-30 mm, ♀♀, 26-28.5 mm. In the males the antennae are more heavily clubbed than in the females. The body is blue-black, lightly haired. The legs are likewise blue-black, the femur lightly haired, the tibia in part dirty yellow. The middle spurs on the hind tibia are absent. In fresh specimens the red coloration of the forewing spots is somewhat more fiery and warmer than in the described races. An essential characteristic is the distinct enlargement of the forewing spots, especially the middle spots 3 and 4, which in 21♂♂, 5♀♀, are

EXPLANATION OF PLATE

- Fig. 1. *Zygaena graslini czipkai* ssp. nov., Holotype ♂, wingspan 27 mm.
 Fig. 2. *Z. graslini czipkai* ssp. nov., Allotype ♀, wingspan 28.5 mm.
 Fig. 3. *Z. graslini czipkai* ssp. nov., Paratype ♂, wingspan 28 mm.
 Fig. 4. *Z. occitanica albarracinensis* Reiss & Reiss, Holotype ♂, wingspan 25 mm.
 Fig. 5. *Z. occitanica albarracinensis* Reiss & Reiss, Allotype ♀, wingspan 31 mm.
 Fig. 6. *Z. occitanica albarracinensis* Reiss & Reiss, Paratype ♂, wingspan 25 mm.
 Fig. 7. *Z. trifolii mideltica* Reiss & Reiss, Holotype ♂, wingspan 29 mm.
 Fig. 8. *Z. trifolii mideltica* Reiss & Reiss, Allotype ♀, wingspan 30 mm.
 Fig. 9. *Z. trifolii mideltica* Reiss & Reiss, Paratype ♂, wingspan 28.5 mm.
 Fig. 10. *Z. trifolii mideltica* Reiss & Reiss, Paratype ♀, wingspan 32 mm.

N.B.—Dr Günther Reiss and his wife found a few specimens of *Z. occitanica albarracinensis* Reiss & Reiss in the type locality in 1970.

**Zygaena problematica* Naumann (1966), described from Namrun, Cilician Taurus, Turkey, was placed next to *Z. graslini* Lederer. Alberti (1958) placed *graslini* in the subgenus *Mesembrynus* Hübner. More recently, Naumann (1970) has reared the larva on *Eryngium planum* and also placed the species in this subgenus.

broadly confluent and cover a much larger area of the forewing. There are no specimens in which spots 3 and 4 are separated by the blue-black ground colour. Also the confluent spots 1 and 2 tend to be confluent with spots 3 and 4; in 8♂♂, 3♀♀ spot 1 is extended along the costa as far as spot 3, with which it is joined, while spot 2 in 7♂♂, 1♀ is broadened towards the inner margin, forming spot 2a. Spot 5 is generally larger and nearer to the confluent spots 3 and 4. Spot 6 is present in all specimens, extends towards the termen, and is confluent with spot 5. The ab. *confluens* Oberthür, with spots 1, 2, 3 and 4 broadly confluent, is represented by 2♂♂, 1♀. This form was first described by Oberthür, not Dziurzynski, from Akbès, Syria, the type-specimen being figured by Tremewan (1961). On the somewhat matter underside of the forewings, the spots generally form a strong red suffusion. The red of the hindwings is somewhat less fiery than that in the forewing spots. In 5♂♂, 1♀, the hindwings have a narrow but distinct blue-black border, especially at the apex; in the remaining specimens the hindwing border is absent. The fringes are blue-black.

This race is named after Mr H. Czipka: *czipkai* ssp. nov. The holotype and allotype ♀ with the above quoted data in coll. Reiss; paratypes with the same data in coll. Czipka and coll. Reiss.

The ♂, labelled Haifa, coll. Pietsch, in coll. Reiss, that was recorded in 1932 (Reiss, 1932) has similar enlarged forewing spots and appears to be referable to *czipkai* ssp. nov.

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Butterflies in the New Forest in 1970

By Rear Admiral A. D. TORLESSE, C.B., D.S.O., R.N.

The cold weather of early March continued with little intermission until the end of April, and spring came late. But thereafter there was little or no frost and, coming as it did after the rather favourable butterfly season of 1969, this probably accounted for the relatively good showing of our native butterflies in the New Forest and elsewhere in England later in the Year.

The first Brimstone (*Gonepteryx rhamni* Linn.) appeared in my garden at Sway on 26th March, but thereafter butterflies were conspicuous by their absence until the end of April when the Brimstones appeared in numbers, with an occasional Green-veined White (*Pieris napi* Linn.), Peacock (*Nymphalis io* Linn.) and Small Tortoiseshell (*Aglais urticae* Linn.). On 5th May the first Holly Blue (*Celastrina argiolus* Linn.) appeared; this butterfly was noticed occasionally here and there in the Forest till late May, but contrary to normal experience the second brood, though short in duration, proved to be much more numerous than the first. The Brimstone was plentiful, following a very good emergence the previous summer, and was seen on the wing as late as 28th June.

The Pearl-bordered Fritillary (*Argynnis euphrosyne* Linn.) was first noticed on 18th May, but was not fully out until some ten days later. It was noticeably more numerous in the Forest than for some years past, but another May butterfly, the Duke of Burgundy (*Hamearis lucina* Linn.) did not reappear in some of its old haunts in the southern half of the New Forest, from which it has been absent for several years at least. The Small Pearl-bordered Fritillary (*Argynnis selene* Linn.) was not seen until 30th June and seemed to be far less numerous than *A. euphrosyne*. Even in such a favourable year both butterflies were much less plentiful in the New Forest than formerly.

The White Admiral (*Limenitis camilla* Linn.), first noticed on 29th June, was well up in numbers compared with 1969. The Silver-washed Fritillary (*Argynnis paphia* Linn.), well out by mid July, was also more numerous than for several years past, but again this year the High Brown Fritillary (*Argynnis cydippe* Linn.), once so plentiful in the New Forest, was very scarce indeed. Two reports of the Purple Emperor (*Apature iris* Linn.) having been seen in the Forest reached me, but neither could be confirmed and one was almost certainly a case of mistaken identity.

Generally, it was a good year for most of our common native species. The Speckled Wood (*Pararge aegeria* Linn.) appeared in fair numbers throughout the summer, though it never reached the extraordinary abundance of 1967. The Wall Brown (*Pararge megera* Linn.) was not much in evidence, but the Grayling (*Eumenis semele* Linn.) had a better year, while the Meadow Brown (*Maniola jurtina* Linn.), Hedge Brown (*M. tithonus* L.), Ringlet (*Aphantopus hyperanthus* L.), Small Heath (*Caenonympha pamphilus* Linn.) and Silver-studded Blue (*Plebejus argus* Linn.) were all in plenty, the Meadow Brown having an unusually long season and almost certainly a second brood. But the Small Copper (*Lycaena phleas* Linn.) remained relatively scarce, and little was seen of the Green-Hairstreak (*Callophrys rubi* Linn.).

The second brood of the Holly Blue was a welcome surprise; though never appearing in large numbers the butterfly was noticeable all over the

Forest for a short period in late July and early August, when a splendid emergence of Brimstones and Peacocks and rather smaller numbers of Small Tortoiseshells occurred, and the Purple Hairstreak (*Thecla quercus* Linn.) was in more than usual numbers. The Common Blue (*Polyommatus icarus* Rott.), so scarce in many parts of the country for some years past, appeared sparingly in the Forest in August this year, and was seen in abundance on a West Hampshire down in late August, flying together with large number of Chalk Hill (*Lysandra coridon* Poda) and Adonis (*L. bellargus* Rott.) Blues, the Brown Argus (*Aricia agestis* Schiff.) and some belated Dark Green Fritillaries (*Argynnis aglaia* Linn.), a sight to gladden any butterfly lover's heart.

Although in some respects a rather notable year for our native species, it was certainly not so for the immigrants, the Clouded Yellow, Painted Lady and Red Admiral being all relatively scarce in this neighbourhood. But even in such a favourable year for the natives there was no sign of the more spectacular New Forest butterflies, notably the four species of Fritillary formerly so abundant, reappearing in their former numbers, and it is reasonable to ask why. The most noticeable change that has taken place in the Forest, apart from the much more widespread planting of conifers, is the absence of the bramble from the rides in the inclosures, and the general scarcity in these rides of flowering plants, in particular of the Dog Violet, the foodplant of all four fritillaries. Spraying of the ride verges with a brushwood inhibitor has certainly been carried out in many of the inclosures, to what extent and with what frequency is not known. It is also fairly certain that over-grazing to an ever-increasing extent since the last war by the greatly increased numbers of deer has been an important contributory cause of the scarcity within the inclosures both of the larval foodplant and of the bramble. Similarly, over-grazing outside the inclosures by the ever-increasing numbers of animals enjoying Commoners' grazing rights has contributed to the relative scarcity of some of the heathland species, which have also to compete with more frequent heather cutting and burning as well as with the trampling of the hordes of spring and summer campers.

Some Egg Laying and Larval Habits of *Papilio machaon* L. (The Swallowtail Butterfly)

By JOHN McFEELY

Early on 14th June 1970, I set out for the Norfolk Broads with the object of seeing, for the first time, the swallowtail in its natural English habitat. On arrival, disappointment appeared certain as a heavily clouded sky, supplemented by light rain and a constant north east wind was the order of the day. These conditions, quite unlike the glorious weather of the past few days, were to prevail until after my return in the late afternoon.

Even the hardiest butterflies would not venture out in these almost winter-like conditions, so, leaving the net in the boot of the car, I decided to try my luck looking for swallowtail ova. Searching a small and neglected-looking reed bed, one of several found near most of the broads, it did not take long before I found milk parsley (*Pseucedanum palustre*) growing in the reeds. Shortly afterwards I examined a large plant at the

edge of the reeds with several sprays growing outwards and clear of the surrounding vegetation. On one of these sprays I found the first of six ova as a result of the search on these plants, over the next hour. By this time certain factors had emerged regarding the site chosen for oviposition. It appears that the female selects those plants which afford direct and easy access. Close examination of many fine plants which did not enable an easy approach proved fruitless. One particularly fine specimen of milk parsley, several inches taller than myself and therefore over six feet high, had grown clear of the surrounding reeds, and was chosen for the site for two ova.

The dark colour of two of the ova indicated that they would shortly hatch. With a hand trowel I dug up several plants, and returning with these to the car, I noticed a small specimen of *Angelica sylvestris* growing in the short grass on the bank at the edge of the reed bed. Situated on this plant, within an area of less than two square inches, were four ova. I assumed that at least two females had visited this plant as two of these eggs were considerably smaller than the others. This difference in the size was most noticeable even without the aid of a lens.

In order to have the best chance of rearing fine specimens, I was prepared to make further journeys to the broads for foodplant, but in the event only one journey proved necessary. Milk parsley last very well when potted.

After two days, the first larva appeared, and within the next four days all had hatched. In the first, and for part of the second instars the larvae were kept in airtight tins with small cut sprays of milk parsley. Thereafter they were placed in a large breeding cage on growing plants.

On my first visit to the broads, I had noticed several other reed beds a little nearer home. Ten days after my first visit I returned to the previously noted reed beds, and in the few minutes of daylight still remaining, I quickly dug up several milk parsley plants. Examination of these plants revealed four small larvae of this butterfly. Having sufficient for my needs, these were replaced on foodplant in the reed beds. It would appear that 1970 has been a good year for this magnificent creature.

I placed the fresh foodplant already potted, in the breeding cage and left the occupants to themselves. Two hours later I returned to find that several of the larger larvae had transferred to the "new" foodplant, from which they had taken large bites from some of the stems, resulting in the partial collapse of the affected stems. Some too, on attempting to eat the fresh foodplant would immediately wipe their jaws on any nearby surface in an almost frantic attempt to remove the sap from which the plant gets its name. At first these observations seemed to suggest rejection of the fresh foodplant. I then noticed a smaller individual crawl on to the fresh plants and I prepared to watch its every move. Sure enough, immediately after his taking the first bite there followed the frantic jaw wiping behaviour. At this time I also noticed that some of the others were now heartily feeding on the fresh plants.

After ten minutes apparent rest, the individual being watched crawled a few inches down the stalk of the leaf from which it had attempted to eat, to a point where the stalk joined the main stem, at which, just below the join, it made three or four incisions with its jaws. After a few minutes without further movement, it then returned to the leaf from which it had first attempted to eat. Almost immediately it recommenced feeding, only

this time the sap was no longer a problem. The whole process lasted about twenty minutes.

It is a feature of the milk parsley that when a leaf, or, to a lesser extent, a stem is punctured there exudes a blob of tacky milk-like sap which gradually hardens on exposure to the air. The larvae appear not to tolerate this, and make incisions slightly lower down on the plant, which presumably reduce the pressure of the sap to a level which enables the larvae to feed unhindered.

This behaviour continued until the larvae were fully fed although the sap does not seem to trouble the larger larvae to any great extent.

The resultant imagines are the finest marked, and on average the largest I have ever seen. On the whole, I think the little extra effort (and petrol) involved in ensuring a healthy supply of growing milk parsley well worth while.

As a sequel to the above, my fiancee, whilst on holiday with me at Seefeld in Austria, found a second instar larva of this butterfly on wild carrot (*Daucus carota*). On arrival back home, it was placed on milk parsley and exhibited, to a much more marked degree, the same behaviour as observed with the English individuals, which by this time had all pupated, following approximately three weeks in the larval state.

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Notes on the Indian Species of the Genus *Paralabis* Burr (Dermaptera : Carcinophoridae)

By G. K. SRIVASTAVA, Calcutta

INTRODUCTION

Burr (1915) erected the genus *Paralabis* for the reception of the following species:—*Nannopygia dohrni* Kirby, 1891; *Anisolabis greeni* Burr, 1899; *Anisolabis pervicina* Burr, 1913 with *Anisolabis owenii* Burr, 1911 as the type species of Srivastava (1969) has established the genus *Aborolabis* with *A. pervicina* as its type.

While studying the members of the family Carcinophoridae from India I have come across two more species of the genus *Paralabis* viz., *Paralabis aborensis* (Burr, 1913) and *Paralabis montshadskii* Bey-Bienko, 1959. On the basis of the shape of parameres, *Psalis lefrovi* Burr, 1910, is also placed under this genus, thus bringing the total to five species from India. Specimens of all the five species, present in the collections of the Zoological Survey of India, Calcutta, have been examined.

In the present paper I have made an attempt to redefine the status of the genus and the species. Brief notes to the species are also given.

DIAGNOSTIC CHARACTERS OF THE GENUS *Paralabis* BURR

Male: Head triangular, longer than broad, sutures faint or obsolete; eyes black or sometimes whitish. Antennae 17 to 19-segmented, dark brown to blackish brown, sometimes a few apical segments whitish, 1st long and conical; 2nd small; 3rd long and cylindrical, slightly longer than 4th and almost equal to 5th; 4th conical or cylindrical; 5th and 6th cylindrical and rest gradually increasing in length. Pronotum quadrat. longer than broad, hind margin rounded, gently widened pos-

teriorly, sides straight. Elytra abbreviated or perfect, sometimes totally absent. Legs unicolorous, often banded with black. Abdomen smooth or punctate, narrowed anteriorly, sides of 6th to 9th abdominal segments obtuse or acute, smooth or punctate, carinate or ecarinate. Ultimate tergite usually transverse, often longitudinal fold on sides present, median suture faint or distinct. Penultimate sternite triangular with posterior margin rounded, obtuse or acute; manubrium longer than the sternite with apex dilated. Forceps usually slightly asymmetrical, trigonal near the base, curved at apices, inner margin finely crenulate or smooth. Genitalia (figs. C and F) typical of the family with parameres about as long as broad, broader at base or middle, narrowed towards apex, tip rounded, external margin regularly convex and inner margin generally concave; distal lobes unarmed or variously armed.

Female: Similar to males except the weakly transverse ultimate tergite, narrowed apically; forceps simple and straight.

Distribution.—Ethiopian and Oriental Regions.

KEY TO THE INDIAN SPECIES OF THE GENUS *Paralabis* BURR

1. (2). Penultimate sternite with posterior margin emarginate
P. montshadskii Bey-Bienko
2. (1). Penultimate sternite with posterior margin rounded or obtuse
3. (4). Distal lobes unarmed *P. greeni* (Burr)
4. (3). Distal lobes variously armed
5. (6). Distal lobes armed with a pair of chitinous, denticulate rods apically *P. aborensis* (Burr)
6. (5). Distal lobes armed with minute chitinous teeth apically
7. (8). Elytra with posterior margin truncate *P. dohrni* (Kirby)
8. (7). Elytra with posterior margin very slightly obliquely truncate.....
P. lefroyi (Burr) comb. nov.

SYSTEMATIC ACCOUNT

Paralabis dohrni (Kirby)

Labidura femoralis Dubrony (nec Dohrn), 1879. *Ann. Mus. Stor. nat. Genova*, **14**, p. 352.

Nannopygia dohrni Kirby, 1891. *J. Linn. Soc. (Zool.)*, **23**, p. 508 (♀; Ceylon).

Carcinophora caeruleipennis Bormans, 1900. *Das Tierreich*, **11**, p. 40.

Carcinophora dohrni: Burr, 1902. *J. Bombay nat. Hist. Soc.*, **14**, p. 328, pl. B, fig. 20 (♂, ♀; Description).

Psalis dohrni: Burr, 1910. *Fauna Brit. India, Dermaptera*, p. 76, pl. 3, fig. 19.

Paralabis dohrni: Burr, 1915. *J. R. micr. Soc. Lond.*, p. 540, pl. 12, fig. 1 (Genitalia).

General colour reddish to blackish brown, pronotum yellowish on sides, femora banded with black. Pronotum longer than broad, gently widened posteriorly, sides straight, hind margin rounded, median longitudinal suture faint. Elytra smooth, shining, black or reddish with posterior margin truncate. Wings generally absent, rarely present. Abdomen gently widened posteriorly, surface finely punctulate, sides of 6th to 9th abdominal segments in ♂ obtusely rounded. Ultimate tergite in ♂ transverse, on sides with a faint longitudinal fold. Penultimate sternite somewhat triangular with posterior margin rounded.

Length of body	♂	♀
(without forceps)	10-12 mm.	9.5-12.5 mm.
Length of forceps	2-2.5 mm.	1.9- 2.5 mm.

Distribution. — India: Andhra Pradesh, Assam, Kerala and Maharashtra. Ceylon.

Paralabis greeni (Burr)

Anisolabis greeni Burr, 1899. *Ann. Mag. nat. Hist.*, (7) 4, p. 257 (♂, ♀; Punduloya, Ceylon).

Borellia greeni: Burr, 1910. *Fauna Brit. India, Dermaptera*, p. 87.

Euborellia greeni: Burr, 1911. *Genera Insect.*, 122, p. 30.

Paralabis greeni: Burr, 1915. *J. R. micr. Soc., Lond.*, p. 540, pl. 12, fig. 2 (Genitalia).

General colour varies from dark brown to blackish brown, often legs brick red. A very distinct species in having the head, pro- and mesonotum, elytra and dorsal surface of abdomen punctate. Penultimate sternite triangular with posterior margin obtuse. Forceps in ♂ weakly asymmetrical, subcontiguous at base, inner margin with a faint tooth at about middle or nearer to the base.

Length of body	♂	♀
(without forceps)	11.5-23.5 mm.	16.4-18.24 mm.
Length of forceps	2-3 mm.	3.2- 3.42 mm.

Distribution.—India: Madras and Mysore. Ceylon.

Paralabis lefroyi (Burr) comb. nov.

Anisolabis brunneri? Burr (nec Dohrn), 1906. *J. Asiat. Soc. Beng.* (N.S.), 2, No. 9, p. 389.

Psalis lefroyi Burr, 1910. *Fauna Brit. India, Dermaptera*, p. 77, pl. 3, fig. 20 (♂, ♀; Bombay: Mahim "feeding on plantain roots"; Pusa, Bengal).

Eurborellia lefroyi: Kapoor, 1967, *Agra Univ. J. Res. (Sci.)*, 16 (1), p. 11 (comb. nov.).

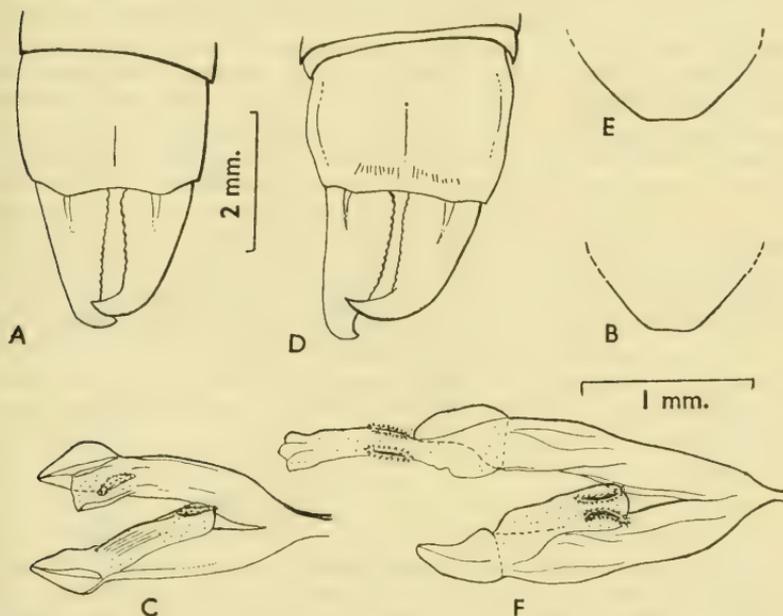
There are 3 ♂♂ before me (India, Madhya Pradesh, Shahdol Dist., 1 ♂, Amarkantak, 14.v.1962, *S. Chakrapani* coll.; 1 ♂, left bank of Narbada between Kund and Kapildhara, 22.v.1965; 1 ♂, Doodh Dhara, 2nd waterfall of Narbada River, Amarkantak, 9.v.1962, *P. Singh* coll.) which I am referring to this species as these are agreeing well with the original description and illustration (pl. 3, fig. 20) of Burr (1910) except the ultimate tergite which is strongly transverse, not narrowed posteriorly and forceps curved at apices.

It will be worthwhile to mention here that although the legend to Burr's said figure reads as '♂' the shape of ultimate tergite and forceps suggest it may be a ♀. With these points I wrote to Mr John Huxley to kindly clear my doubt regarding the sex of the 'Type'. He has very kindly informed me that British Museum (Natural History), London, possesses two specimens, i.e., 1 ♀ and another probably a ♂ nymph, both these labelled as 'Bombay, Mahim, 22.ii.1904, on plantain roots' which should be best regarded as 'Syntypes' since none of these are identifiable as 'Types' either from the original description or labels. And probably the ♀ mentioned above has been figured by Burr (1910, pl. 3, fig. 20). Following is some more information regarding the said syntypic pair as supplied by him.

"1 ♀. Elytra present; wings absent; sides of abdominal terga ecarinate, finely punctulate as dorsal surface. Probably the specimen figured in

Fauna.

2. ? ♂ nymph. Elytra and wings totally absent. ♂ number of abdominal terga, ecarinate, sparsely punctulate at sides. No detectable genitalia, no manubrium."



Paralabis lefroyi (Burr): ♂, A. Ultimate tergite and forceps; B. Posterior margin of penultimate sternite; C. Genitalia. *Paralabis aborensis* (Burr): ♂, D. Ultimate tergite and forceps; E. Posterior margin of penultimate sternite; F. Genitalia. (A, B, D and E same scale and C and F same scale).

It has been clearly mentioned by Burr (1910, p. 78) that he has described the species from a single pair in poor condition, which is now deposited in the British Museum (Natural History) London, from the locality as mentioned above. There is mention of another locality (Bengal: Pusa) also in the publication. In my opinion it has been given for those specimens from Purneah Dist. which were earlier (1906) referred by Burr, doubtfully to *A. brunneri* and later on (1910, p. 78) as immature specimens of this species.

Altogether ten specimens were referred to *A. brunneri* by Burr (1906, p. 389) which is obvious from the registered Nos. mentioned in the publication. Out of these ten, only three specimens with reg. Nos. 9530-9532/14, Purneah Dist., N. Bengal (now in Bihar) and labelled as Juv. ? *Psalis lefroyi* Burr, are present in the Zoological Survey of India, Calcutta. The specimen with reg. No. 9525/14 appears to have been lost since only the pin with various other labels is left. All the specimens lack elytra and are probably the nymphs of this species as stated by Burr.

The species is redescribed below.

Male: Head blackish brown, smooth, about as long as broad, triangular, posterior margin gently emarginate in middle, sutures faintly marked, frons tumid. Antennae 17-segmented, blackish brown except the segments 2nd, 13th and 14th yellow. Pronotum blackish brown with sides yellow, longer than broad, anterior margin straight, sides very faintly concave in middle, posterior margin rounded, median suture distinct. Elytra black with posterior margin very slightly obliquely truncate, small scutellum visible. Wings absent. Legs yellow, femora banded with black. Abdomen punctulate, gently widened posteriorly, sides of segments 6th to 9th in ♂ rugosely punctulate. Ultimate tergite (fig. A) transverse, longitudinal fold on sides present, median sulcus prominent in posterior half only. Penultimate sternite (fig. B) triangular with posterior margin briefly rounded, manubrium three times as long as the sternite and dilated at the apex. Forceps with branches subcontiguous at base, triangular with ridge in basal one third only, weakly asymmetrical, with right branch more curved and crossing over the left one near the apex, tip curved and pointed, inner margin finely crenulate throughout. Genitalia (fig. C).

Female: Almost similar to males except the weakly transverse ultimate tergite narrowed posteriorly and forceps with branches straight, apices pointed and not hooked.

Length of body	♂	♀
(without forceps)	12.2-13 mm.	9 mm.
Length of forceps	2-2.2 mm.	1.75 mm.

Distribution.—India: Bihar, Maharashtra, Madhya Pradesh and Mysore.

Remarks.—This species closely resembles *P. dohrni* (Kirby) but it can be easily distinguished by its slightly larger size; comparatively stouter build and the elytra obliquely truncate at the posterior margin.

Paralabis aborensis (Burr)

Euborellia aborensis Burr, 1913. *Rec. Indian Mus.*, 8 (2), p. 137 (♂, ..; Assam).

Paralabis aborensis: Srivastava, 1968. *Ent. Rec.*, 80, p. 292 (comb. nov.).

General colour reddish chestnut with shades of yellow and black. Elytra present or absent. Abdomen punctulate and clothed with long and reddish hairs, sides of segments 7th to 9th in ♂ carinate and rugulose. Branches of forceps (fig. D) unarmed and asymmetrical in ♂ and in ♀ simple and straight. Genitalia (fig. F).

Length of body	♂	♀
(without forceps)	12.4-14 mm.	12-15.9 mm
Length of forceps	2-2.5 mm	2-3 mm.

Distribution.—India: Assam (Rotung, Janakmukh and Dibrugarh).

Paralabis montshadskii Bey-Bienko

Anisolabis (Paralabis) montshadskii Bey-Bienko, 1959. *Ent. Obozor.*, 38, No. 3, p. 600, fig. 16 (♂, ♀; China, Yunnan).

Paralabis montshadskii: Srivastava. *Rec. zool. Surv. India*, Calcutta, figs. (In press).

Size medium, built stout, general colour dark brown or black. Pronotum with apical margin and sides straight, posterior margin briefly rounded. Legs unicoloured or sometimes femora banded with black.

Elytra and wings absent. Abdomen in ♂ punctulate, sides of segments obtuse, rugosely punctate; ultimate tergite transverse, narrowed apically, median suture faint, with tumid elevations laterally above the bases of forceps. Penultimate sternite in ♂ with posterior margin emarginate in middle. Forceps in ♂ heavy, trigonal in basal one third, crossing near the apex, inner margin unarmed; in ♀ branches straight and contiguous.

Length of body	♂	♀
(without forceps)	11.5-14.63 mm.	10.35-13.01 mm.
Length of forceps	2.2-2.5 mm.	1.97-2.37 mm.

Distribution.—India: N.E.F.A., Kameng Division, Rahung and Chug village. China: Yunnan.

ACKNOWLEDGMENTS

I am thankful to the Director, Zoological Survey of India, Calcutta, for providing necessary facilities. My thanks are also due to Mr John Huxley of British Museum (Natural History), London., for supplying the valuable information regarding the 'Types' of *Psalis lefroyi* Burr.

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Notes and Observations

HYDRILLULA PALUSTRIS HÜBN. IN LINCOLNSHIRE.—On 21st June 1902 J. F. Musham and C. P. Arnold took a male specimen of this species near a fresh water marsh in the coastal sand dunes at Theddlethorpe. Repeated visits by many entomologists have failed to produce a second specimen.

On the morning of the 13th June of this year, I found a male *H. palustris* in the mercury vapour light trap in my meadow. Mr R. P. Demuth has very kindly confirmed the identity of this specimen. The meadow overlooks a fresh water marsh some four hundred yards away. Beyond this is some wet woodland, very reminiscent of Wood Walton Fen, and beyond this a second marsh. In both marshes there is an abundant growth of meadow-sweet. I do not think that either of these marshes has ever seen an entomologist in the past. I have only recently come to live in this area and it would appear that my time could be spent very profitably next year in a thorough investigation of this wetland area.—R. E. M. PILCHER, The Little Dower House, South Thoresby, Alford, Lincs. 16.xi.1970.

L208 LYCAENA PHLAEAS L.—On 7th November 1970 I observed for several minutes a small copper butterfly enjoying the afternoon sunshine on a south-facing slope above the sea at Polruan, Cornwall. The specimen looked very fresh as it fluttered among the bushes, and finally settled on a bramble leaf with wings outspread, almost under my nose. I could easily have captured it but did not do so. It would be interesting to know whether this very late individual was a straggler from the usual October emergence or whether it was the offspring of the October butterflies which, for some reason, forgot to hibernate and completed its growth abnormally quickly for the time of year.—JOHN L. GREGORY, Lepidoptera House, 17 Grove Road, St Austell, Cornwall. 17.xi.1970.

ANTITYPE XANTHOMISTA GREGSON IN IRELAND.—I spent a short time collecting in south west Ireland this October. On 11th October I had a Robinson mercury vapour light trap in the Castle grounds at Castletownshend which is on the sea in the extreme south west corner of County Cork. The night was calm and warm and there were a lot of insects in the trap next morning. The commonest was *Aporophyla nigra* Haw. with about one hundred specimens. There were also three *Leucania unipuncta* Haw., which is almost certainly a resident in this very mild area, and one *Antitype xanthomista* Gregson. According to Baynes, this is the first Irish record, and it is surprising that *xanthomista* should not have turned up in Ireland before, in view of its presence on the facing and very similar coasts of North Cornwall and Pembroke. It is a poor specimen and I am unable to say whether it differs in any degree from the English form.—R. P. DEMUTH, Watercombe House, Oakridge, Stroud, Glos. 4.xii.1970.

WORK OF A NEW FOREST SPIDER.—During a night's bug hunting in the New Forest in July, the remarkable efficiency of the spider was brought home to us. We had arrived about 9 p.m., and, before deciding where to set up our light and sheet, we explored a ride which led in from the main road. Three of us walked abreast the entire length of it.

About 1.30 a.m. things began to get slack in the spot we had adopted, so I decided to try the car headlights along the side ride. As soon as the beam was in position I noticed about ten yards away a large spider's web, quite perfect with a big spider in the centre awaiting customers.

The diameter of the web was about 10". It was 3 feet from the ground, right in the middle of the path, and at first glance it appeared to be quite unsupported. Curiosity forced us to investigate and we found one supporting strand leading directly to a pine branch 12 feet away on the far side of a deep ditch and 8 feet up. On the other side the upper stay led to the top of a tall thistle 8 feet away. The lower stays were not quite so long, but the whole structure entirely blocked the ride.

This stupendous achievement by a single spider had been completed in less than four hours. Can anybody tell us how it was done?—B. W. WEDDELL, 39 Victoria Road, Trowbridge, Wilts. 3.xii.1970.

LOXOSTEGE STICTICALIS L. IN WESTMORLAND.—I took a specimen of *Loxostege sticticalis* L. in my mercury vapour lamp trap here in New Hutton on the night of 28/29.viii.1970. I know of no previous record of this species from Westmorland but it was recorded in some numbers from the Penrith area (just in Cumberland) in 1955 (*Ent. Rec.*, 67: 273). At the time of capture, there was no evidence of any other migratory species, and indeed, migrant moths have generally been very scarce in this district this year.—Dr NEVILLE L. BIRKETT, Kendal Wood, New Hutton, near Kendal. 3.xii.1970.

MONMOUTHSHIRE LEPIDOPTERA RECORDS IN 1970. — Perhaps the most interesting of several unexpected species of moths I have encountered in Monmouthshire during the last two years was *Parascotia fuliginaria* L. a single specimen appearing in my garden m.v. trap at Usk on 3rd August 1970. I am not aware of any earlier Monmouthshire occurrences of this moth and should welcome information on any previous Welsh records. Last year on 31st July *Euphyia cuculata* Hufn. appeared in my trap at Usk.

In a small fen in southern Monmouthshire I took this year a specimen of *Leucania straminea* Treits. on 10th July and later that night a *Gastropacha quercifolia* L. came to m.v. light. This is the only time I have met the Lappet in this county. At the same spot on 11th July 1969 a male *Spilosoma urticae* Esp. came to m.v.

Hadena bombycina Hufn. which usually is rare in Monmouthshire turned up in a number of localities in 1970.

1970 has proved a good year for *Celastrina argiolus* L. in Monmouthshire as in other parts of the country. Its appearance here was widespread and when the second brood had emerged in July and August it was not unusual to see six or more at a time flying round the hollies and other evergreens in my garden. 1958 was Gwent's last big Holly Blue year but the numbers this time exceeded those of twelve years ago.

It is gratifying to be able to report the presence this year of *Limenitis camilla* L. in the north of Monmouthshire. Hitherto in this country I had only seen it in the Tintern district where I observed it from 1952 to 1962. During that decade it steadily increased in numbers and extended its territory considerably but it then suddenly died out and although I have searched the area most years since then it has not reappeared.

Migrants in general have been far fewer in Monmouthshire this year than in 1969. There were very few *Vanessa atlanta* L. and *Vanessa cardui* L. The moths *Plusia gamma* L., *Agrotis ipsilon* Hufn., and particularly *Peridroma porphyrea* Schiff. were all comparatively infrequent. I saw only a few *Nomophila noctuella* Schiff. and but one *Udea ferrugalis* Hübn. However I did see a single *Colias croceus* Fourc. on 28th September and one *Macroglossum stellatarum* L. which appeared was the first I have seen here for more than thirteen years.

It may be of interest to record here that I know of three colonies of *Zygaena lonicerae transferens* Verity. in Monmouthshire, one being in the vicinity of Usk.

Finally my m.v. trap at Usk yielded a fresh male *Orthosia incerta* Hufn. on the rather surprising date of 23rd October 1970. — Dr. G. A. NEIL HORTON. Plas Newydd, Usk, Monmouthshire. 21.xi.1970.

THE MEANING OF THE NAME GRIPOSIA.—Mr J. L. Campbell asks (*antea*: 296) for the meaning of this generic name in the Noctuidae. However, he has really answered his own question when he remarks that it appears to be only an anagram of *Agriopis*—a name that has been in use for very many years, I believe. Now in general an anagram, being nothing but a rearrangement of the letters of the original, can *ipso facto* have no etymological (as distinct from entomological) meaning; though just occasionally an author has succeeded, either by ingenuity or by a happy accident, in creating a *meaningful* anagram at least as suitable as the original name! *Agriopis*, like most names of genera, is taken from the Greek or made up of Greek elements, and signifies 'wild-eyed' or 'of savage aspect.' But as to why this should be specially appropriate to our handsome 'Merveille du Jour' and its exotic allies, Mr Campbell's guess is as good as mine! Possibly something in the fore-wing markings may have suggested to an imaginative person the likeness of a grotesque face; or is the allusion rather to the moth's actual 'face' seen from the front? In any case, the choice of many names in entomology is highly fanciful, often even entirely arbitrary.—A. A. ALLEN, 63 Blackheath Park, S.E.3. 26.xi.70.

NEPTICULID COCOONS: THEIR GREGARIOUS NATURE.—I have in previous years observed but not remarked upon the gregarious nature of these cocoons when produced in captivity. This autumn, having given more attention than before to the collecting and studying of the Nepticulid larvae, this curious habit was particularly noticeable among those species that I had collected in numbers (*Nepticula viscarella* Stt., *N. myrtillella* Stt., *N. betulicola* Stt./*N. luteella* Stt., *Stigmella poterii* Stt., etc.).

Although Nepticulid larvae live solitarily as leaf-miners, if a number of tenanted leaves be collected and placed together in a box one on top of another, many of the resulting cocoons will be found formed gregariously between certain leaves without any apparent reason for this preference. All breeders of Nepticulidae must be familiar with this behaviour, yet I cannot recall having ever read or heard of any suggested explanation to account for it. Perhaps our specialists in this group—Mr Jacobs, Col. Emmet and Mr S. C. S. Brown—would be so kind as to favour us with their views on this subject? — J. M. CHALMERS-HUNT. 30.xi.1970.

[I certainly have noticed this tendency, and many years ago exhibited a group of eight or so cocoons of *Nepticula aurella* Stt. in the centre of a three inch glass topped box. At the time I offered the suggestion that this might be in order to facilitate mating when the insects hatched, but Dr Cockayne stated that such foresight could not possibly be attributed to these moths, and that the explanation was probably that they selected the spot which offered the best micro-climate, particularly as regards humidity.—Ed.]

Current Literature

Lepidoptera New Series I, No. 10, Lepidopterologisk Forening, Copenhagen, contains two papers by **Ernst Urbahn**, which should be of great interest to Lepidopterists.

The first compares *Amphipyra pyramidea* L. with *A. berbera* Rungs., and starts by comparing the ova with highly enlarged micro-photographs by Dr. Klaus Sattler, which show marked differences in the reticulation and especially in the microphyle. The larvae are illustrated in colour showing dorsal and lateral view of both species, side by side. Drawings of the cremastal hooks of the pupae of both species give dorsal and ventral aspects and photographs of four imagines show *A. berbera berbera* from Algeria, *A. berbera svenssoni* from Zehdenick, *A. pyramidea* from Jena and *A. berbera svenssoni* from Sweden. The paper finishes by citing 13 references to papers on the subject. The paper is in the Danish language, and the only criticism of this excellent work is that it lacks the customary summary in English, French or German.

The next paper by the same author deals with the two closely related species *Diarsia rubi* View. and *D. florida* Schmidt. The subject is treated similarly to that on the *Amphipyra* species, with micro-photographs of the egg reticulation and also very highly magnified photographs of the microphyle, also by Dr Sattler. The larvae are illustrated on two coloured plates, giving lateral and dorsal views of each species; there is also a drawing by the author showing segment VI of a *florida* larva from lateral and dorsal aspects. There is also a drawing showing the chaetotaxy of the anal segment of both species.

The cremastal hooks of the pupae of both *rubi* and *florida* after O. Wilde and also six drawings by the author giving three examples of each species show differences.

The imagines are compared in a coloured plate showing pairs of each species separately and the two pairs side by side. The genitalia of both species, male and female, are illustrated by drawings by the author. References to nine papers are given, but here again, a summary in another language is missing.

Finally there is a coloured plate of 20 figures showing species added to the Danish list since the publication of Dr Skat Hoffmeyer's book on the Danish Moths. The plate explanation gives short details of each of these species.—S.N.A.J.

A similar paper on the *Diarsia* by Ernst Urbahn appears in Zeitschrift der Wiener Entomologischen Gesellschaft 54: 8-22 with the text in the German language.—S.N.A.J.

Provisional Atlas of the Insects of the British Isles, Part I. Lepidoptera Rhopalocera (Butterflies) edited by **John Heath**: The Biological Records Centre, Monks Wood Experimental Station, Abbots Ripton, Hunts.. 10/- (50p).

This book, or rather, file, for it is bound with a plastic clip on the loose leaf style, represents the first contribution of the Biological Records Centre to the European Invertebrate Survey. It puts together the observations of some 620 observers spread over the country whose reports have been collated by Mr Heath and his staff, who have also searched for and in-

cluded published records.

The Introduction by the Editor occupies the first page after the title page, and on its reverse side there are indices both of scientific and of Vernacular names. In his introduction, Mr Heath sets out the principle on which the distribution maps have been made. These show pre-1960 records as open circles, while 1960 onwards records are shown as filled black circles. The maps are on a 100 Km. grid, the squares of which are divided on the map margins into 10 Km. squares which can therefore be projected across the map by the use of a straight edge instead of obscuring the subject by a printed 10 Km. grid.

The maps are printed one on each side, and the first map illustrates the places from which records have been received, and therefore showing the distribution of the recorders. Thereafter the maps illustrate the distribution of one species per map, that of *Gonepteryx rhamni* L. being accompanied by distribution maps of *Rhamnus catharticus* and *Frangula alnus*, its foodplants. In all, 57 maps are given, only the residential British species being included.

The format is large quarto in stiff paper covers, and is printed by an offset process on heavy art paper. In a later edition, it is hoped to be able to show records pre-1940, 1940-1960, and 1960 to date. The work will show itself to be indispensable to all who are interested in or concerned with insect distribution.

I understand that the centre has a similar work on a selected list of macro-moths in preparation.—S.N.A.J.

Atlas Provisoire des insectes de Belgique, Maps 1-100, edited by Jean Leclercq. Faculte de Sciences Agronomiques de L'Etat, Zoologie Générale et Faunistique, Gembloux.

The Editor of this file explains in his Introduction that the present selection of distribution maps gives species from as many genera as possible rather than the full list of species of a genus, and is issued to tide over the necessarily long time which must pass before a complete set of European Distribution Maps can be issued.

The first map shows the grid system used, Belgium being covered by a 100 Km. grid with an adjustment for the earth's curvature, the squares being lettered serially for longitude and latitude. These squares are divided into 10 Km. squares, which are grouped in sub squares of 50 Km. marked 1, 2, 3 and 4. Maps 2-64 record Hymenoptera families Vespidae, Formicidae, Sphecidae, Pompilidae and Siricidae. Diptera have Maps 65-88, representing Rhagonidae, and Syrphidae, while Coleoptera have Maps 89-100 in which the Cantharidae are represented.

This set is also printed by an offset process on good heavy paper, the format being a small fooscap, roughly 7" x 10", with two maps per side, the binding being by two punched holes through which the two ends of a metal ribbon are threaded, the ribbon being attached to a strong paper cover.

The appearance of this painstaking work should stimulate more interested observers to supply data so that further issues may be able to show the fullest possible data. The Editor, in his introduction, laments the blank spots in his maps, which are in many cases caused by a lack of observers. It is good to see this gigantic project beginning to come to the hands of the interested public, and its success is assured, for it will fill a very wide-felt need.—S.N.A.J.

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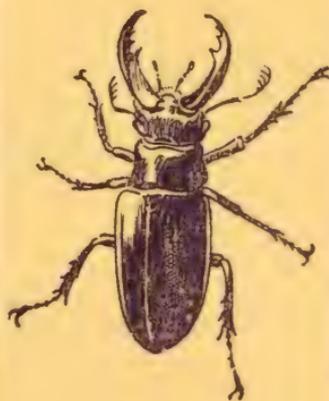
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WARNE

From the Alpes Maritimes to Albarracin

(July-August 1970)

By C. G. M. de WORMS, M.A., Ph.D.

The region of the Alpes Maritimes is indeed one of the richest for lepidoptera not only in France, but also for Europe as a whole. I made this area my venue during the last days of July 1970 when I had arranged a rendezvous there with Major-General Sir George Johnson who had been on a collecting tour, mainly in Switzerland. This was my third visit to this grand mountainous area stretching back from the Côte d'Azur which I had already sampled in July 1955 in company with Col. C. W. Mackworth Praed (vide *Entom.*, **89**: 26) and again with Mr R. F. Brether-ton in August 1962 en route from Corisca.

I flew from London to Nice on July 26th where I was surprised to find M. Dujardin and his niece awaiting for me at the airport, as I had acquainted him on my imminent visit. It was a glorious Sunday afternoon when we motored on the road via Grasse to Coussols where there was a galaxy of butterflies on the wing. The collecting ground was a large open valley bordered on one side with out-crops of limestone pavement among small low-growing bushes. Of the twenty-six species of butterflies observed during the few hours that afternoon among the Pierids most prominent was *Aporia crataegi* L. The Satyrids were well to the fore with many *Hipparchia alcyone* D. & S. as well as *Coenonympha dorus* Esp., while *Satyrus bryce* Hübn (*cordula* Esp.) accompanied some early *Arethusana arethusa* Schiff. The only Fritillaries seen were *Argynnis aglaia* L., *Clossiana dia* L., a few worn *Brenthis hecate* Schiff. and *Melitaea phoebe* Schiff. By far the most numerous group were the Lycaenids with swarms of *Strymon spini* Schiff. and a large number of *Lysandra coridon* Poda, also *L. bellargus* Rott., some very fine *Agrodiaetus damon* Schiff., an occasional *Plebeius argus* and *Philotes baton* Bgstr. The Hesperids were mainly represented by *Pyrgus foulquieri* Oberthür and *P. carthami* Hübn. *Agapetes galatea* L. and *Satyrus semele* L. were also in great plenty. We returned to Nice in the brilliant sunshine of the summer's evening and threaded our way along the crowded Promenade des Anglais after a very fruitful start to the trip.

I stayed overnight in this vast city in a small hotel near the station and not far from M. Dujardin's home and early the following day I picked up a small Renault at the airport and sped up the road towards St Martin Vésubie which I last visited in 1962. It was a glorious day again with plenty on the wing to keep me busy. Halting at a clearing a few miles south of this well-known resort, I found a clump of buddleia bushes in full bloom and alive with butterflies, chiefly *Argynnis paphia* L., *A. adippe* Rott. in a very large and bright form, also lots of *Brintesia circe* Fab., *Aglais urticae* L. while further down along the road near one of the gorges were flying many *Parnassius apollo* L., *Satyrus bryce* Hübn. (*cordula* Fab.), with a few *Iphioides podalirius* L. On reaching St Martin I at once made my way up the six miles of steep valley to the old hospice of La Madone de Fenestre which had proved so fruitful eight years before, but unfortunately it was much less prolific on this occasion. There were a few *Erebias* flying, mainly *E. alberganus* de Prun. (*ceto* Hübn.), *E. cassioides* R. & Hochenwarth and *E. montanus* de Prun (*goante* Esp.). But the chief quarry *Boloria graeca* Stdgr. so common there

in 1962, did not put in an appearance, only an occasional *B. pales* Schiff. A few *Colias phicomone* Esp. were careering about the slopes. Returning through St Martin I then motored up the very steep five miles of winding road to the Col de la Colmiane at 5000 ft. which had been my main collecting ground in 1955 and 1962. In a small dry valley which had been a favourite haunt I found a good many *Melitaea didyma* Esp., *M. phoebe* Schiff., with *Plebeius argus* L., a single *Maculinea arion* L. Late that afternoon I made the very precipitous descent to the valley of the Tinée and returned to Nice.

Another warm and bright morning welcomed me on July 28th when I left Nice and again wended my way up the same valley as the previous day, but this time I followed the Tinée all the way. I happened to stop by a small lavender bank where a lot of sea buckthorn was growing and was pleased to find a number of *Lycaeides idas*. f. *calliopis* Bdv. feeding on the flowers of the lavender. There are those who consider this insect a species on its own as its larvae seem to feed exclusively on the *Rhamnoides*. After depositing my luggage at the Hotel Issautier at St Étienne de Tinée I made my way up the steep road to the ski resort of Auron where a flowery field produced many *Argynnis aglaia* L., *A. niobe* L., *Coenonympha iphis* Schiff. and *Satyrus actaea* Esp. in a nearby wood. I next ascended in the téléferique to 7500 ft. where it was very windy. A few small *Erebias* were flying at this altitude which appeared to be *E. gorge* Hübn. I descended again to St Étienne to find Gen. Sir G. Johnson had just arrived from Italy. The 29th broke another fine day when we motored up the Col du Restefond to a height of nearly 8000 ft. We halted at an old army camp at the end of a number of zig-zags as this was said to be a locality of *Erebia scipio* Bdv., but the only members of this genus which we saw on the rocky and grassy slopes were a small form of *E. meolans* de Prun. (*stygne* Ochs.) and *E. epiphron* Knoch. Soon about noon the whole sky became overcast and a heavy thunderstorm broke which ended our day's collecting. However, we once more set out early on the 30th in two cars up the previous ascent to the same spot. I went on to make the summit of the pass at the Col de la Bonette which claims to be the highest road in Europe at 9300ft. A magnificent panorama was awaiting me of almost the whole of the Alpes Maritimes, but it was too high for any insects. So I descended a little way to a small scree where a number of *Erebias* were flying in the hot morning sun. These proved to be mainly *E. pluto* de Prun. with a few *E. gorge* Hübn. and *E. pandrose* Bkh. (*lappona* Esp.). On descending a little further I came across a scree facing east which was alive with *E. pluto* in both sexes with a sprinkling of *E. gorge*. Both were much easier to catch and select in this setting. But once more a drenching thunderstorm broke about lunchtime which prevented further collecting.

On July 31st we left St Étienne early, motoring down the valley to Nice Airport where I returned my small car and continued as a passenger in Sir George's car westwards along the Autoroute which skirts Cannes. We ran into another big storm at Aix-en-Provence and eventually drove into Arles on the Rhone where we spent the night at the Hotel Jules César. August broke very fine and warm when we set out again westwards skirting the northern end of the Camargue to Montpellier. But soon afterwards we ran into a big traffic hold-up of hundreds of holidaymakers going seawards, known in France as the Aoùtiers. However, we were

fortunately able to leave the unending stream of cars and strike inland via Béziers and eventually turned southwards through the most picturesque Route des Corbières, a small range of limestone mountains. This was virtually a deserted winding road which bypassed Narbonne, so that we finished by joining the trunk road which goes inland westwards from Pergignan, through country which I had previously sampled for collecting in 1965. After passing Prades we made the big ascent which I had covered so often five years earlier, eventually putting up at the large and sumptuous Grand Hotel on the edge of the Forêt at Font-Romeu which had been a happy hunting ground in 1965, but when I ventured into the pine-clad area near the hotel on the afternoon of August 2nd I was most disappointed in the number of butterflies on the wing. There was no sign of *Erebia euryale* Esp. which was swarming on my earlier visit. *Coenonympha iphis* Schiff. was the commonest species on grass stems with an occasional *Erebia oeme* Hübn., the females being still quite fresh. However, we had a better harvest that morning when we descended to a spot quite close to Villefranche-de-Conflent, just north of Vernet, which had proved very prolific in 1965. As we arrived quite a cloud of *Hipparchia fidia* L. rose from the rocks, but all proved to be males mostly just out. Both *Pyronia cecilia* Vall. (*ida* Esp.) and *P. bathseba* Fab. (*pasiphæ* Esp.) were about, but worn with a host of the only Hairstreak present which turned out to be *Strymon esculi* Hübn. also mostly past their best. Other species in fair numbers were *Coenonympha dorus* Esp. with the Blues *Lysandra hylas* Esp. (*argester* Bgstr.). *Everes alcetas* Hfmgg. and *Polyommatus icarus* Rott. Other less frequent species included *Iphiclides feisthameli* Dup., *Gonepteryx cleopatra* L., *Limnitis rivularis* Scop., *Brenthis ino* Rott. and *Mellicta dejone* Gr.

We made an early start in heavy rain on August 3rd crossing into Spain with ease at Bourgmadame whence we followed a tortuous road through the foothills of the Pyrenees to Lerida and then on to Saragossa for another night. En route the only entomological incident was when held up at a level crossing a *Papilio machaon* L. alighted on some fennel and laid an egg in full view. From Saragossa on the 4th we followed the route I had taken in 1966 reaching the neighbourhood of Albarracin by mid-day in very warm conditions. We halted in a dry valley just east of that famous resort which had proved so fruitful four years earlier, but that was in the first half of July. By early August most of the butterflies had vanished and all that was flying were a few *H. fidia* and *Chazara briseis* L. as well as *Pontia daplidice* L., *G. cleopatra*, *Lysandra albicans* H. & S. and *Sloperia proto* Ochs. Later that day we motored back the 25 miles to Teruel where we put up at the excellent Parador where a small suite only came to about 25/- a day.

August 5th dawned well with exceptional heat in the offing so that we set out soon after 8 a.m. for Albarracin and thence to the high ground at near 5000 ft. in the Bronchales region. En route we halted at the edge of the fir forest by a small bridge where I had had a harvest in 1966, but little of interest was on the wing in this attractive spot except for a few *Argynnis paphia* L., *A. adippe* Rott. in its form with its greenish underside together with worn *Heodes alciphron* Rott. In the thicker fir forest further along the road to Orihuela we searched in vain for *Lysandra nivescens* Kef. which had occurred in this terrain in 1966. Nor was there any sign of our main quarry *Erebia zapateri* Oberthür peculiar to this region, which

we had been led to believe was widespread in this forest. However, Col. Manley advised us to survey the road to Griegos. Where it left the one to Orihucla, we found *Mellicta pathenoides* Kef. in plenty on thistles, but on emerging from the main forest we came across some open flat clearing alive with butterflies, mainly *Lysandra caelestissima* Verity and *Agrodietus damon* Schiff. in a small and pale form. It was not long before a dark insect flitted past me and I had no difficulty in identifying it as *E. zapateri* of which we took only an occasional example in this spot. Other butterflies in this most prolific locality included many *Satyrus semele* L., *Hipparchia alcyone* Schiff. in a small form, *Hyponephele lycaon* Kuhns, *Chazara briseis* L. with some *Agapetes russiae* Esp. (*iapygia* Cyr.), already past their best as also was *Sloperia proto* Ochs. About mid-day we proceeded along the road to Griegos when Sir George drew up suddenly. To our amazement there were some thistle heads smothered with *E. zapateri*, nearly all males, though some were already damaged. Several outsize *Parnassius apollo* L. were also sailing along this shaded part of the road through the forest. After light refreshment in the village of Griegos we returned to the Parador and revisited to this high level area early on the morning of August 6th when the chief additions to the big population of butterflies were *Issoria lathonia* L., *Pyronia tithonus* L. and *Hesperia comma* L. For our final day, the 7th, in this celebrated region we made Muscardon our venue. As we arrived on the ground we came across a number of *Satyrus actaea* Esp. in a large form on scabious. When we reached the main collecting area, so rich in 1966, we found the flat ground with short grass flitting with *L. caelestissima* in great plenty and much fresher than in the higher locality, while along a damp stretch the tall thistles were smothered with a galaxy of species, mainly the three larger Fritillaries, mostly *A. adippe* and *A. paphia* with a few *A. aglaia* L. and lots of *Arethusana arethusa* D. & S. just out. There were still a few worn *Brenthis hecate* Schiff. and we were delighted to find many more *E. zapateri* fluttering among the firs. The chief member of the Hesperids was *Pyrgus cirsii* Rambur (*fritillum* Schiff.). On the way back to Teruel we stopped in a dried-up river bed just south of Albarracin where many large Satyrids were flying, but most of them turned out to be *Chazara briseis* L. However, one capture proved to be *C. priouri* Pierret, still in good order. In the vicinity of the Parador late that afternoon on some bare ground I found many *Lysandra albicans* and *Pyronia tithonus*, also a few fresh *Hipparchia statilinus* Hufn.

We set out on the homeward journey early in August, again in great heat and retraced our route to Saragossa, thence on to Huesca where we stayed at the very well appointed Hotel Pedro, which I had patronised in 1966. After lunch I did some collecting on the outskirts of the town where in rough field I again saw *L. albicans*, *P. tithonus*, *H. statilinus* and *Melitaea phoebe* Schiff. The next morning we penetrated the Pyrenees at Jaca crossing them by the Sampert Pass, then descending to Urdos, but it was dull nothing of interest was flying. We put up that night in Salie de Béarn and searched some woods near Dax on the morning of the 10th. Many *Pararge aegeria* L. were on the wing with a few *Colias croceus* Fourc. That night we entrained at Biarritz with the car on board, reaching Boulogne early on August 11th. We made for the airport at Le Touquet at an early hour. While waiting to fly over to Lydd I surveyed the airfield

perimeter where I was surprised to see *Everes argiades* Pall. with *Celastrina argiolus* L. and *Satyrus semele* L. We were soon back in Kent whence we motored direct to Surrey, thus ending a most enjoyable and productive fortnight which took us by road 1600 miles through the south of France to central Spain and back to Biarritz.

I have thought it of interest to enumerate the species of butterflies we noted on the whole of our journey which comprised 104 species in all.

PAPILIONIDAE

Papilio machaon L. Flying on Col. de la Bonette (A.M.) and near Heusca.
Iphiclides podalirius L. Numerous in valleys near St Martin Vésubie (A.M.).

Iphiclides feisthameli Dup. Few at Villefranche-de-Confient (Pyr. Or.).
Parnassius apollo L. A few near la Madone de Fenestre (A.M.) and in a larger form near Bronchales (Teruel).

PIERIDAE

Pieris brassicae L. Seen in several localities near St Martin Vésubie.

Pieris rapae L. A few at Coussols (A.M.).

Pieris napi L. Seen in the vicinity of St Martin Vésubie (A.M.).

Aporia crataegi L. Flying at Coussols (A.M.).

Pontia daplidice L. Only observed near Albarracin and Huesca, Spain.
Leptidea sinapis L. Numerous near St Martin Vésubie.

Gonepteryx rhamni L. A few near Bronchales (Teruel).

Gonepteryx cleopatra L. Noted at Villefranche-de-Confient (Pyr. Or.) and at Albarracin.

Colias phicomone Esp. A few at La Madone de Fenestre (A.M.).

Colias australis Verity. Flying at Coussols (A.M.) and near Bronchales, Spain.

Colias croceus Fourc. A number near St Martin Vésubie.

NYMPHALIDAE

Limenitis rivularis Scop. A few at Villefranche-de-Confient (Pyr. Or.).

Vanessa atalanta L. Only seen in the vicinity of Albarracin.

Vanessa cardui L. A few at Coussols (A.M.) and at Albarracin.

Aglais urticae L. Observed near St Martin Vésubie.

Inachis io L. A few in valleys near St Martin Vésubie.

Polygonia c-album L. Also seen near St Martin Vésubie.

Mellicta deione Rott. A few at Villefranche-de-Confient.

Mellicta parthenoides Kef. Only noted near Bronchales, Teruel.

Melitaea phoebe Schiff. A few at Coussols and Colmiane (A.M.), also at Villefranche-de-Confient and Huesca.

Melitaea didyma Esp. Still flying at Col de la Comiane near St Martin Vésubie.

Argynnis aglaia L. Seen at Coussols, also near St Martin Vésubie and near Bronchales.

Argynnis niobe L. Only noted at Auron (A.M.).

Argynnis adippe Rott. Many at Coussols, near St Martin Vésubie and with green undersides in the Albarracin and Bronchales region.

Argynnis pandora D. & S. A few still on the wing near Albarracin.

Argynnis paphia L. Numerous at Coussols and round St Martin Vésubie, also in the Bronchales area, Spain.

- Brenthis hecate* Schiff. A few worn specimens at Coussols (A.M.) and at Albarracin.
- Brenthis ino* Rott. Only seen in the Forêt de Font-Romeu (Pyr. Or.).
- Clossiana selene* Schiff. Noted at Villefranche-de-Conflent (Pyr. Or.).
- Clossiana ala* L. A few flying at Coussols.
- Clossiana euphrosyne* L. Observed at Auron (A.M.).
- Boloria pales* Schiff. Only noted at La Madone de Fenestre (A.M.).
- Issoria lathonia* L. Only seen near Bronchales.

SATYRIDAE

- Erebia epiphron* Knoch Only observed on the Col de Restefond (A.M.).
- Erebia alberganus* de Prun. (*ceto* Hübn.) numerous at Madone de Fenestre.
- Erebia pluto* de Prun. In numbers near Col de la Bonette (A.M.).
- Erebia pluto* de Prun. In numbers near Col de la Bonette.
- Erebia cassioides* R. & H. A few at La Madone de Fenestre.
- Erebia montanus* de Prun. (*goante* Esp.). A few at La Madone de Fenestre.
- Erebia oeme* Hübn. A few in the Forêt de Font Romeu (Pyr. Or.).
- Erebia meolans* de Prun. (*stygne* Ochs.) A small form on the Col de Restefond.
- Erebia pandrose* Borkh. (*lappona* Esp.). Seen on the Col de la Bonette (A.M.).
- Erebia zapateri* Oberthür Numerous locally near Bronchales and Albarracin.
- Agapetes galathea* L. A dark form at Coussols (A.M.).
- Agapetes lachesis* Hübn. A few near Albarracin.
- Agapetes russiae* Esp. (*iapygia* Cyr.) A few worn at Albarracin.
- Hipparchia alcyone* Schiff. Plentiful in all localities in the Alpes Maritimes and in a smaller form in the vicinity of Albarracin.
- Hipparchia semele* L. Numerous at Coussols (A.M.) and near Brochales, Teruel.
- Hipparchia statilinus* Hufn. A few at Teruel and Huesca, Spain.
- Hipparchia fidia* L. Common at Villefranche-de-Conflent (Pyr. Or.) and scarce near Albarracin.
- Arethusana arethusa* D. & S. Just appearing at Coussols and again in the Albarracin region.
- Brintesia circe* Fab. Fairly common round St Martin Vésubie and in a smaller form near Bronchales and Albarracin.
- Chazara briseis* L. Numerous round Bronchales and Albarracin.
- Chazara priouri* Pierret. A few near Albarracin.
- Satyrus cordula* Fab. Numerous in the Alpes Maritimes and Pyrénées Orientales.
- Satyrus actaea* Esp. A few near St Étienne-de-Tinée and in a larger form at Muscardon near Albarracin.
- Pararge aegeria* L. Only seen near Dax and Le Touquet.
- Pararge megera* L. Observed only at Le Touquet.
- Pararge maera* L. A few at Coussols (A.M.).
- Maniola jurtina* L. Scarce at Coussols.
- Hyponphele lycaon* Kuhns. Plentiful in the Albarracin region.
- Pyronia tithonus* L. Numerous near Albarracin and Teruel.
- Pyronia cecilia* Vall. (*ida* Esp.) A few worn at Villefranche-de-Conflent.

- Pyronia bathseba* Fab. (*pasiphaë* Esp.) Similar to the previous species.
Coenonympha iphis Schiff. Noted at Auron (A.M.) and in the Forêt de Font-Romeu.
Coenonympha arcania L. Only seen at Coussols (A.M.).
Coenonympha dorus Esp. Numerous at Coussols and at Villefrance-de-Conflent.
Coenonympha pamphilus L. Sporadic near St Martin Vésubie and Auron (A.M.).

LYCAENIDAE

- Strymon esculi* Hübn. Plentiful but worn at Villefranche-de-Conflent.
Strymon spini Schiff. Abundant at Coussols.
Strymon ilicis Esp. Seen near St Martin Vésubie.
Heodes alciphron Rott. Only seen near Bronchales.
Lycaena phlaeas L. A few near Bronchales.
Everes argiades Pall. One observed at Le Touquet.
Everes alcetas Hfsgg. A few at Villefranche-de-Conflent.
Philotes baton Bergstr. A few worn at Coussols (A.M.).
Maculinea arion L. Only seen at the Col de la Colmiane (A.M.).
Lycaeides idas L. A few in f. *calliopsis* Bdv. near St Étienne-de-Tinée (A.M.).
Plebeius argus L. Seen at Auron (A.M.).
Aricia agestis Schiff. A few noted at Coussols.
Cyaniris semiargus Rott. Only seen in the Forêt de Font-Romeu (Pyr. Or).
Polyommatus icarus Rott. Numerous in the Alpes Maritimes and at Villefranche-de-Conflent.
Lysandra dorylas Schiff. Only at Villefranche-de-Conflent.
Lysandra bellargus Rott. A few at Coussols (A.M.).
Lysandra coridon Poda. Numerous at Coussols.
Lysandra coelestissima Verity. Plentiful near Bronchales and at Muscardon near Albarracin.
Lysandra albicans H.-S. A few near Albarracin and Huesca.
Agrodiaetus damon Schiff. Numerous at Coussols and in a smaller form in the region of Bronchales Teruel.

HESPERIDAE

- Carcharodus alceae* Esp. Only noted near Huesca.
Pyrgus carthami Hübn. Many worn at Coussols.
Pyrgus cirsii Rambur (*fritillum* Schiff.) Plentiful near Albarracin.
Pyrgus bellieri Oberthür (*foulquieri* Oberthür) Plentiful at Coussols.
Sloperia proto Ochs. A few near Albarracin.
Spialia sertorius Hfsgg. Noted at Coussols.
Adopaea lineola Ochs. Also seen at Coussols.
Adopaea sylvestris Poda. Observed at Auron (A.M.).
Thymelicus acteon Rott. Fairly common at Coussols.
Ochlodes venata Brem & Grey. A few at Coussols.
Hesperia comma L. Numerous at Bronchales.

Very few moths were observed throughout the trip, mainly Burnets including a small form of *Zygaena fausta* L. near Griegos, Teruel, and *Procus geryon* Hübn. at Coussols (A.M.).

Laspeyresia saltitans Westw. (Olethreutinae) the Mexican Jumping Bean Moth

By JOHN L. GREGORY

On 13th September 1969, I arrived home at mid-day to find that a parcel had been left for me by the postman, and it had been placed on a small table to await my return. On approaching the parcel I soon realised that it was making quite a loud noise, like the ticking of a few hundred miniature time bombs, or like heavy rain falling on a tin roof. Now I have many times received from entomologists parcels which rattle when moved or tilted, particularly when several items have been packed, not too securely, in the same parcel. But this was the first time I had received a parcel which was such a rattling good one that it rattled on its own. I bet the G.P.O. were glad to get it off their hands.

The noise ceased abruptly the moment I picked up the parcel preparatory to opening it. Inside was a batch of jumping beans which had been sent to me by Mr William Wilson of Helensburgh, Dunbartonshire.

During the following weeks I distributed many of the "beans" to other entomologists, and retained some for my own observations. The details of the life history of the jumping bean are quite widely known. *Laspeyresia saltitans* Westwood occurs in Mexico on *Sebastiania pavonia* (Euphorbiaceae), the ova being laid in June on the flowers, and the subsequent larvae feeding up fast in the seeds, only one larva to a seed. In July when the seeds are ripe, they fall, and those which contain a larva are completely hollowed out so that only the outer shell remains. The dry heat of semi-desert conditions causes the larva to jump, and to keep on jumping inside its prison, presumably in an attempt to find shade and to find a hiding place safe from predators. Each larval jump moves the "bean" anything up to about one quarter of an inch in a horizontal direction, and at maximum activity the jumps may exceed one hundred per minute. As the species is univoltine in nature, and pupation takes place shortly before emergence, the larva would be capable of causing its "bean" to jump continuously for about nine months! And in fact, some of my own beans were still able to jump at well over twelve months old. Gentle warmth (not excessive heat so as to roast them alive) keeps the larvae in healthy jumping condition.

I cut open a few of the "beans" in order to study the larvae, and one of the obvious things which immediately struck me was the virtually complete absence of frass inside the "bean" and there appeared to be no exit-hole to the outside world through which frass could have been ejected. I am forced to the conclusion that the larva must absorb in its body practically the whole of what it eats. The kernel of the "bean" is devoured entirely, and the inside of the shell is lined with a thin layer of silk.

So that I could watch the behaviour of the incarcerated larvae, I cut a small hole in each of several "beans", and then covered the hole with cellophane. I soon found that the cellophane windows were really unnecessary as the larvae were unwilling to abandon "beans" with even quite large holes cut in them. Some of them eventually repaired the damage as well as they could with fresh silk, but others did not. The larvae in the opened "beans" were as willing to demonstrate their powers in jumping as were those which I had left intact.

The jumping is produced by the larva gripping the silk-lined shell with the anal claspers and hind pair of prolegs, bending the rest of the body upwards and backwards with a slight stretching movement, almost to a semi-circle, then rapidly straightening, or almost straightening the body, thus bringing the underside of the thorax into hard contact with the inside of the "bean". The larva makes several jumps without changing the position of its rear end, then walks forward a few paces in loop-the-loop fashion, causing the bean to roll over, before it reattaches its hind end in preparation for the next series of jumps.

The larva is pale yellowish or creamy white, with a darker dorsal line, and rather small reddish brown head. Its body tapers fore and aft and is rather flattened as seen from above. It becomes distinctly more yellow before pupation. The prolegs appear small and widely spaced laterally.

When preparing to pupate, a small circular hole is bitten either completely through the shell of the "bean", or almost through it, and then a flimsy cocoon is constructed with its exit adjoining the hole in the "bean" shell. The pupa is yellowish brown at first, darker between segments, but the wing-cases and eyes soon become dark brown. The moth has a wing span of approximately seven eighths of an inch, the forewings being a light smoky grey colour marked with many fine black streaks running generally from costa to dorsum, a large blackish cloud in the terminal area, and a black, narrow wedged-shaped mark on the dorsum. The hind wings are dark grey to sooty black. My first moth emerged towards the end of May, and they have been emerging in odd ones and twos until the time of writing this article. Two females have just emerged today, the 17th November 1970

17 Grove Road, St Austell, Cornwall.

Hydraecias in the Coastal Areas of Western Ireland

By H. C. HUGGINS, F.R.E.S.

The Hydraecias to which these notes refer are those which in the days of my youth were comprised in the all-embracing name "*nictitans*".

This included *oculea* L.=*nictitans* Bork., *crinanensis* Burrows, *lucens* Frey and *paludis* Tutt.

For thirty years now, the distribution of these species on the coast of the West of Ireland has puzzled me. *Paludis*, of course, is quite simple, there is no authentic Irish record, the only one of any importance being that of Kane's insects identified by Tutt, which Cockayne later showed were a mixture of *lucens* and *crinanensis*. Occasionally an insect turns up a greyish-green colour which, if taken on our Thames estuary marshes would be passed at once as *paludis*. This form occurs

rarely both in the Burren and Kerry, but all I have seen on genitalia examination have proved to be *lucens* (3) (2 from Ballynalacken and 1 from Dingle) and *crinanensis* (2) (both Dingle).

Oculea is a complete enigma to me; Donovan calls it common, though he considered it more of an inland insect than the others. From 1949 until 1970 I have visited some part of Western Ireland at the right time of the year for the moth and until 1970 never saw a specimen. However, on 14th August 1970, I spotted a very small *Hydraecia* in the bottom of the trap at Dingle; I had little doubt of its identity and Mr D. S. Fletcher at the B.M. confirmed that it is *oculea*. It is exactly the same as the ones I have taken on the Kentish Downs or in the garden here, and looks a bit scruffy compared with *crinanensis* and particularly *lucens*. I suppose *oculea* is a bit of a wanderer, like *paludis*, which is not only taken in my garden here, but which Robin Mere once caught at Chiddingfold.

Lucens is rather a local insect, I never took it at Glengarriff in four visits at the right season, and have only taken six in all at Dingle in nine years. It is usually a bigger, brighter insect than *crinanensis*, which invariably accompanies it, but cannot be identified with certainty except by genitalia examination. It has, however, sometimes a look of its own; in 1970 these insects were very common at Dingle and I picked out six as candidates for the *lucens* stakes and am glad to say that Mr Fletcher confirmed four of them. *Lucens* appears to be the commonest of the group in the Burren, where Robin Mere found it predominating at Corofin, and I did at Ballynalackan. It is usually very big and bright with a tendency for the outer third of the forewings to be of a different colour from the rest, though my smallest specimen except the *oculea* is a Burren *lucens*.

Crinanensis is the commonest of the three in Western Ireland; I have quite often seen seventy or eighty in a night (though of course I may have missed a *lucens* or two amongst them) I can well remember as a boy when my old mentor the Rev. C. R. N. Burrows, first differentiated it, and the excitement that ensued. The late L. W. Newman arranged for a special collector to get some for him. It was a pity that Burrows was working on this material from the Crinan district when he spotted it, as it thus obtained a rather unsuitable name, but as it is the commonest in Ireland it is as well he was not working on some of these, as we have quite enough "*hibernicas*" already. (I have added one or two!).

I wish to express my indebtedness to the late Dr Cockayne, Mr W. H. T. Tams and above all Mr D. S. Fletcher, for their patient examination of genitalia for me, without which I should still be at sea.

65 Eastwood Boulevard, Westcliff-on-Sea.

Two 'rediscoveries' made in 1970

By DAVID AGASSIZ

Parocystola acroxantha Meyr.

In late August I had been enjoying a few days of successful collecting in Cornwall with Barry Goater. On the way back we decided to spend one night in Torquay—the main quarry being *Eupithecia phoeniciata*. The previous year a kind resident had allowed me a plug in for an M.V. trap in his garden and when approached he again agreed to extend his hospitality. The traps yielded several *Euplagia quadripunctaria* (one of six suspected ♀♀s actually was ♀! and laid a supply of fertile eggs), and also a few micros which looked interesting. These included one distinctive looking Oecophorid unknown to me. Some time after returning home I looked up Jacobs' article in the S. London proceedings for 1949-50 and the moth was readily identified as *Parocystola acroxantha* Meyrick.

Its status is described by Jacobs (loc. cit.) as 'locally established on South Devon coast' so I was pleased to have hit upon an unexpected local speciality. Further investigation revealed only 3½ previous British examples! It was first taken in September 1908 (by Rev. J. W. Metcalfe) who found a specimen near Ottery St. Mary (Clutterbuck: Ent. XLIII (1910) 96-97), though he later seems to have had some doubt about the exact locality. Metcalfe found another specimen near Exmouth in 1917 (Ent. L.: 267) and E. G. R. Waters took one specimen on 22nd August 1925 at Dawlish and also found a single forewing in a nearby flourmill. Apart from these records from Devon the species is known only in Australia, and New Zealand where it has been imported. The life history seems to be unknown, though it is suggested that the larva feeds between spun leaves of *Eucalyptus*. The species must still be resident here at low density and some time spent searching for the larva might well repay anyone within reach of South Devon.

Hylaea fasciaria (Linn.) ab *prasinaria* (Schiff.)

In early July I was staying in Suffolk and on the 6th I decided to go to a nearby Broad as the weather was ideal for night work. After obtaining permission from the owner, I battled my way through thick herbage to the mouth of the broad, almost on the sea front. There I set up my lights—two M.V. lamps and one actinic tube. The night turned out to be rather disappointing, it was evidently too early for *Photodes brevilinea* and there was not the quantity of moths I was expecting—the total was 70 species. Numbers of *Brachmia inornatella* and a few *Spilosoma urticae* were to me the most interesting species. After some time I decided to remove the sheet and leave the traps going while I had some sleep in the car! I awoke at dawn and not much seemed to have arrived, so I quickly bundled everything into the car and left. It was only after further sleep and breakfast that I looked again at

the traps to see nothing was left. In the last one, an actinic tube trap which had been right on the shore line there was a beautiful olive-green form *prasinaria* of *Hylaea fasciaria*. It was a fresh female in perfect condition which presented me with a dilemma. Having little confidence in my capacity for breeding, the temptation to make sure of this one was too great and I succumbed. So did the moth. I saw no other specimens of this species, not one of the typical red form.

South says this form is well known on the continent, but is very rare in this country and has been taken in Kent and Suffolk. Barrett gives more details: The first was taken by A. H. Jones, at Eltham in June 1861, another (no data) by F. Bond; then Rev. G. H. Rayner bred some from Brandon which were 'soft olive-green with pink lines' and Rev. C. Cruttwell took one at Aldeburgh in July 1892 described as a soft, pea-green with similar lines. In all the cilia remain red. There is one specimen in the National collection taken in the 1890s and Tutt's name is on the label. According to these descriptions mine is most like those from Brandon.

There may be further records which I have overlooked, but if not this is the first record in this century. E. B. Ford says that genetically, this form is a simple recessive.

Collecting Notes, 1970

By R. G. CHATELAIN and D. O'KEEFFE

The following account of collecting undertaken during 1970 is by no means complete but attempts to cover the less mundane entomological events of the year.

Spring was again cold and late and although a few visits were paid to local woods for wingless females, it was not until late March that longer trips were made. One of our first objectives was *Orthosia populeti* Fab. but the insect must have had a bad year in Ham Street, as visits intended to straddle its time of emergence drew a blank and it was not until 27th May that a worn male was seen.

On 5th April, we departed for Aviemore, where the season was late and the weather dismal. It snowed daily; the only foul meteorological condition not encountered was fog, which delayed its appearance until the return journey on the M.1. One male *Brachionycha nubeculosa* Esp. was taken at m.v. with a few *Achlya flavicornis* L., whilst the posts at Struan produced only ten male and one female *Poecilopsis lapponaria* Boisd., one or two *flavicornis* and females of *Erannia marginaria* Fab. Hibernating larvae of *Polia hepatica* Clerck (*tineta* Hübn.) were found under bark on the posts and in due course gave rise to the handsome Scottish form of this insect. After two days, discretion was deemed the better part of valour and the homeward journey undertaken.

Weather conditions and early darkness restricted collecting to week-ends and hampered our plans to take females of *Gypsitesa leucographa* Schiff. and *Dasycampa rubiginea* Schiff. Three males of the former, past their prime, were seen at m.v. at Alice Holt on 24th April together with plenty of the common *Orthosias*, including a good sprinkling on the willows, and one early male *Lampropteryx suffumata* Schiff. It was not until 1st May that we were able to try for *rubiginea* and, although we took a female, she was laid out and only deposited seven eggs, from which six moths were bred. Another scarce species this season was *O. miniosa* Schiff. which we only saw once—at Abinger on 8th April. However, we had each bred a series from a female taken the previous year, in the New Forest.

Results in the spring would have been more disheartening had we not succeeded in taking a fresh series of *Bapta distinctata* H.-S. in the New Forest on 17th April, when they were sitting low down on the blackthorn in pouring rain. We also had emerging fine series of *Tricopteryx polycommata* Schiff. and *Xanthorhoe quadrifasciata* Clerk. at this time from females taken at Winchester and Stonor respectively during the previous year.

On 4th May O.K. was joined by Bernard Skinner for a trip to the New Forest. En route, seven larvae of *Parascotia fuliginaria* L. still in the hibernating skin were found under a log near Esher, whilst on the Test larvae of *Panaxia dominula* L. were still only half grown on the comfrey. In the Forest, larvae of *Thera variata* Schiff. were fairly common on spruce and a few larvae of *Ellopija fasciaria* L. were dislodged from pine. *Cleora cinctaria* Schiff. was well out with about three dozen collected from pine trunks. That night in Denny Lodge enclosure, the usual spring species turned up in fair numbers at m.v. including six *Odontotia carmelita* Esp. and three *Eupithecia irriguata* Hübn.

Visits to Ham Street and Abinger the following weeks confirmed that the usual species were about, including *Notodonta trepida* Esp., a few *O. carmelita*, while *L. suffumata*, *Anticlea derivata* Schiff. and *Ligdia adustata* Schiff. were common at dusk at Ranmore on the 8th. On 11th May, we found egg batches of *Orthosia advena* Schiff. after dark on stems but for the second time failed to rear the bug, our disappointment being heightened by the success other collectors have had with this species from the same locality. Later that night at Ockham, we found we were too late for larvae of *Amathes ditrapezium* Schiff. Larvae of *Aporophylla lutulenta* Schiff. were again plentiful on heather locally later in the month but this is also not an easy species to breed. The larvae take readily to birch but have difficulty in pupating.

On 15th May, Bernard Skinner, his wife and C. drove to Ledbury to renew acquaintance with Dr Michael Harper and his family and to try for *Xylomyges conspicillaris* L. A detour

was made via Andover for fully fed larvae of *P. dominula*. On arrival at Ledbury and after enjoying Mrs Harper's usual hospitality, the afternoon was spent searching miles of posts. Only one *conspicillaris* was found but as this was a heavily pregnant female, plenty of pupae have been obtained. Light that night was disappointing, due to the cold, clear weather and the only noteworthy capture was *Eupithecia dodoneata* Guen. of which a few were seen.

Larvae of all sizes of *Philereme transversata* Hufn. and *P. vetulata* Schiff. were fairly common on buckthorn when we stopped near Eynsford on 22nd May en route for Faversham to look for larvae of *Leucania favicolor* Barrett. Here larvae were abundant but only one produced *favicolor*, the remainder being *L. impura*. Again, we were possibly too late.

Larvae of *Cirrhia gilvago* Schiff. were common on wych elm on the banks of the Royal Military Canal, on 27th May, with a sprinkling of *B. sphinx* Hufn. Light at Ham Street that night produced nothing unusual, except for the late *O. populeti* already referred to. Larvae of *Lithosia deplana* Esp. on yew at Box Hill were still only half-grown on 28th May and slightly under-sized moths were bred but *Cepphis advenaria* Hübn. was flying abundantly the same day at Abinger in fresh condition with a few newly-emerged *Scopula lactata* Haw. A longer trip was made on 29th May, the first stage being to Esher where five large larvae of *Parascotia fuliginaria* L. were found to supplement those taken earlier from the same log. Near Andover, larvae of *Plusia chryson* Esp. were in the second half of their growth on hemp agrimony but very few *P. dominula* were still feeding. That night in the New Forest, 48 *L. sororcula* Hufn. were counted. It was interesting that the great majority were in the same trap, illustrating once again the importance of siting the lamps correctly. *L. otregiata* Metcalfe was beginning to emerge but visitors to the light were routine, including a few *Hyloicus pinastri* L., *Cosymbia porata* L., *C. linearia* Hübn., *C. albipunctata* Hufn. and ten quite fresh *N. anceps*.

It is in June that things really begin to heat up and the first trip of the month was to the chalk downs near Wrotham where m.v. attracted a large concourse of species, including *Hadena contigua* Schiff., *Agrotis denticulata* Haw., many *Horisme vitalbata* Schiff., *B. bimaculata* Fab. and *B. temerata* Schiff. Surprisingly no *X. montanata* Schiff. were seen and we found the moth generally scarce this year. The 5th June saw us in mixed woodland in the Chilterns, well known for its supply of *Trisateles emortualis* Schiff. These woods harbour many desirable species and on this occasion we were pleased to note the dark local form of *Stauropus fagi* L., two *Apatele alni* L., two examples of the *melanotica* form of *Colocasia coryli* L., *Discoloxia blomeri* Curt, *Abraxas sylvata* Scop., *C. annulata* Schulze, *C. linearia*, *Ectropis consonaria* Hübn., and, as we were packing up, thirteen *Selenia lunaria* Schiff.

On 6th June, Bernard Skinner accompanied C. to Tilgate

where moths were flying in numbers, including a couple of *Harpyia bicuspis* Bork., eight *A. alni*, five *H. pinastri*, one *Euphyia luctuata* Schiff., and a late *O. gothica* L. Three days later in Ham Street, we were surprised to be still taking quite fresh examples of *Panolis flammea* Schiff. which had been going over in Berkshire five weeks previously. The most welcome visitors were a male *Colobochyla salicalis* Schiff., a dozen *E. luctuata* and five *Moma alpium* Osb. Having worked Sandwich for the first time in 1969, we decided to spend more time there this year. The first visit was on 10th June when *Heliophobus albicolon* Hübn. was common at light and sugar and *A. ripae* Hübn., *Spilosoma urticae* Esp. and *Cucullia umbratica* L. were seen at light.

A more ambitious day was planned for 12th June when Skinner and C. headed for Dorset after *Eriogaster lanestris* L. S. soon found a large nest and the larvae were successfully sleeved on bullace. Then on to Hod Hill where *Perizoma albulata* Schiff. was common but worn and two *Parasemia planataginis* L., a few *Euphydryas aurinia* Rott. and *Lysandra bellargus* Rott. were seen. The sandhills at Studland were the next stop when thirteen larvae of *Lasiocampa trifolii* Schiff. were found on the marram. That night light in the New Forest attracted many species. *H. contigua* was common on the heather with many pairs in cop. Three each of *Eustrotia uncula* Clerck. and *C. viridata* Clerck. were taken, together with a few *Dyscia fagaria* Thunb., *H. pinastri*, *C. umbratica*, *Mysticoptera sexalata* Retz., and *Pachynemina hippocastanaria* Hübn. In all, quite a good day.

The whole of June was notable for the very fine weather but it turned cool after dark on 16th when we visited Horsell Common. Only one *D. fagaria* was found on the heather but *Perconia strigillaria* Hübn. was very common. Although a diverse range of species was attracted to the lights, the quantity was low and we were not kept very busy. The best insects noted were *H. contigua*, several *Boarmia roboraria* Schiff. and *Diacrisia sannio* L., with a brace of *Sterrhia sylvestraria* Hübn. One or two larvae of *A. lutulenta* were still feeding.

The next outing, on 19th June, was to the Fens where we were joined by the Skinners. Moths were plentiful, one of the first species on the wing being *Zanclognatha cribrumalis* Hübn. which was common and in fresh condition. *Meliana flammea* Curt., *Chilodes maritima* Tausch., *Leucania pudorina* Schiff. and *L. straminea* Treits were going over, but a few fresh *E. bankiana* Fab., *S. lunaria* and *Apeira syringaria* L. were taken and one worn *X. biriviata* Bork. was seen.

A second visit to Sandwich, on 24th, was not very rewarding. *A. clavis* Hufn. and *Apamea sublustris* Esp. were the commonest moths at sugar with one *L. obsoleta*. *H. albicolon* and *A. ripae* came to light whilst *C. umbratica* were sitting low down on the posts but were worn. On 28th June, *S. ochrata* Scop. and *Aplasta ononaria* Fues. were flying in fair

numbers by day although past their prime.

Larvae of *O. gracilis* Schiff. were spun up in the tips of bog myrtle in the Forest on 26th June and three *S. muricata* Hufn. and several worn *D. sannio* were seen. That night dusking at Portland yielded 19 *S. degeneraria* Hübn. the majority of which were females. Some moths were bred out in September and the remaining larvae are now in hibernation. M.v. was practically useless, the best visitors being *L. l-album* L., *A. trux* Hübn., *S. conjugata* Bork. and one *Procus versicolor* Bork.

At the end of the month, larvae of *Malacosoma castrensis* L. were common at Faversham whilst larvae of *Cucullia chamomilae* Schiff. were abundant in all sizes on chamomile.

July was far less active, the first trip being to the Chilterns on 4th when nine *T. emortualis*, mostly females, were seen. Although eggs were obtained and the larvae started to feed, they quickly died off in spite of efforts to supply oak leaves of the right age and texture. *A. ditrapezium*, *A. sylvata*, *D. blomeri* and *C. linearia* were present in numbers but a welcome species was *P. versicolor* which was just emerging and clearly distinguishable from its co-geners by its purple flush and reddish thoracic tuft.

Good nights were the feature of this period and moths were again plentiful at Ham Street on 6th July, when O'K. had over 100 species to light, including many *Paracolax derivalis*, *Apoda avellana*, *Angerona prunaria*, *Tethea fluctuosa* with a few *M. alpium*, *Atolmis rubricollis*, *Rheumaptera undulata*, *Epione repandaria* and five *Heterogenea asella*. At Dungeness on 10th, *Lithosia pygmeola* was already worn and the few *Thalera fimbrialis* seen were in tatters at this early date.

The night of 17th July was cool, clear and moonlit, in the New Forest. Half a dozen *L. quadra* L. were a pleasant sight, together with some females of *S. straminata* Bork., many male *Lymantria monacha* L. and two *Mormo maura* at sugar. At the same spot on 24th, sugar attracted *Amyhipyra berbera* Rungs, two more *M. maura* and one *C. promissa*. *Deplana* was fairly common, at light, accompanied by three male *quadra*, two female *monacha* and a female *Ennomos quercinaria* Hufn.

On the last day of the month, O'K. made the journey to Walberswick where he met Dr Michael Harper who was staying in the district with his family. Together with Mr Chipperfield, they dusked along the shore where *Euxoa cursoria* Hufn. was common and in lovely condition. *Scopula emutaria*, *Celaena leucostigma* Esp., and *Apamea oblonga* Haw. were also seen. At light in the marsh, *Nonagria neurica* Hübn. put in its usual appearance, fifteen being noted but *Arenostola brevilinea* Fenn. was only just coming out whilst the few *Simyra venosa* Borkh. that turned up were badly worn.

By August, moths and enthusiasm were waning but on 5th Skinner and C. found pupae of *Nonagria algea* Esp. in the reed mace near Cuckfield where *C. rufa* Haw. was flying in

hundreds at dusk. Walls near Brighton were searched for ten *Cryphia muralis* Forst. The first night trip was on 8th, when, accompanied again by Skinner, we visited the Broads. *Arenostola brevilinea* Fenn, *Calaena haworthii* Haw., *C. leucostigma* Hübn. were common, but only a few *N. dissoluta* Treit., *Simyra venosa* Bork. and *Orthonama lignata* Hübn. were taken. A few swallowtail larvae were still about. Other trips during the month to Ranmore and Dungeness produced nothing of note.

Early September saw the emergence of a short series of *C. ocellaris* Borkh. from Black Poplar catkins collected near Bexley in April. This species would appear to be more widespread than is generally supposed and is very easy to breed.

A second visit to Scotland was made on 13th September, the quarry being *Coenocalpa lapidata* Hübn. Once again, we were unlucky with the Scottish weather; two of our four nights were cold and very wet and the other two were very cold with sharp frost. Many hours were spent trying to put up *lapidata* but without success. The species is said to fly in the afternoon but although the mornings were sunny, cloud built up after lunch and the cold wind kept temperatures well below normal. Larvae were not over plentiful but by working high ground, we managed to beat *Hydriomena ruberata* Frey. in numbers, together with a few common proinents. Juniper near Aviemore Bridge held many larvae of *Eupithecia helveticaria* Bdv. and a few pupae of *Thera juniperata* L., whilst the pine yielded *Bupalus piniaria* L. in quantity, from which we are looking forward to the white male form. Our base was at Calvine where we ran two traps with two more in the village of Struan. The only noteworthy species was a worn male, *C. lapidata* at Struan and although singletons of such things as *A. lunibergenii* Fr., *Antitype chi* L., *Lithomoia solidaginis* Hübn., *Xylena vetusa* Hübn., and *Oporinia filigrammaria* H.-S. were seen, they were of course past their best. *Chloroclysta miata* L., *C. siterata* Hufn. and *O. autumnata* Borkh. were uncommon but fresh, and *Dysstroma citrata* L. was worn but abundant; we have a goodly supply of eggs.

On 25th September, O'K. visited Dungeness but although conditions appeared reasonable very little came to light or sugar. He then transferred to Ham Street where the bugs were different but still unexciting. Autumn is a most peculiar time of year for collecting and seemingly ideal conditions frequently prove disappointing. Such was the situation in the Forest on 4th October when the temperature was 59° F. but even the pine carpets were scarce. Of note was one each *Lithophane ornitopus* Hufn. and *C. siterata* with a few *T. firmata* Hufn. for good measure.

October was a very mild month and the usual autumn species were quite plentiful at Ranmore on the 10th, with *Agrocola macilentata* Hübn. in plenty. The mild weather continued throughout November, and the nights of the 10th and

23rd, when visits were made to Wye, were no exception. For some reason, however, conditions did not quite suit *P. plumigera*; only two being seen on the 10th and none on the 23rd, although there were plenty of *P. populi*, *Oporinia fagata* Scharf. and *E. aurantiaria* about.

British Coleoptera: Corrections and Supplementary Notes, including the addition of *Axinotarsus marginalis* Lap. (Melyridae) to our list

By A. A. ALLEN, B.Sc., A.R.C.S.

I take this opportunity to bring together a number of post-scripts to my papers published in the *Record* over the last few years, aimed at revising the list of our species in certain groups of beetles; and especially, to correct the chief misprints and any errors of fact therein which have since come to my notice. In referring to the individual papers I have thought it unnecessary to give the full title, as the name of the genus or group will in each case suffice for identification. They will be taken in chronological order.

I. ATOMARIA (1968, 80: 318-326)

Page 319, line 6 up, for *zetterstedtii* read *zetterstedti*. p. 320, l. 8 up, for Sjöberg read Sjöberg. p. 321, footnote, l. 3, for Hebst read Herbst. p. 322, l. 4, for 'infusata' read 'infusate'; l. 9, for Horton read Horion. p. 323, l. 3, for Schon. read Schön.; l. 24, for 'of the' read 'of in the'. p. 326, l. 3, for *zetterstedt* read *zetterstedti*; l. 8 up, for 'sud-' read 'süd-'; l. 7 up, for Laubbume read Laubbäume; l. 5 up, for Sjöbery read Sjöberg.

A. rhenana Kr. (p. 230): at the time I wrote, the correctness of this name for the species there characterised had not been proved and was still open to question (cf. also p. 323 *ad fin.*). Since then, however, Mr Colin Johnson has found that our insect is without doubt Kraatz's *rhenana* (thus vindicating Fowler's usage); but that, on the other hand, Sjöberg's attribution of it to *godarti* Guil. is erroneous, the latter being a different species. My statement, therefore, that *godarti* is definitely the present one turns out to have been premature, though everything pointed to its truth when written.

A. gibbula Er. (p. 323): I mentioned, in my discussion of the species to which Sjöberg (*not* British authors) has applied this name, that its true identity was suspect and under investigation by Mr Johnson. He has lately discovered that our species is really *A. viennensis* Reitt., which name must therefore replace both *gibbula* sensu Sjöberg, Allen, and *versicolor* sensu Fowler, *nec* Er.

A. scutellaris Mots. (pp. 319-320) was British on one record only (Scillies, Blair) at the time of writing. Since then, Mr C. MacKechnie Jarvis has found that he had taken one example on Tresco, 29.v.65 (*Ent. mon. Mag.*, 1969, **105**: 69).

A. divisa Rye (p. 324): the unique type has lately been examined by Mr Johnson, who is satisfied that it is identical with *rubricollis* Bris.—as suspected but not definitely known up to now. An Irish record can be added for this (with us) very rare *Atomaria*, a specimen from Killarney, Co. Kerry, having been found in the Power collection mixed with *nigripennis* Payk.

2. CERCYON (1969, **81**: 211-216)

Page 211, l. 5 up, for 'vary' read 'very'. p. 212, l. 8-9, transpose comma after '1956' and semicolon; l. 8 up, insert full stop at end of sentence. p. 213, l. 5 up, insert dash after 'separated'. p. 215, l. 11, delete final 's' in 'characteristics'; l. 16, insert full stop at end; l. 28, for 'punctuate' read 'punctate'; l. 5 up, for Joesph read Joseph. p. 216, l. 7, delete (Sussex).

C. laminatus Shp. (pp. 211-2): the entire upper surface may be more or less pitchy with only the side margins obscurely paler. I can add no further localities; but the species has continued to occur here at m.v. light at the rate of one or two a year, and I now have virtually no doubt that pigeons' nests are the breeding-source.

C. bifenestratus Küst. (p. 213) must, after all, remain on our list, as I have since taken a specimen at Rye, Sussex, 6.viii.69 (see *Ent. mon. Mag.*, 1970, **106**: 5).

3. SCYDMAENIDAE (1969, **81**: 239-246)

Page 239, l. 26, for 'Kies' read 'Kies.' p. 240, l. 26, for 'chraacters' read 'characters'. p. 242, l. 15, for Pararaphes read *Pararaphes*. p. 243, l. 19 up, for 'mistakes' read 'mistake'. p. 244, l. 1, for *exilus* read *exilis*. p. 245, l. 4 up, for *Scydaenidae* read *Scydmaenidae*.

Neuraphes helvolus Schaum (p. 242): for a recent record from the London district (Blackheath) see Allen, 1969, *Ent. mon. Mag.*, **105**: 198.

Stenichnus pusillus M. & K. (= *stotti* Donis.) (p. 243): my statement that "the *pusillus* of all our collections and literature is obviously *scutellaris*" is, I now think, too incautious and dogmatic; 'all' should be omitted and 'in general' substituted for 'obviously'. The actual position appears to be less clear-cut. It should have been pointed out that Fowler's description and key characters for *pusillus* are correct, though many of his records no doubt apply to *scutellaris*. I have a new Dorset record of the true *S. pusillus* (*Ent. mon. Mag.*, in press).

Euconnus murielae Last (p. 244): Dr A. M. Easton records a specimen taken indoors at Great Bookham, Surrey, in 1937, which is thus the earliest known capture of the species (*Ent. mon. Mag.*, 1970, **106**: 2).

4. MALACODERMATA (1969, 81: 269-273)

Page 270, l. 8, for 'inisisted' read 'insisted'; l. 9, delete final stop; l. 13 up, for 'el. read 'el. p. 271, l. 12, for 1951 read 1851; l. 16, for 'identified' read 'identified'. p. 273, l. 26, delete I.

Axinotarsus marginalis Lap. (Melyridae).—This species, new to Britain, is nearest to *A. pulicarius* F. which it much resembles, but may be readily distinguished as follows:—

Smaller, l. 2.2-3 mm. Antennae shorter; segment 5 not longer than 4. Tarsi at least towards apex metallic black; front and middle tibiae reddish or pitchy-brown towards apex at least ♂ (in ♀ often obscurely).

Male: Antennae only about as long as elytra. Upper edge of elytral apex subtruncate, (upper) sutural angles rounded right-angles seen from above, outer apical angles not at all acute; apical excavation much shallower, reflexed part projecting beyond rest and forming the lower sutural angles, shiny brown-black, of irregular twisted shape, produced upward to meet the upper angles *marginalis*.

Larger, l. 3-3.5 mm. Antennae longer; segment 5 plainly longer than 4. Tarsi in great part red-yellow; all tibiae wholly dark.

Male: Antennae much longer than elytra, or at least obviously so. Upper edge of elytral apex having the outline of an open inverted V, (upper) sutural angles very obtuse or absent and outer apical ones acute, seen from above; apical excavation very deep: lower sutural angles wanting, the (not shiny) brown reflexed part largely hidden from above inside the excavation, and having two pairs of backwardly-directed processes, the outer with spatulate, the inner with finely aciculate apex, and both pairs projecting to about the level of the outer angles *pulicarius*.

The complicated structure of the reflexed portion of the male elytral apex in these species and their allies in the Malachiini is very peculiar and remarkable, furnishing valuable specific characters analogous to those of the male genitalia in other groups.

Found by Mr David Appleton (who already has to his credit a series of highly notable captures in the New Forest area, including *Hypocoelus cariniceps* Rtt. unique as British) in two localities in South Hampshire several miles apart: a wood near Fareham, and Bere Forest. In the former place a few examples were swept from herbage or flowers bordering the wood in the summer of 1966, and on 1-2.vii.67 it was rather common on flowers of *Scabiosa succisa* in a fire-break in another part of the wood. In the second locality it was common in June-July 1970 on flowers and grass around the edge of an area that had been cleared and sprayed. Quite naturally it was taken by its captor for *A. pulicarius*, and the fact that it instantly runs down to that species in British keys renders it possible that *A. marginalis* is standing as the other species in a few of our collections; this is likeliest of any captures within the last decade or two, since *marginalis* is plainly, I think, a recent colonist with us, whilst *pulicarius* is a very local insect of south-east England which does not appear to have been taken for a good many years. It remains to be seen whether the former,

having obtained a foothold, will spread much beyond its present stations; both species extend across central and southern Europe to the Caucasus. We now possess as British all three mid-European species of *Axinotarsus*.

Ebaeus pedicularis F.—A member of an allied genus not 'officially' represented in our fauna; but there are definite records, supported moreover by actual specimens, to which the sole objection—or so it appears—is their antiquity. This species is the *Malachius productus* of Stephens (1830: 315-6; 1839: 195), concerning which Donisthorpe (1939, *Prel. List Col. Windsor Forest*: 82) writes:—"Windsor, Dr Leach' (Stephens, 1830). There are three specimens in the Stephensian collection and three in the drawer of doubtful British species in the British Museum." I have seen no other reference to the insect in our literature since Stephens, who records it also from Devonshire and Bristol, and again, it would seem, on Leach's authority. The evidence for its having occurred is certainly no weaker, but rather stronger, than for a number of other species included with reserve, or at least mentioned, by Fowler (*Col. Brit. Isl.*); and, as with some others, the omission of the present species from his standard work (accidental?) explains its subsequent neglect. In future *E. pedicularis* could with advantage be included with either the doubtful or the 'presumed extinct' species—preferably the former. It might well turn up again in the Windsor Forest area, just as did (e.g.) *Ludius ferrugineus* L. also taken there by Leach (*teste* Stephens).

A note on certain other Melyrids given as British by Stephens.—The same author includes under his genus '*Aplocnemus*' two species that deserve passing notice, as they are not otherwise known as British. *A.* (now *Trichoceble*) *floralis* Ol. is stated to have been taken at Petworth, Sussex, by Westwood (1830: 317); but in the *Manual* (1839) the species is placed in brackets as 'not rightly ascertained to be indigenous' and the Petworth record transferred to *Dasytes niger* L. (both on p. 195). As the descriptions he gives of the two beetles do not differ greatly, we may fairly conclude that the original *A. floralis* record was a case of mistaken identity.

It is otherwise, however, with the second species, *A.* (now *Divales*) *4-pustulatus* F. (the name is given as *4-punctulatus* in the earlier work), which, with another—'*Enicopus ater* F.' (now *Henicopus pilosus* Scop.)—he records as taken in Devonshire by Dr Leach. It is of interest to note that seven good pinned examples of the *Divales* are still extant among the remnants of the old 'B.M.Coll.' material at the end of the Power collection, which seem likely to be some of Leach's specimens. Nevertheless, there are two reasons—perhaps really one and the same—why it is safer to assume that the two species were ascribed to Britain through some error: viz., that both are purely southern in Europe, and that in the later work the entries for both are bracketed as doubtful. Yet it is a fact that some largely Mediterranean insects appear to be at home in at least the south-west of England!

It may be added that the *Dasytes caeruleus* F. of Stephens is not the true species of that name—which has never been found in this country, though it ought to be—but *Psilothrix cyaneus* Ol.; that the same applies to his *D. viridis* Rossi; and that his *D. serricornis* is evidently the male, and his *D. aeratus* the female, of the well-known *Dasytes aerosus* Kies.

Trichodes (p. 272): in my paper there referred to, on the British status of this genus of Cleridae, one record of *T. alvearius* F. was overlooked, namely 'Leatherhead' (Surrey) given by Stephens (1839: 198). He links it with Dorking (not far off) where Waterhouse had taken a specimen as reported in Stephens's earlier work. We can thus tentatively date the Leatherhead capture as being some time between 1830 and 1839, and the probability that *I. alvearius* was then still lingering on in that part of Surrey is rendered thereby a few degrees stronger.

Corynetes caeruleus Deg.: for a note on the habitat of this Clerid—which present certain points of interest—see Allen, *Ent. mon. Mag.*, in press.

5. OXYPODA (1970, 82: 19-26)

Page 20, l. 10 and head of para. 3, alter 'Muls.' to 'Rey'; also delete footnote and substitute: 'Species of Staphylinidae hitherto ascribed to Mulsant, or Mulsant and Rey jointly, are now deemed to have been published by Rey (*teste* G. Fagel *in litt.*). The appropriate changes should therefore be made in the authorship of species 2, 9 and 12, and in the synonymy of species 15 and 16, in my check-list (pp. 24-5). p. 21, head of para. 3, delete 'Muls. &'. p. 23, l. 22, transpose final stop and bracket. p. 24, l. 21 up, for 'diferent' read 'different'. p. 25, l. 21, delete 'as does Fowler'.

In the check-list above mentioned I elected (provisionally, cf. note 3 succeeding the list) to follow Tottenham (1949) and Kloet & Hincks (1945) over the question of the correct name for the species long known as *O. longiuscula* Er. (or Grav.) and more recently as *O. elongatula* Aubé. The choice, however, turns out to have been unfortunate! Mons. G. Fagel, of Brussels an authority on the family, has been good enough to elucidate the matter: the older name (1806) cannot stand as it is a junior homonym of *Aleochara longiuscula* Grav. (1802)—now an *Atheta* (*Liogluta*). Consequently, species no. 7 (p. 25) should read *elongatula* Aubé (1850)/= *longiuscula* (Gravenhorst, 1806, *nec* 1802).

O. rugulosa Kr.: Dr G. A. Lohse (1970, *Ent. Blatt.*, 66 (2): 66) has discovered that the species which has long passed under this name on the Continent is really another, *O. riparia* Fairm.; and from what he writes it is quite clear that the same is true of the British so-called *O. rugulosa*—one of our rarest species. Kraatz's insect of which he has seen the type, is very distinct and seems extraordinarily rare. Actually, Fowler as long ago as 1888 (*Col. Brit. Isl.*, 2: 32) recognised the identity of our

species with *riparia* Fairm. (*nec* Thoms.), but used Sharp's name for it, while querying *rugulosa* Kr. as synonymous. Species 17 of the check-list must therefore be altered to *riparia* Fairmaire 1859/= *mutata* Sharp 1871/= *rugulosa* auct., *nec* Kraatz 1856.

O. tarda Shp. (p. 24): in a paper which I have not seen (1959, *Mitt. D. ent. Ges.*, **18** (4): 60-1), Dr H. Korge has split off from *O. brachyptera* Steph. a species determined as *O. difficilis* Roub. Dr Lohse, however (*op. cit. sup.*, 67) points out that *O. difficilis* sensu Korge is a different species from Roubal's and is in fact *O. tarda* Sharp. In my notes I have tentatively classified *tarda* as a form of the evidently plastic species *brachyptera*, but must stress that this treatment (like others in the same paper) is no more than provisional. When the question has been more thoroughly sifted it may well appear that *tarda* should be restored to specific rank; but as yet—the two forms being in any case exceedingly close—I am not convinced of the need for this, and meanwhile we shall not be far wrong in adopting the more synthetic point of view. It is, moreover, quite possible that the form *tarda* has on the Continent evolved further towards full speciation than it has in Britain; there are several instances where this (or the converse) seems to have happened.

6. ORTHOPERUS (1970, **82**: 112-120)

Page 112, l. 8, insert comma after 'limbs'. p. 113, l. 1, insert full stop after (1889). p. 117, l. 19 up, for *nirgescens* read *nigrescens*. p. 119, l. 13 up, for Fennoscaydian read Fennoscandian; l. 4 up, for 'seems' read 'seem'.

63 Blackheath Park, London, S.E.3. 26.xii.70.

Gortyna borelii Pierret (ssp *lunata* Freyer ?): a new British moth

By J. B. FISHER

I have now taken 3 specimens of this moth, the first kindly identified by Mr D. Read of the Natural History Museum, South Kensington, and the second and third by myself. The first, a female was caught at a lighted window in the autumn of 1968 and for various rather embarrassing reasons not taken to be identified until early this year. The others were taken on 25th September 1970 at an M.V. trap in the same locality. According to the Museum this is the first British record.

This *Hydraecia* is well known in Central France and Central Europe generally I think, and has the typical *Hydraecia* shape. It resembles most a giant Frosted Orange (*Gortyna flavago*), its size in fact being similar to a Large Yellow Underwing (*Noctua pronuba*). My three specimens have wing spans ranging from 50 mm to over 56 mm. The ground colour of the fore wings,

however, is paler and much more olive than *flavago*, all 3 stigmata are very pronounced and there is a widening dark brown/black mark going horizontally through the orbital and reniform. Finally there is no inner line. The body is very similar indeed to *flavago*.



With no other British record and little information to go on I thought it must be a vagrant or migrant but the capture of the second and third this September—one of which was very fresh—raised the possibility that this was a very local, indigenous species. On the advice of Mr D. S. Fletcher of the Museum I wrote to M. Charles Boursin in Paris and his reply was most encouraging. The moth he said is not a migrant, is unlikely to have been introduced recently and feeds on an extremely local member of the umbelliferous tribe which, as it happens, grows within 3 miles of my house (possibly nearer) and in very few other places in this country. He also pointed out (rather wryly) the somewhat similar circumstances of *Hydraecia hucherardi*'s discovery in the 1950's, and was not at all surprised to hear that we had *borelii*.

Thus there is a very strong likelihood that this is a local breeding species, possibly quite common. It is a relatively late flyer. There are no keen collectors that I know of in the immediate neighbourhood, and as the breeding area is rather remote I suppose it could easily have been overlooked for some time. I myself am a lazy collector at the moment, with an M.V. trap on at weekends only, and not every weekend, so more diligence at the right time could well have produced more specimens here, let alone in the actual breeding area. Next year, of course, I will search for larvae to try and prove breeding but it is nice to think that there is a strong possibility of a casual M.V. trap in commuter country still turning up a new breeding species.

Butterflies of South Bohemia

By OTAKAR KUDONA, F.R.E.S.

Department of Zoology, Downing Street, Cambridge

(Continued from Vol. 82, Page 330)

SATYRIDAE

Erebia ligea L.

Eurosiberian. Coniferous forest. July-August. Quite widely distributed in the country mainly in large forest areas except higher level of mountains. Mostly common.

Erebia euryale Esp.

Ssp. *isarica* Heyne. Boreo-alpine. Coniferous forest, July-August. Continuously distributed in spruce forests and their neighbourhood in the Sumava mountains from about 800 m. above sea level up and mostly very common, every year in spite of its two year life-cycle.

L.: Antigl, Boubín, Černý Kříž, Horská Kvilda, Javorí pila, Jezerní slat, Kubova Hut, Kunžvart, Kvilda, Lenora, Libín, Modrava, Mrtvý luh, Nové Hutě, Prachatice (?), Stachy, Stožec, Vacov, Vimperk, Volary, Vyssí Brod (?).

R.: 18, 34, 36, 57, 61, 64.

Erebia aethiops Esp.

Eurosiberian. Deciduous forest. July-August. Widely distributed mainly in lowlands and usually common.

Erebia medusa Den. et Schiff.

Eurosiberian. Meadow. June-July. Distributed over the whole country and generally very common.

Melanargia galathea L.

Eurooriental. Meadow. June-August. Widely distributed and common in the country but does not occur above the 1000 m. line in mountain areas.

Hipparchia fagi Scop.

Eurooriental. Forest steppe. July-August. Very rare and only a few examples have been occasionally captured.

L.: České Budějovice, Choustník, Jindřichuv Hradec (?), Libnič, Nová Obora.

R.: 1, 5, 57.

Hipparchia aelia Hffmegg.

Atlantic. Forest steppe. July-August. Locally distributed mainly in the valley of the river Vltava and on the sandy soils in the Trebon basin. Uncommon or rare.

L.: Borkovice, České Budějovice, Čížova, Holubov, Klet, Klučenice, Orlík, Písek, Podolsko nad Vltavou, Ríhov, Rípec, Soběslav, Trebon, Vysehrad.

R.: 1, 9, 12, 37, 57, 64.

Hipparchia semele L.

Mediterranean. Forest steppe. July-September. Widely distributed in the country except higher level of the Sumava mountains (from about 900 m. above sea level up), but mostly uncommon.

Brintesia circe F.

Eurooriental. Forest steppe. July-August. More continuously distributed only in the south-east part of the country, where it is in certain years common and rather widely spread. Its permanent appearance as a common species on the top and hillsides of the mountain Kraví hora (958 m. above sea level) near the Austrian border seems to be quite unusual.

L.: Čertuv kámen, České Budějovice, České Velenice, Dobra Voda, Dubíkov, Choustník, Jindřichuv Hradec, Kaplice, Kraví hora, Prelát, Sejby, Trhové Sviny, Trocnov.

R.: 1, 5, 12, 52, 53, 57.

Chazara briseis L.

Mediterranean. Steppe. July-September. Distributed mainly in lowlands on rough rocky hillsides, e.g. in the valley of the river Vltava. Mostly uncommon.

L.: Klučnice, Kotek, Netolice, Orlík, Rábi, Soběslav, Srubec, Stachy, Týn nad Vltavou, Vodňany, Zahorany.

R.: 1, 12, 18, 33, 57, 64.

Minois dryas Scop.

Eurosiberian. Forest steppe. June-August. Distributed only in the valley of the river Vltava south from České Budějovice, where the butterfly was in certain restricted areas very common. In the last few years it has appeared much less abundantly.

L.: Adolfov, Borsov, České Budějovice, Holubov, Jamné, Kamenný Újezd, Kotek, Němá Strouha, Rančice, Vrabče.

R.: 1, 57.

Aphantopus hyperanthus L.

Eurosiberian. Meadow. June-August. Distributed over the whole country except mountain areas from about 800 to 900 m. above sea level up. Usually very common.

Pararge aegeria L.

Ssp. *egerides* Stgr. Mediterranean. Forest steppe. May-June, July-August. Distributed throughout the whole country and generally common.

Dira megaera L.

Eurosiberian. Forest steppe. April-June, July-September. Widely distributed in the country and common.

Dira maera L.

Eurosiberian. Deciduous forest. June-August. Distributed over the whole country and common.

Lopinga achine Scop.

Eurosiberian. Deciduous forest. June-July. A few specimens have

been found in the southern part of the country near the Austrian border, none of them in recent times.

L.: Horní Dvoriště, Vyssí Brod.

R.: 1, 57.

Maniola jurtina L.

Eurooriental. Meadow. June-September. Distributed in the whole country and usually very common.

Hyponephele lycaon Rott.

Eurosiberian. Steppe. July-August. Locally distributed on sandy soils mainly in the Trebon basin. Mostly uncommon.

L.: Borkovice, Písek, Soběslav, Tábor, Vlkov, Vodnany.

R.: 1, 9, 57.

Coenonympha amyntas Poda.

Eurosiberian. Deciduous forest. June-August. Widely distributed in the country and common up to about 900 m. above sea level.

Coenonympha arcania L.

Eurosiberian. Deciduous forest. June-August. Widely distributed in the country up to about 800 m. above sea level but really common only in lowlands.

Coenonympha pamphilus L.

Eurosiberian. Meadow. Continuously from April until November in 3 broods. Distributed everywhere in the country and very common.

Coenonympha tullia Mull.

Eurosiberian. Marsh. June-August. Distributed in certain marshes, fens and peat-bogs in the Trebon basin and Sumava mountains, but there up to about 1000 m. above sea level only. Mostly uncommon.

L.: Borkovice, České Budějovice (?), Dolní Radoun, Horní Dvoriště, Jindřichuv Hradec, Jiríkovo Údolí, Mrtvý, luh, Nové Hrady, Peckov, Petříkov, Příbraz, Ríhov, Soběslav.

R.: 9, 18, 36, 53, 57, 64.

NYMPHALIDAE

Apatura iris L.

Eurosiberian. Deciduous forest. July-August. Widely distributed in the whole country, but almost never common.

Apatura ilia Den. et Schiff.

Eurosiberian. Deciduous forest. June-August. Widely distributed in the lowlands, usually uncommon.

Limenitis camilla L.

Eurosiberian. Deciduous forest. June-July. Only a few specimens have been captured. Its appearance in the valley of the river Vltava (e.g. at Orlík) is possible according to the present distribution of the butterfly in Central Bohemia.

L.: Orlík, Rejstejn.

R.: 18, 37.

Limenitis populi L.

Eurosiberian. Deciduous forest. June-August. The butterfly is rather sporadically distributed throughout the whole country. Uncommon.

Neptis rivularis Scop. (= *Iucilla* Schiff.)

Eurosiberian. Forest steppe. June-August. The butterfly is distributed continuously in the south-eastern part of the country especially along the rivers Luznice and Nežárka, where it is common in certain restricted areas. It has been found rarely in some other localities where its foodplant *Spirea* spp. occurs.

L.: Borkovice, České Budějovice, Horusice, Hurka, Jindřichuv Hradec, Lisov, Nová Bystrice, Nové Hrady, Plavsko, Pribraz, Rožmberský rybník, Staré Reky, Soběslav, Spolí, Stráž nad Nežárkou, Schwarzenberský rybník, Trhové Sviny, Trebon, Veselí nad Lužnicí, Zlataá, Stoka, Zelnava (?).

R.: 1, 3, 5, 9, 51, 53, 57, 58.

Vanessa atalanta L.

Eurosiberian. Meadow. June-August, August-May. Widely distributed over the whole country and common. The over-wintering of adults is not clearly proven and high abundance of the summer-brood in certain years possibly depends mostly on immigration in June.

Vanessa cardui L.

Cosmopolitan. Meadow. June-July, August-May. Distributed throughout the whole country and often very common in summer and early Autumn.

Inachis io L.

Eurosiberian. Meadow. June-August, August-May. Distributed everywhere and very common.

Nymphalis xanthomelas Esp.

Eurosiberian. Deciduous forest. July-May. Uncommon but established in restricted locality in the valley of the river Vltava at Tyn nad Vltavou. Occasionally the butterfly has been found in a few other localities.

L.: Jindřichuv Hradec (?), Pisek, Prachatice, Strunkovice nad Blanicí, Týn nad Vltavou.

R.: 12, 57.

Nymphalis polychloros L.

Eurosiberian. Deciduous forest. July-May. Distributed over the whole country and mostly common.

Nymphalis antiopa L.

Holoarctic. Deciduous forest. July-May. Distributed throughout the country and usually common.

Polygonia c-album L.

Eurosiberian. Deciduous forest. June-July, August-May. Distributed throughout the whole country and common.

Araschnia levana L.

Eurosiberian. Meadow. April-May, July-August. Widely distributed over the whole country and common.

Melitaea diamina Lang.

Eurosiberian. Marsh. June-August. The butterfly is quite widely distributed throughout the country and locally common on less cultivated marshes.

Melitaea parthenie Borkh.

European. Steppe. June-August. Locally distributed in certain xerothermic biotypes and mostly rare.

L.: České Budějovice, Hartmanice (?), Nové Hrady (?), Ránčice, Soběslav, Tábor, Trhové Sviny, Vidov.

R.: 1, 57.

Melitaea cinxia L.

Eurosiberian. Meadow. June-July. Distributed mainly in lowlands and there often common.

Melitaea phoebe Den. et Schiff.

Eurosiberian. Steppe. May-June, July-August. Distributed only in a few restricted xerothermic areas. Rare.

L.: České Budějovice, Rejta, Vidov.

R.: 12, 57.

Melitaea didyma Esp.

Eurosiberian. Steppe. May-June, July-August. Distributed only in a few restricted xerothermic areas, preferable on limestone, but there usually common.

L.: Klučnice, Mílesov, Orlik, Písek, Susice, Újezd.

R.: 37, 50.

Mellicta athalia Rott.

Eurosiberian. Meadow. May-June, July-August. Distributed throughout the whole country and mostly very common in summer. In lowlands generally double-brooded.

Mellicta neglecta Pfau.

European (?). Peat-bog (?). June-July (?). A single male has been recorded recently from the peat-bog Mrtvý luh in the Sumava mountains. Although the relationship between *M. neglecta* Pfau and *M. thalia* Rott. is not quite clear, nor is the bionomy, ecology and distribution either.

L.: Mrtvý luh.

R.: 68.

Mesoacidalia charlotta L.

Eurosiberian. Meadow. June-August. Distributed over the whole country and common.

Fabriciana adippe Rott.

Eurosiberian. Meadow. July-August. Widely distributed in the country and mostly common.

Fabriciana niobe L.

Eurosiberian. Meadow. July-August. Widely distributed throughout the whole country and usually common.

Pandoriana pandora Den. et Schiff.

Mediterranean. Steppe. July-August. Only two specimens have been captured in the valley of the river Malse near České Budějovice (31/7/1932 and 8/8/1936). Possibly an occasional immigration from Austria.

L.: Rímov.

R.: 42, 43, 44, 48.

Argynnis paphia L.

Eurosiberian. Deciduous forest. July-September. Distributed everywhere and mostly very common.

Brenthis ino Rott.

Eurosiberian. Marsh. June-July. Locally distributed in certain marshy habitats mainly in the Sumava mountains (up to about 1000 m. above sea level) and its surroundings, where it is mostly common.

L.: Antigl, Divčí Kamen, Kristanovice, Lenora, Netolice, Peckov, Polecnice, Prachatice, Prelát, Spolí, Soběslav, Trhové Sviny, Trojice, Vacov, Vimperk.

R.: 12, 31, 33, 34, 36, 48.

Proclossiana eunomia Esp.

Holarctic. Peat-bog. June-July. Recently distributed only in restricted area of the peat-bog Mrtvý luh in the Sumava mountains and its neighbourhood, but there very common. A few specimens have been found in peat-bogs in the valley of the river Vltava near Vyssi Brod but this locality has been inundated by the building of an artificial lake almost twenty years ago.

L.: Chotýčany (?), Mrtvý luh, Vyssi Brod.

R.: 12, 36, 67, 68.

Clossiana selene Esp.

Holarctic. Meadow. May-June, July-August. Widely distributed and mainly in lowlands common. In the lowlands only there might be a partial second brood.

Clossiana euphrosyne L.

Eurosiberian. Meadow. May-July. Widely distributed in the country and common.

Clossiana dia L.

Eurosiberian. Meadow. April-May, July-August. Distributed throughout the whole country and mostly common. In mountains possibly only single brooded.

Boloria aquilonaris Stich.

Eurosiberian. Peat-bog. June-July. Distributed in a few restricted areas in peat-bogs in the Sumava mountains. Uncommon or rare.

L.: Kunžvart, Lenora, Modrava, Mrtvý luh.

R.: 36, 50, 57, 58.

Issoria lathonia L.

Eurosiberian. Meadow. June-July, August-May. Distributed throughout the whole country and common. Double-brooded possibly only in lowlands.

RIODINIDAE

Hamearis lucina L.

European. Deciduous forest. May-June, August? The butterfly is locally distributed mainly in certain restricted habitats (deciduous forest and rough bushy hillsides) in the valley of the river Vltava. Uncommon.

L.: Borkovice, České Budějovice, Horní Dvoriště, Klučnice, Soběslav.

R.: 1, 9, 37, 57.

LYCAENIDAE

Thecla quercus L.

Mediterranean. Deciduous forest. June-August. Sporadically distributed in lowlands. Uncommon.

Thecla betulae L.

Eurosiberian. Deciduous forest. July-September. Widely distributed mainly in lowlands, mostly uncommon.

Strymondia spini Schiff.

Eurosiberian. Forest steppe. June-July. Distributed locally mainly in the valley of the river Vltava in restricted areas on xerothermic bushy hillsides. Rare.

L.: České Budějovice, Hluboká nad Vltavou, Némá Strouha, Roudná, Soběslav, Susice, Vysenské kopce.

R.: 12, 57.

Strymonidia w-album Knoch.

Eurosiberian. Deciduous forest. June-August. Distributed in a few restricted areas. It occurs preferably on warm dry bushy hillsides. Uncommon or rare.

L.: Hluboká nad Vltavou, Nová Obora, Peckov, Vacov, Zdíkov.

R.: 12, 18, 57.

Strymonidia pruni L.

Eurosiberian. Forest steppe. June-August. Locally distributed in lowlands, mostly uncommon or rare.

L.: Borkovice, České Budějovice, Horní Dvoriště (?), Klučnice, Soběslav, Týn nad Vltavou.

R.: 9, 37, 57.

Callophrys rubi L.

Eurosiberian. Meadow. April-June. Distributed throughout the whole country and common.

Heodes virgaureae L.

Eurosiberian. Meadow. June-September. Distributed throughout the whole country and mostly very common.

Heodes tityrus Poda.

Atlantic. Meadow. May-June, July-August. Widely distributed in the country up to about 800 m. above sea level. Common.

Heodes alciphron Rott.

Eurosiberian. Meadow. June-July. Distributed locally mainly in the Sumava mountains and hills Novohradské hory. It occurs rather rarely in rough meadows, marshes and similar uncultivated grassy places. In a few restricted areas common.

L.: České Velenice, Dobrá Voda, Hartmanice, Idina pila, Klášterec, Lenora, Mrtvý luh, Netolice, Peckov, Písek, Prachatice, Říhov, Vacov, Vysehrad, Vyšší Brod.

R.: 12, 18, 31, 33, 36, 57.

Lycaena phlaeas L.

Holoarctic. Meadow. May-June, July-September. Distributed throughout the whole country and common.

Thersamonia dispar Haw.

Ssp. *rutilus* Wernb. Eurosiberian. Meadow (marsh). May-July. Only two single specimens have been found in the valley of the river Vltava near České Budějovice: 1st in June 1926, 2nd 15/6/1940.

L.: Němá Strouha.

R.: 5.

Thersamonia thersamon Esp.

Euroriental. Steppe. May-June, July-August. Only a few specimens have been found in the country, all of which were recorded before the year 1930. Possibly extinct.

L.: České Budějovice, Hluboká nad Vlavou, Klet.

R.: 57.

Palaeochrysophanus hippothoe L.

Eurosiberian. Marsh. June-August. Widely distributed in the country, but only in certain restricted areas really common. Possibly partially double brooded in lowlands, certainly single-brooded in mountain areas.

Lampides boeticus L.

Tropical. Forest-steppe, June-September. The only specimen recorded in the country was one female found in the year 1898. Certainly an immigrant or casual introduction.

L.: Horebník.

R.: 57.

Everes argiades Pall.

Eurosiberian. Meadow. May-June, July-September. Distributed throughout the whole country and generally common, the summer brood locally very common, the spring brood in higher levels often uncommon or rare.

Cupido minimus Fuessl.

Eurosiberian. Steppe. May-June, July-August. Distributed sporadically mainly in lowlands, but it occurs locally in mountain part of the country. In certain restricted xerothermic areas very common.

Celastrina argiolus L.

Eurosiberian. Deciduous forest. April-June, July-September. Distributed over the whole country and mostly common.

Scolitantides orion Pall.

Eurosiberian. Steppe. May-June, July-August. Distributed locally in a few restricted xerothermic biotypes, e.g. in the valley of the river Vltava. L.: České Budějovice, Divějí Kamen, Holubov, Horepník, Vidov. R.: 1, 57.

Philotes vicrama Moore.

Ssp. *schiffermulleri* Hemm. Eurosiberian. Steppe. May-June, July-August. Distributed in certain restricted areas on xerothermic biotypes in lowlands. Mostly rare.

L.: České Velenice, Dobrá Voda, Horepník, Chotýčany, Kájov, Koroseky, Lipno, Vidov, Vrábče.

R.: 1, 12, 33, 57.

Glaucopsyche alexis Poda.

Eurosiberian. Steppe. May-July. Sporadically distributed in certain restricted areas on xerothermic biotypes preferable on limestone. Mostly rare.

L.: Adolfov, České Budějovice, Dívčí Kamen, Hluboká nad Vltavou, Klučenice, Orlík, Písecká Smoleč, Písek, Ránčice, Soběslav, Stranov, Týn nad Vltavou, Velesin, Vidov, Vrábče, Vysenské kopce.

R.: 12, 37, 57.

Maculinea alcon Den. et Schiff.

Eurooriental. Meadow. June-August. Locally distributed mainly in the valley of the river Vltava south from České Budějovice. The butterfly usually occurs in restricted areas and appears quite rare.

L.: České Budějovice, Chýnov, Koroseky, Kotek, Nové Hrady, Trocnov, Vyssi, Brod.

R.: 1, 57.

Maculinea teleius Bergstr.

Eurosiberian. Marsh. July-August. Distributed sporadically mainly in lowlands and mostly uncommon, but in certain restricted areas is very common.

Maculinea nausithous Bergstr.

Eurosiberian. Marsh. July-August. Widely distributed throughout almost the whole country, but usually uncommon, except for certain restricted areas, where it is common.

Maculinea arion L.

Eurosiberian. Meadow. July-September. Widely distributed throughout the whole country and usually common.

Lycaeides idas L.

European. Steppe. May-June, July-August. Distributed in certain xerothermic usually restricted localities in lowland, usually uncommon or rare.

L.: České Budějovice, Jankov, Kaproun, Klučnice, Némá Strouha, Nové Hradý, Orlík, Písek, Tábor, Týn nad Vltavou, Veselí nad Lužnicí, Vidov, Vrábče.

R.: 1, 53, 57.

Plebejus argus L.

Eurosiberian. Meadow. June-August (possibly only partially double-brooded). Distributed throughout almost the whole country and generally common, on certain heaths very common.

Aricia agestis Den. et Schiff.

Eurosiberian. Steppe. May-June, July-August. Sporadically distributed in restricted warm and dry biotypes mostly in lowlands, uncommon. The butterfly occurs on the hillsides of Kraví Hora (958 m. above sea level) near the Austrian border, but is not common there.

L.: České Budějovice, Dobrá Voda, Jankov, Koroseky, Netolice, Orlík, Písecká Smolec, Píseck, Prachatice, Soběslav, Tábor, Trocnov, Týn nad Vltavou, Vysenské kopce, Zahoany.

R.: 12, 33, 37, 57.

Eumedonia chiron Rott.

Eurosiberian. Marsh. July-August. Only in a few very restricted areas on marshes with *Geranium* ssp., there usually uncommon.

L.: Chýnov, Kratochvíle, Písek.

R.: 31, 33.

Cyaniris semiargus Rott.

Eurosiberian. Meadow. June-August. Distributed throughout the whole country and common.

Vaccinia optilete Knoch.

Eurosiberian. Peat-bog. June-August. Continuously distributed only in peat-bogs in the Sumava mountains and Trebon basin. In its habitat usually uncommon, but in a few restricted areas might be found very abundant.

L.: Borkovice, Červené Blato, Horská Kvilda, Churánov, Javorí pila, Jezerní slat, Jiríkovo údolí, Kovárav, Kvilda, Kunžvart, Lenora, Modrava, Mrtvý luh, Nové Hradý, Petříkov, Plechý, Popelní hora, Soběslav, Volary, Zlatá Studna, Zelnava.

R.: 1, 9, 12, 18, 36, 37, 57, 60, 64, 68.

Polyommatus icarus Rott.

Eurosiberian. Meadow. May-June, July-September. Distributed throughout the whole country and mostly very common.

Lysandra icarius Rott.

Eurosiberian. Meadow. June-August. Distributed usually in slightly damp, but warm meadows in lowlands and in certain restricted areas common. The most abundant in the typical xerothermic locality of Vysenské kopce.

L.: Borkovice, Červená nad Vltavou, Dobrá Voda, Jindřichuv Hradec, Jiríkovo údolí, Klučnice, Netolice, Nová Obora, Nové Hrady, Písecká Smoleč, Písek, Ránčice, Rípec, Soběslav, Týn nad Vltavou, Vysenské kopce.

R.: 9, 12, 33.

Lysandra argester Bergstr.

Euroriental. Steppe. June-August. Locally distributed in certain xerothermic restricted areas preferable on limestone, in a few of them common.

L.: České Budějovice, Chatýčany, Klučnice, Kotek, Ránčice, Soběslav, Trhové Sviny, Vyseiské Kopce.

R.: 12, 35, 57.

Lysandra bellargus Rott.

Euroriental. Meadow. May-June, July-August. Widely distributed in lowlands and sometimes common.

Lysandra coridon Poda.

Euroriental. Steppe. June-August. Distributed in certain restricted xerothermic areas mostly on limestone, but only in a few of them common or very common.

L.: Borkovice, České Budějovice, Klučnice, Mokrý, Mílesov, Písecká Smoleč, Písek, Rábi, Týn nad Vltavou, Veselí nad Lužnicí, Vidov, Vysenské kopce.

R.: 9, 12, 57.

Agrodietus damon Den. et Schiff.

Eurosiberian. Steppe. July-August. Only a few specimens have been recorded in xerothermic biotypes mostly in the wider surroundings of České Budějovice.

L.: České Budějovice, Hluboká nad Vltavou, Horní Dvoriště (?).

R.: 1, 57.

Meleageria meleager Esp.

Euroriental. Steppe. July-August. Distributed only in certain restricted areas on xerothermic biotypes, only in a few of them common. Preferably on limestone.

L.: Borkovice, České Budějovice, Kamenný Újezd, Klučnice, Orlík, Písecká Smoleč, Písek, Soběslav, Strakonice, Týn nad Vltavou, Veselí na Lužnici, Vidov, Vysenské kopce.

R.: 1, 9, 12, 57.

HESPERIIDAE

Erynnis tages L.

Eurosiberian. Meadow. April-June, July-August. The butterfly is widely distributed and common over the whole country about 900 m. above sea level.

Carcharodu alceae Esp.

Eurosiberian. Forest steppe. April-May, July-August. Only occasional specimens have been captured in a few xerothermic habitats.

L.: Károv, Klet, Klučnice, Soběslav.

R.: 1, 37, 57.

Pyrgus carthammi Hbn.

Eurosiberian. Steppe. May-August (1 or 2 broods?). Only a few specimens have been recorded, none of them recently. (May be extinct).

L.: České Budějovice, Jamné, Něma Strouha, Vrábče.

R.: 1, 57.

Pyrgus malvae L.

Eurosiberian. Forest steppe. April-May, July-August. Generally distributed and common throughout the whole country.

Pyrgus serratulae Rbr.

Eurosiberian. Steppe. May-July (1 brood only?). The distribution is restricted to certain xerothermic habitats mainly in the valley of the river Vltava. Rare.

L.: České Budějovice, Chýnov, Klučnice, Něma Strouha, Písek, Rímov.

R.: 1, 12, 37, 57.

Pyrgus alveus Hbn.

Eurosiberian. Forest steppe. July-August. Widely distributed in the country and in some areas common.

Carterocephalus palaemon Pall.

Holarctic. Deciduous forest. May-June. Widely distributed in the country up to about 800-900 m. above sea level, but only locally common.

Adoepa lineola Ochs.

Eurosiberian. Forest steppe. June-August. Generally distributed and common.

Adoepa sylvestris Poda.

Eurosiberian. Meadow. July-September. Distributed throughout the whole country and common.

Thymelicus acteon Rott.

Mediterranean. Forest steppe. June-August. The distribution is restricted to certain xerothermic habitats mainly in the valley of the river Vltava. Rare.

L.: Klučnice, Lipno nad Vltavou, Orlik, Písecká Smoleč, Soběslav, Suchdol nad Lužnicí, Týn nad Vltavou, Vrábče.

R.: 12, 37.

Ochlodes venata Brem. et Gray

Ssp. *septentrionale* Vty. Eurosiberian. Meadow. June-August. Widely distributed in the whole country and common, locally very common.

Hesperia comma L.

Eurosiberian. Meadow. June-August. Distributed almost everywhere up to about 900 m. above sea level and common.

NOTE

In the literature there are data of occurrence of the two following species in South Bohemia. These species have not been included in this study, because their occurrence in South Bohemia is more than doubtful:

Colias chrysotheme Esp.: Sumava mountains (18). New data. The occurrence of this typical steppe species in this locality is certainly impossible. Possibly a mistake in identification (36).

Polygonia l-album Esp.: Jindrichuv Hradec (57). Old data. Possibly an occasional migrant (?), but it is almost certainly a mistake in identification.

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The Editor much regrets the disruption occasioned by the postal strike in combination with other unavoidable causes of delay.

To rectify matters, the present issue is dated from February to 15th March, and it is proposed that the next issue shall be dated 16th March to April, the issues being enlarged accordingly, and thereafter it is proposed to return to the customary routine, but there will be ten instead of the customary eleven issues in 1971.

Notes and Observations

A POSSIBLE CASE OF DIPTEROUS ECTOPARASITES CAUSING THE DEATH OF NESTLING HOUSE MARTINS.—During August 1969, I received a letter from Mr J. R. Clay of Dudleston Manor Farm, Dudleston, near Ellesmere, Salop, requesting the identification of an insect which he had taken from a dying House Martin, *Delichon urbica* (L.). On examination, I found it to be a specimen of the louse-fly, *Stenopteryx hirundinis* L. (Diptera: Hippoboscidae), a common ectoparasite of martins and swallows.

As Mr Clay mentioned that the House Martins nesting around his farm were dying, and deserting their nests, I asked him for further particulars. He subsequently informed me that he actually found two nestlings dying on the ground, apparently having fallen from their nests, and that he removed five of these flies from each of them. Both birds died shortly afterwards. Furthermore, Mr Clay told me that he had 21 occupied nests at the front of his farmhouse and 25 at the rear. A few days after he found the second bird dying, he noticed that the adult House Martins had deserted the latter group of nests, and, on investigation, discovered that about half of the 25 nests contained dead nestlings or adults (mostly the former) in them, the number in each nest varying from 1 to 4.

Unfortunately, Mr Clay was not able to check these other dead birds for parasites, but in view of this remarkably high mortality and the high number of Hippoboscids he found on the two dying birds beneath the nests, it seems to me that this may have been a case of a heavy infestation of ectoparasites having been responsible. The fact that the group of nests at the front of the farmhouse were apparently unaffected would appear to rule out starvation due to a spell of unfavourable weather reducing the availability of food to the young. In any case, that would not satisfactorily explain the deaths of the adults found in the nests.

Such examples of blood-sucking ectoparasites causing the death of their hosts are rare, but it is known that the depredations of *S. hirundinis* can sometimes so weaken martins and swallows that they become incapable of flight.—J. F. BURTON, BBC Natural History Unit, Bristol 8. 17.xii.1970.

AN UNUSUAL LATE BROOD OF NEPTICULA ANOMALELLA GOEZE.—On 4th October this year, I inspected a small and nondescript rose bush in my garden for Nepticulid mines and found two, probably *N. fletcheri* Tutt. This bush usually has three or four

mines of *N. anomalella*, and I was somewhat surprised to see the different mine, with no *anomalella*.

On 10th December I had occasion to go to the same, usually unfrequented part of my garden and was astonished to see the bush literally covered by *anomalella* mines. I counted 73 mined leaves and some of these had two or even three mines. The mines were all empty but gave the appearance of having only recently been vacated. However, I found no cocoons in their customary place on the leaf petiole against the stem. Possibly, being a late brood, the larvae had dropped to the ground to spin up in surface litter, or possibly they may have found their way into the crop of our garden wren; next year may produce a clue to show which way they went.—S. N. A. JACOBS, 54 Hayes Lane, Bromley, Kent, BR2 9EE. 26.xii.1970.

AN UNDETERMINED LEAF-MINE ON SALLOW.—In October of this year, when collecting at Debden in Essex, I found a vacated mine in a leaf of *Salix capraea* which I could not determine. It appeared to be the early feeding of a Tortricid larva, and it reminded me of *Gypsonoma oppressana* Treits. on white poplar in that the frass protruded through the downy under surface of the leaf.

I consulted Hering's herbarium at the Natural History Museum, where I found a single example of a similar mine on *Salix cinerea* which had been taken in the Berlin area on 20th September 1953. Hering's annotation of the mine reads:—"Tortricide, Frassbild ähnlich wie bei *Gypsonoma oppressana* Treits an *Populus*."

Can anyone identify the mine for me? Has *oppressana* ever been recorded from willow?—A. M. EMMET, Labrey Cottage, Victoria Gardens, Saffron Walden, Essex. 18.xii.1970.

A LATE *COLIAS CROCEA* FOURC.—It was on this date four years ago that I noted the finding of a female clouded yellow butterfly on the beach at Porthpean, Cornwall. The specimen was in a lethargic state and it first appeared to be dead. It was found on the sand only a few inches above the reach of the oncoming waves from the sea, and it seemed to be in danger of being washed away by the next large wave. On examination it proved to be in good condition, except for the absence of quite a large, almost semicircular piece which had been torn from the terminal area of the left hind wing. Whether this individual was an accidental wind-blown immigrant, or a freak emergence from a local brood, is a mystery. The butterfly remained alive in my cold garage for the following five and a half weeks, until it died naturally on or about the 2nd February 1967. Not surprisingly, although regular supplies of fresh clover leaves were presented, no ova were laid.—JOHN L. GREGORY, 17 Grove Road, St. Austell, Cornwall. 25.12.1970.

AN EARLY BUTTERFLY.—Following the extraordinarily warm spell of weather at the weekend 9th/10th January when temperatures were as high as 15°C. it would not be surprising that the sighting of a dormant butterfly should come to our notice.

This was in fact the case and I should like to record that Mrs N. F. Macmillan sighted a large colourful butterfly at Bromborough, Cheshire. She tells me that it was not a small tortoseshell (*Aglais urticae* (Linn.)) being too large and more colourful and I suspect it to have been a peacock (*Nymphalis io* (Linn.)).—E. G. HANCOCK, Assistant Keeper of Invertebrate Zoology, City of Liverpool Museums. 12.i.1971.

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Advertisement in H. T. Stainton's *Entomologist's Weekly Intelligencer*, Vol. 1 (No. 4): p. 32, of 26th April 1856. Was J. J. perhaps a relative of H.T.?—C. F. COWAN.

Current Literature

Insect Pollination of Crops by **John B. Free**. xi. + 544. Academic Press Inc. (London) Ltd. £7.25 (145/-).

In his preface the author points out the scope of his work, which is to bring together under one cover the essence of the information scattered through the literature (over 1700 titles are given in the bibliography at the end of the book), so that it may be readily available to the people, from growers to research workers, who are in need of it. He acknowledges that in some cases our knowledge is still in need of further research, and in such cases he mentions the fact; he also invites new information so that it may be included in a second edition, foreseen for some time in the future. The plants are limited to those of economic importance, and excludes decorative plants and timber trees. After the index of contents, there is a short list of conversion factors for the conversion of linear, square, and avoirdupois weights and measures into their respective decimal units and *vice versa*.

Scientific names are used throughout on account of the diversity of vernacular names current in various countries, but a Plant Index may be consulted for the English names.

In chapter 1, headed introduction, the author begins by pointing out the pollination requirements of crops, and how, even with self fertile species, insect pollination can be of considerable advantage, while with plants such as European

cucumber varieties, it is desirable to prevent pollination. The next heading is Types of Pollinating Insects, and it is pointed out that although many insects have been reported as visiting the flowers of crops, few, other than bumblebees and honeybees are fitted by construction and/or behaviour pattern, to be of real importance to the grower. It is pointed out that while in natural conditions, plants do not occur together in large quantities and the wild pollinators are adequate, with the planting of crops, the wild species are generally insufficient and the introduction of honeybee colonies is necessary. Various cases from different parts of the world are cited, and it is also pointed out how growers may make their crops more attractive to pollinators. Mention is also made of wind pollination. Further headings are on determining the need for insect pollination, concentration of honeybee colonies needed and techniques for studying foraging behaviour.

Part II (Chapters 2-7) is headed Insect Pollinators. Much information is given on the behaviour and use of honeybee colonies, copiously illustrated by photographs, drawings, diagrams and charts. Chapter 5 deals with using bumblebees as pollinators and gives interesting information on the encouragement of such colonies by presenting artificial nesting sites. Chapter 6 deals with solitary bees such as *Megachile* and *Osmia* species, and finally, chapter 7 deals with pollination in enclosures and after bees have been dealt with, the use of blowflies for the pollination of onion flowers in bags placed over the flowers is mentioned.

Part III (chapters 8-33) is headed Crops Needing Insect Pollination, and in this part the chapters are each devoted to a particular plant family or sub-family; details are given of pollination mechanisms illustrated by drawings, photographs, and charts. This part clarifies the reasons for the varied requirements of different plants.

Pages 444-506 are occupied by the bibliography, arranged alphabetically under authors' names. This is followed by an Author Index, an Animal Index, a Plant Index, and finally a General Index.

So much information is gathered into this book that, as foreseen by the author in his preface, it will be of practical use to many sections of the agricultural and scientific communities in all parts of the world. The author's industry in collecting this material together, the industry of his assistants, and the collaboration of the authors and publishers of that material in giving permission for its reproduction combine to make the book worthy of the highest commendation.

The printing has been done in good clear type on good paper, and is well bound in boards to provide a serviceable volume for handling. It is copiously illustrated throughout, and beside its scientific use for the professionals, it can also provide much entertaining information for the ordinary naturalist, so is well worthy of inclusion in libraries other than scientific ones as well.—S.N.A.J.

Proceedings and Transactions of The British Entomological and Natural History Society, Vol. 3, Part 4 (November 1970), published by the Society. 10/-.

This part begins with Part III (Sphingidae) of Dr MacNulty's Life Histories of Some West African Lepidoptera (95-122). In his introduction the author points out that he has quoted other authors to supplement his own observations. A good account is given of the larvae of many species individually, and at the end he gives a key to the larvae (presumed to be in the final instar), which should be of great interest. References to 18 works are quoted. Two plates illustrate five species of larva. The Proceedings follow, covering indoor meetings from 14th May to 11th June 1970. There is a book review by J. Mackechnie Jarvis on Dr Hickin's African Notebook, and a note by F. D. Buck on *Roeseliana roeselii* (Hagenbeck) (*Salt. Tettigonidae*) in Essex.—S.N.A.J.

A.E.S. Leaflet, 30: Rearing of Stick Insects. By various authors. 20 pp. 6/-.

Giving practical information on the subject to the hobby breeder, with illustrations of breeding cages, anatomical details, and some of the species usually cultivated. There is a plate showing typical eggs of 13 genera with a key to these eggs. Another key is given for older nymphs and imagines, and 13 items for further reading are cited.—S.N.A.J.

A.E.S. Leaflet, 33: Insect Light Traps by J. Heath. 15 pp. 6/-.

Begins with an outline of the development of the use of light for collecting insects, after which various types of light source and their accompanying circuits are described and illustrated, and finally various forms of trap and their applications are described. A list of references cites 12 titles; there is a list of components, and also a list of five firms supplying such equipment.—S.N.A.J.

Obituary

PERCEVAL JAMES BURTON (1888-1970)

Yet another of our most ardent field collectors has left us with the passing of Jim Burton on 16th November 1970, at the age of 82. He spent nearly half of his active life in Suffolk and did a great deal to further the cause of Natural History in that county and above all to add a great deal to the knowledge of its lepidoptera.

Born in 1888 at Wellington in Somerset, his early interest in butterflies started when he was at Dean Close School at Cheltenham. He made dentistry his profession and after a few

years at Ilfracombe, he served in France during the 1914-18 War with the Army Dental Corps. It was on his demobilisation in 1920 that he first took up practice at Lowestoft which was to be his home for the next thirty-three years. His original collection having been destroyed during the war period, he started another with renewed ardour and became closely associated with the late Claude Morley who was then the leading entomologist in that part of the Country, and founder in 1929 of the Suffolk Naturalists' Society which Jim Burton joined soon after its inception becoming one of its leading members and serving on the Council for many years. He wielded his net in almost every corner of Suffolk and among his major discoveries was the wide range of the White-mantled Wainscot (*Nonagria neurica*) in the local seaside marshes where with the writer he took, in 1950, the first Fenn's Wainscot (*Arenostola brevilinea*) for the County, a species at one time thought to be confined to the Norfolk Broads. Every year he travelled to some part of the British Isles for collecting and more than once to the Highlands and the Lake District where he caught that elusive little geometer the barred Carpet (*Perizoma taeniata*) of which he bred up a fine series and was one of the few collectors to have done so. He was in fact a most successful breeder of lepidoptera and in this connection used to tell of an amusing occurrence when he was stationed in Dorset in the First War. As his dental duties were not very onerous, he set up a lathe and a number of breeding cages, well-stocked, in his special room in the camp. Luckily for him he was away from it when an on-the-spot inspection was made by the divisional commander who demanded that his sanctum be opened up. The general's wrath knew no bounds when he saw the unorthodox contents and the unfortunate camp commandant had to bear the brunt of the outburst and make rather lame excuses. In 1953 owing to failing eyesight Jim Burton had to give up his work at Lowestoft. He migrated to Godshill on the western fringe of the New Forest where he carried on his collecting to good advantage for the next eight years, running a moth-trap regularly and taking in it most of the Forest specialities.

Owing to indifferent health he moved in 1961 to Bodenham on the outskirts of Salisbury where he spent his last nine years, but he was forced to dispose of his fine collection of British Lepidoptera, some of which had been supplemented by purchases. Among these a superb albino *Lysandra coridon* realised a probable record price of £50 at auction, while another of his choice butterflies, an almost black *Pieris napi* went for nearly as high a figure.

Of fine upstanding bearing he was a most delightful companion in the field who with his most kindly nature was always ready to give help and advice. He will indeed be mourned by all who knew him and deep sympathy goes out to his widow who helped him so much in his work and his hobby.

C.G.M. de W.

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LEPIDOPTERA OF KENT, VOL. II

This comprehensive work was completed with the instalment in our May issue and a limited number of separates, unbound, with stiff paper cover, is available for sale at 45/- per copy from The Editor, 54 Hayes Lane, Bromley BR2 9EE, Kent. (Postage extra)

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Edited by S. N. A. JACOBS, F.R.E.S.

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Notes on some of the British Nepticulidae (Lep.)

By Lieut.-Col. A. M. EMMET, M.B.E., T.D., M.A., F.R.E.S.

The notes which follow deal, as the title declares, with only some of our species of Nepticulidae: they do not attempt to cover the family exhaustively. Some common species are omitted because I have nothing constructive to say about them; others, which are more local, I have not yet encountered. The notes follow no set pattern. In some cases I have tried to widen our knowledge of biological history; in others, to record new localities; with others, to help entomologists to differentiate the mines. In short, I have included a miscellany of information, new or forgotten, which has come to my notice, in connection with the most neglected family of the British lepidoptera. I am filling the gaps, not writing a text-book.

The study of the Nepticulidae is in one respect a wider and richer pursuit than that of most other lepidoptera, for it involves a secondary science, that of minology. If you say "*Iris*" to me, I see a handsome butterfly in my mind's eye; but if you say "*Weaveri*", I see, not a moth, but a leaf of *Vaccinium vitis-idaea* containing a mine and a cocoon. So the notes which follow deal more with the mines than the moths. Yet both must be studied together. New species have been erected on the evidence of the mines alone and have proved to be chimaeras, for there are some members of the family which are variable in the formation of their mines. In other cases, a small difference in the mine does indeed indicate a different species. So, as I say, the mine and the moth are a partnership which must be considered together, if mistakes are to be avoided. It follows that both must be collected together, and a herbarium of pressed leaves in which there are mines is just as important as, and far more interesting than, a cabinet drawer of set specimens.

The late Professor Hering did a great deal to promote the study of minology. He emphasised the importance of sharing information if progress is to be made. He writes: "Once again it should be emphasised that as many entomologists as possible should get together, and where convenient work in groups; it then becomes possible to exchange experience, and show each other species of mines which have been identified, so that the experience of one becomes available to the others and in this way the unnecessary and frequently difficult breeding of known species can be avoided. Reciprocal exchange of information on breeding experiences of every kind will facilitate everyone's work and the amount of new information discovered will in this way be greatly extended. Assistance with each other's determination problems will eliminate the necessity for duplicating breeding of the same insect, and the pleasure attendant on every fresh discovery will in its turn help to increase interest in minology" (Hering, 1951, p. 330). So in writing these notes I am hoping that others will come

forward to supplement and correct what I have written, and will continue where I have left off.

Some people quite wrongly regard me as an expert in the Nepticulidae merely because I am one of the few people in this country who studies them; a fourth-former is a scholar among Hottentots. A question I am repeatedly asked is: "Are we to call them Stigmellidae or Nepticulidae, or, if some are one and some the other, what is the difference?" *Stigmella* was coined by Schranck in 1802 and *Nepticula* by Heyden in 1843; so *Stigmella* has priority. When Beirne (1945) made a revision based on the structure of the genitalia, he used the name Stigmellidae for the family as a whole, but retained *Nepticula* for one of the genera into which he divided it. Beirne's revision does not appear to have been entirely accepted on the continent, but it was used by Heslop (1964) except that he gave the family name as Nepticulidae. The forthcoming edition of Kloet & Hincks's check-list follows Heslop in this respect. That work, which has not been finalised at the time I am writing, classifies the British members of the super-family as follows:—

NEPTICULOIDEA

NEPTICULIDAE

(=STIGMELLIDAE)

Stigmella Schranck (about 36 species)

Nepticula Heyden (about 36 species)

Dechtiria Beirne (15 species)

Fomoria Beirne (2 species)

Levarchama Beirne (2 species)

Fedalmia Beirne (1 species)

Etainia Beirne (4 species)

Trifurcula Zeller (3 species)

Bohemannia Stainton (= *Scoliaula* Meyrick) (1 species)

OPOSTEGIDAE

Opostega Zeller (4 species)

TISCHERIIDAE

Tischeria Zeller (5 species)

Kloet & Hincks is to be our bible as far as nomenclature is concerned, and therefore, with that work, we should say Nepticulidae: but we must bear in mind that our continental friends do not talk quite the same language. I do not know why the junior name has been adopted: it may well be on the grounds of usage, since the abbreviation "nep" is a familiar part of the vocabulary of microlepidopterists, and the choice will be popular.

These notes deal with only the first seven of the genera given above, in other words with the species embraced by

Nepticula in Meyrick (1928) and Ford (1949).

A scientific classification based on anatomical affinities is one thing, but for the practical study of mining insects in the field a more convenient grouping is according to the foodplant. This arrangement (initiated, in the literature I have read, by Professor Waters (1924)) is followed by continental writers and I am happy to fall into line. It also makes it easy to leave certain foodplants (e.g., beech) for possible future treatment.

Readers may notice that I speak of cocoons and not pupae. The reason is that I do not know whether the insect inside the cocoon is overwintering as a larva or a pupa. If one wishes, one can have a look. Slight pressure with fine forceps on the sides of the broader end of the sweet-corn-shaped cocoon will cause it to open its mouth like a snapdragon, and one can peep inside. But your nep is a modest insect, and it would sooner die than stomach such an intrusion on its privacy.

I shall conclude this introduction by stressing once again that I am not an expert and have not been studying the Nepticulidae for long. Perhaps it would have been wiser for me to have kept my mouth shut for the time being, for I am bound to have made mistakes. But if I have done so and they are corrected by other writers, a useful purpose will have been served. The notes which follow reveal many gaps and uncertainties in our knowledge of this family, which offers one of the richest fields to the entomological explorer. Too many people are dissuaded from tackling the neps because they are afraid to handle such tiny insects, but it is in resolving the problems of entomology that its fascination lies. The physical difficulty of setting the Nepticulidae will be found to be far less formidable than the imagination painted it, while the intellectual difficulties involved in their study offer an exciting challenge.

ACER PSEUDOPLATANUS L. (Sycamore)

Mr S. Wakely (1962) recorded mines of two types in the leaves of sycamore at Mickleham, Surrey. He had submitted them to the late Mr Carolsfeld-Krausé of Denmark, who pronounced that those with the thicker excremental line of dispersed frass were made by *Nepticula speciosa* Frey, while those with the very narrow continuous line of frass were *N. pseudoplatanella* Skala, a species new to Britain. Wakely bred parasites, but no moths. Since then I have visited Mickleham on three or four occasions, always with Mr Wakely, and have found a good many mines of both types, both not uncommonly occurring in the same leaf. Our timing has been bad and few of our mines have been tenanted, but from those that were I have reared two specimens of *speciosa*. It has always seemed odd that two such local species should occur together and I have long suspected that both forms of mine were made by the same insect. These suspicions are confirmed by Borkowski (1969) who has bred from both types of mine and found no

difference in the imagines. *Pseudoplatanella* Skala becomes a synonym of *speciosa* Frey.

The species appears to be distinctly uncommon. Apart from Lyndhurst, Hants, where it was first discovered, Mickleham and Blackheath (Wakely, *loc. cit.*), the only locality I know is High Halstow in Kent, where Mr Wakely showed me a mine during a field meeting held in October 1968.

Meyrick (1928) and Ford (1948) make *speciosa* univoltine, with a larval season from August to October: Hering (1957) and Borkowski regard it as bivoltine with larvae in June as well as the autumn. It may, of course, have one generation in England and two on the continent, but the number of vacated mines I found on the 29th July 1970, when I also took an imago on a trunk, suggests that we have two generations too. On the day in question, I also found four tenanted mines (two of each type), whose larvae duly spun up; these could have been late examples of the first of early members of the second brood. No imagines have yet resulted, but their emergence next spring is still a possibility.

On the 9th July I also took a specimen of *Etainia decentella* H.-S., which was resting on the same trunk as the imago of *speciosa*. This species was introduced as new to Britain by Robert Adkin (1933) and has rarely been recorded since that date.

AGRIMONIA EUPATORIA L. (Agrimony)

Nepticula nitens Fologne (1862) (Lep. Nepticulidae)—a species new to Britain

Our standard text-books record three species of *Nepticula* feeding on *Eupatoria agrimonia*. These are *N. aeneofasciella* H.-S., a relatively common species which makes a fine gallery leading abruptly to a blotch, *Dechtiria agrimoniae* Frey, which makes a broad gallery gradually widening into a blotch in which the larva pupates, and *N. fragariella* Heyd., which makes a long, irregular gallery. Until recently I had attributed all gallery mines to this third species, but when I found some mines on agrimony, at Durfold, in Surrey, during a field meeting held there on the 9th of November 1970, I was at once struck by their dissimilarity from the other gallery mines on this foodplant which I had found in north Essex and preserved in my herbarium. Investigation showed that it was the Durfold mines which were *fragariella* Heyd. (or *aurella* Fab.—see below), while those I had previously encountered belonged to *Nepticula nitens* Fologne, a species hitherto not recorded from Britain in our own literature.

I therefore sent examples of each type of mine to Dr Joseph Klimesch in Austria for his opinion, and he was kind enough to confirm my determination. In his letter, however, he added the following proviso: "By the way, the imagines of *fragariella-dulcella-aurella-nitens* are all very similar to each other. I could not find any difference in the male copulatory apparatus.

Perhaps there may be differences in the females but I had no chance to examine these."

The uncertainty regarding the status of these "species" is of long standing and is still far from being resolved. It therefore seems the best course to record *nitens* as a British species while at the same time making it clear that it may, in due course, be degraded to synonymy.

Fologne (1862) describes *nitens* as smaller than *aurella*. The basal portion of the wing is brilliant bronze with green reflections. The fascia beyond the middle of the forewing is brilliant yellowish silver, being less golden than that of *aurella*, and is wider on the dorsum than on the costa. A band preceding the fascia and the apical area beyond it are deep purple, being less bluish than these areas in *aurella*; furthermore, the transition from the coppery basal area to the purple outer area is abrupt; the underside of the wings is darker than in *aurella*.

Tutt (1899, p. 166) mentions *nitens* as a species feeding on agrimony which has been recorded on the continent but not in Britain. It therefore came as a surprise to find that Hering (1957, p. 42) includes Great Britain in his account of the distribution of *nitens*. I at once suspected that Waters was his source of information and wondered whether I would find mines furnished by him in the Hering herbarium. In this I was disappointed, but I was interested to see that he had sent Hering mines of *aeneofasciella* from the Oxford district. Nevertheless, I think my hunch was correct, since in a paper from which Hering quotes in another context, Waters wrote (1924, p. 100), "Yellow larvae of the *aurella* type, inhabiting long slender galleries, are fairly common in this district [Oxford] on *Agrimonia*. The mines usually differ from those of *aurella* in having a much narrower and more compact excremental line, with wide empty margins. The imagines come close to *aurella*, but the ground-colour is greenish-golden (not coppery-golden or purplish-golden) and the colour of the head varies from orange to black. There is little doubt that this is a distinct species, and I refer it to *N. fragariella* Hein. I feel convinced, however, that *fragariella* sometimes feeds on bramble, and *aurella* probably on *agrimonia*. I have found a few mines with a slender excremental line on bramble, and have bred from them imagines with a greenish-golden ground-colour, and one with a black head. Conversely, I have bred specimens with a coppery-golden ground colour from *Agrimonia*. These cases, though apparently exceptional, indicate that the food-plant is not an infallible guide to the species".

Here we see Waters making the same mistake as I had done, and jumping to the conclusion that the gallery mines which he had found in agrimony were those of *fragariella*. The mines with the narrow excremental line, which he describes so clearly, are, in fact, those of *nitens*: all I would add to his



X 2.

S.M.A.J.
18.7.1970

Nepticula nitens Fologne



S.M.A.J.
24.ii.1970.

Nepticula fragariella Heydn

description is that there is a common tendency for the early mine of *nitens* to follow the margin of the leaf. The reader will notice that both Waters and Fologne describe the ground-colour of the moth in very similar terms.

I felt it essential that I should visit the Hope Department of Entomology at Oxford to see Waters's specimens, and at the same time I took the opportunity to study the mines in his herbarium. Both the moths and the mines are all placed over the label "*aurella*", though a question mark is added on one of the pages of mines. The food-plants are clearly indicated on the labels under the moths, but there is no way of linking particular specimens with particular mines. The mines are mainly of the *nitens* type, but among them there are some with a broader band of dispersed frass: I shall discuss the identity of these in due course. The imagines from *Agrimonia* were just as Waters described them, but a further striking character was their markedly smaller size than that of the specimens of *aurella* bred from *Rubus*—another point of agreement with Fologne's description. In case I was regarding them with a biased eye, I invited Mr E. Taylor of the Hope Department to pass judgment on the relative sizes, and he at once declared emphatically that the specimens from agrimony were smaller. I had no certain means of picking out the specimens bred from bramble which came from mines with a narrow excremental line, but what Waters had to say about the coloration of the imago enabled me to select several likely candidates.

Hering states that *nitens* is bivoltine, the larvae appearing in June and again in August to September. The scanty evidence at present available suggests that these dates apply equally to *nitens* in this country.

The other type of gallery mine is longer and broader and the excremental line is wider, with the frass tending to be dispersed in separated grains. Hering states that these are mines of *aurella*, and adds that the larvae may be found to be still feeding in the winter. Some of the mines I found at Durdale in the second week of November contained still active larvae which have since spun up. This winter feeding is, of course, characteristic of *aurella* on the evergreen bramble. Hering (1957, p. 445) recognises *fragariella* as a distinct species, but confines it for food-plant to *Fragaria vesca*. Waters, it appears, is in agreement with Hering in identifying these agrimony mines as *aurella*, and on the present evidence I think our best course is to fall in line with these authorities.

To sum up, there are two types of gallery mine on *Agrimonia* occurring at different times in the year and providing imagines which show constant marks of difference; the genitalia, however, appear to be identical. The moth from the smaller mine with the narrow line of excrement is *Nepticula nitens* Fologne, which is, in my opinion, a good species. The moth from the larger mine with dispersed frass is *Nepticula aurella* Fabricius. The record of *Nepticula fragariella* Heyden

feeding in agrimony is probably an error.

I am grateful to Mr S. N. A. Jacobs for the drawings of the mines of *nitens* and *aurella* (or *fragariella*), executed with his usual skill; and to Professor C. G. Varley for permission to study Water's specimens, mines and diaries preserved in the Hope Department of the University Museum at Oxford.

(To be continued)

Papilio cinyras ridens Fassel: a new status (Lepidoptera: Papilionidae)

By JOHN H. MASTERS

(P.O. Box 7511, Saint Paul, Minnesota, U.S.A.)

Papilio cinyras ab. *ridens* Fassel (1915) was described from a single male taken at Rio Songo, Bolivia, in March of 1915. Fassel called it a striking aberration and the only example in over 1000 *Papilio cinyras* that he had examined. While the original description is brief, the accompanying colour plate is excellent and *ridens* is readily recognised. Apparently the other specimens examined by Fassel were from Peru, for his form *ridens* is typical of specimens of *cinyras* from eastern Bolivia, which now appear to constitute a valid geographical subspecies. Although it has been ignored in the literature since the original description, *ridens* is the earliest available name for the Bolivian subspecies of *Papilio cinyras* and I am hereby elevating it to subspecific rank.

Papilio cinyras Menetries has long been considered conspecific with *Papilio thoas* Linnaeus, after they were united by Rothschild and Jordan (1906). Rothschild and Jordan were the first to use the male genitalia as a taxonomic criterion for the "*Papilio thoas*" group of swallowtails; a criterion which very conveniently separated *Papilio cresphontes* Cramer, *Papilio homothoas* Rothschild & Jordan, and *Papilio paeon* Boisduval from the others whom they united under *Papilio thoas*. Field data, which includes the sympatric occurrence of *Papilio thoas* and *Papilio cinyras* at several localities, leads me to believe that they are distinct species.

I have received a fairly large number of "*Papilio thoas*" from Bolivia, from Franz Steinbach of Cochabamba, over the past ten years. Steinbach had tentatively divided these into three ostensibly sympatric subspecies of *Papilio thoas*: *brasilienensis* Rothschild & Jordan, *thoantiades* Burmeister and *cinyras*. A careful examination of long series has shown me that there is no apparent intergradation or hybridization between the three forms, nor are they seasonal or brood forms. Their external appearance is very close, as is that of a half dozen closely related species, and I am unable to detect distinctions in the male genitalia, however I conclude that three species are involved. Steinbach's "*cinyras*" is a large-wide-banded form which agrees perfectly with Fassel's figure of

ridens, it is undoubtedly related to *cinyras* and specifically distinct from Steinbach's "*thoantiades*", a smaller narrow-banded form, very close in appearance to *thoantiades*, which I ally with *Papilio thoas*. The third form, Steinbach's "*brasiliensis*", appears to be a complete undistinct and possibly undescribed species; it has longer and narrower wings than the others and is quite distinct from *Papilio cinyras brasiliensis*.

This "mix" of populations in eastern Bolivia has led most authors to dismiss the area as a blend zone. The ranges of *Papilio cinyras brasiliensis* and *Papilio thoas thoantiades* also overlap in southern Brazil, Paraguay, Uruguay and northern Argentina. Rothschild and Jordan note the apparent overlap in these regions and give a rather unsatisfactory explanation by the statement: "It is probable that *P. thoas* is in these districts a wanderer like the Nearctic *P. cresphontes*, which would explain the absence of a strict line of separation between the Brazilian and Argentinian forms".

Papilio thoas and *Papilio cinyras* may be distinguished by the following characteristics:

1. Size. *Papilio cinyras* is considerably larger, length of fore-wing, as measured from tip to base, averages 70 mm. in males from Bolivia and specimens from Peru or Brazil are even larger. *Papilio thoas* from Bolivia, have an average fore-wing length of about 60 mm. in males, and Bolivian examples seem to average slightly larger than *P. thoas* from other areas including Argentina, Brazil, Venezuela, Colombia and Mexico.
2. Yellow bands on fore-wings. These bands are typically much wider and solid in *Papilio cinyras* than in *Papilio thoas*. However, they are intermediate in width in *Papilio cinyras brasiliensis*.
3. A few other characteristics which I have used for Bolivian specimens, and which may or may not apply to other populations include: Ground colour of wings, which is slightly more ochraceous in *thoas* and a cleaner brighter yellow in *cinyras*. The length of the tails which averages 25 mm. for males of *cinyras* and 20 mm. for males of *thoas*. The red-brown colouration at the base of cells M_2 and M_3 on the ventral hind-wing are much larger and more pronounced in *thoas* than in *cinyras*.

There are a number of characteristics that can be utilized for separating the three subspecies of *Papilio cinyras*, however the maculation of the dorsal fore-wing (figure 1) seems most reliable and convenient to use. The characteristics for distinguishing the subspecies of *Papilio cinyras* by the dorsal fore-wing are:

- (A) *Papilio cinyras ridens*. Yellow band relatively wide; Four, or sometimes three, submarginal spots present; Apical spot relatively large; Spot in cell M_1 , slightly indented towards costal margin and small spots in Sc , usually present.

- (B) *Papilio cinyras cinyras*. Yellow band relatively wide; Submarginal spots never present; Apical spot quite variable in size; Spot in cell M_1 , whole and never indented on costal margin; Small cell spot nearly always present.
- (C) *Papilio cinyras brasiliensis*. Yellow band comparatively narrow; Four, or sometimes three, submarginal spots always present; Apical spot, usually large and triangular shaped; Spot in cell M_1 , always deeply indented on costal margin; Cell spot usually absent or, if not, very small.

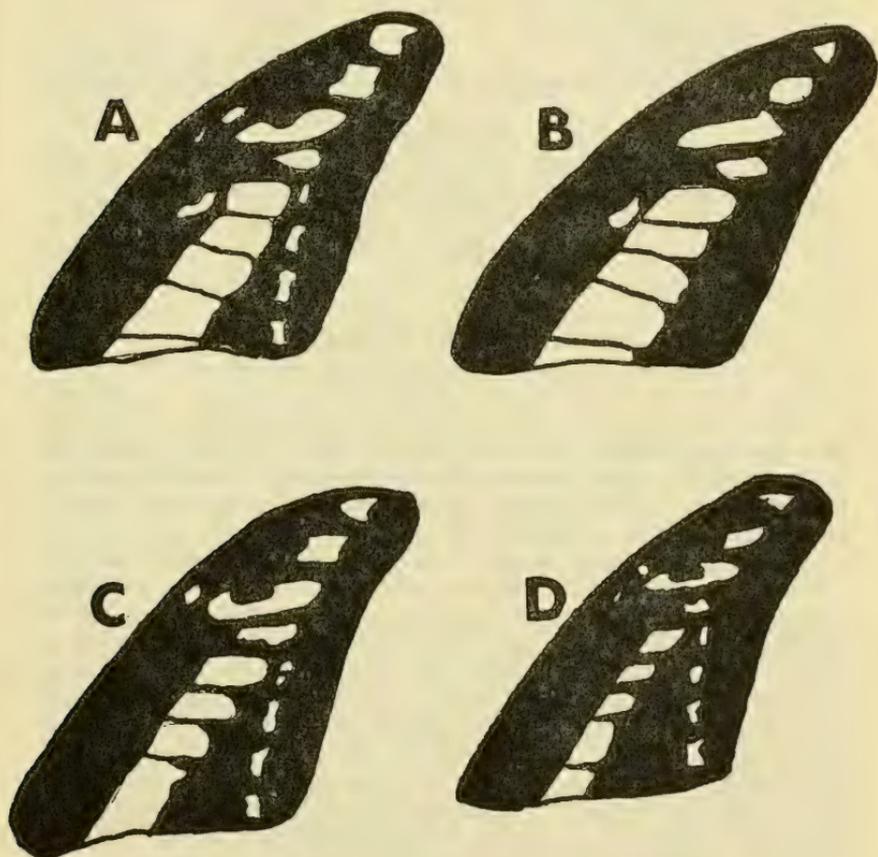


Figure 1. Representations of dorsal forewings to illustrate distinctions between subspecies of *Papilio cinyras* Menetries. (A) *P. cinyras ridens*, Beunavista, Dept. Santa Cruz, Bolivia. (B) *P. cinyras cinyras*, Huallaga Central, Huanuco, Peru. (C) *P. cinyras brasiliensis*, Belem, Para, Brazil. (D) *P. thoas thoantiades*, Beunavista, Dept. Santa Cruz, Bolivia. Actual sizes are shown.

A revision of *Papilio thoas* as proposed by Rothschild and Jordan (1906) seems in order and I propose the following:

Papilio thoas Linnaeus

- | | |
|---|---------------------------------|
| a. <i>t. oviedo</i> Gundlach | Cuba |
| b. <i>t. melonius</i> Rothschild & Jordan | Jamaica |
| c. <i>t. autocles</i> Rothschild & Jordan | Mexico |
| d. <i>t. nealces</i> Rothschild & Jordan | C. America to Trinidad |
| e. <i>t. thoas</i> Linnaeus | Orinoco and lower Amazon |
| f. <i>t. thoantiades</i> Burmeister | Bolivia and Brazil to Argentina |

Papilio cinyras Menetries

- | | |
|---|----------------------|
| a. <i>c. cinyras</i> Menetries | Peru |
| b. <i>c. ridens</i> Fassl | Eastern Bolivia |
| c. <i>c. brasiliensis</i> Rothschild & Jordan | Brazil and southward |

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Procllossiana eunomia Esperin Andorra

By J. V. DACIE, M.D.

The range of this northern insect is well known to extend into Central Europe, and Higgins and Riley (1970) mention its occurrence in widely scattered colonies in the Vosges and the Pyrenees in France as well as in Belgium, Germany, Czech-slovakia, Austria and Bulgaria.

In the Pyrenees it appears to have been recorded only in the vicinity of Porté Puymorans, the local race being referred to by both Bretherton and Manley and Allcard as ssp. *cere-tanensis* Deslandes. I now wish to report the finding of a colony in Andorra about 25-30 km. East of the locality at Porté Puymorans and separated from it by a formidable mountain barrier. The butterflies were seen flying on the 28th June 1970 in company with *C. selene* Schiff. and *H. virgaurae* L. in a damp and flowery meadow on the South slope of the Pyrenees. Only males were seen. Comparison of a short series with specimens taken at Porté Puymorans on the 29th June did not show any major differences between the two colonies.

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The possible existence of temporal Sub-speciation in *Maniola jurtina* (L.) (Lep., Satyridae)

By GEORGE THOMSON, F.R.E.S.

It is generally held that the formation of races is dependent upon the isolation of populations from each other, thus creating a protected gene pool, each acquiring particular features suited to its own environmental conditions. The geographical isolate, however, may be linked to other races of the species by a cline in which the two extremes have acquired recognisably distinct characteristics, the intervening populations consisting of either a gradual change from one form to the other, isolated populations consisting of one or other of the extremes (indicating distinct sub-speciation) or, more commonly, a mixture of the two. The factors causing such isolation have been observed to be geographical, in butterflies at least, and it is not surprising that this has been the most frequently observed. It is a comparatively simple matter to find out whether or not two or more populations are isolated from each other; nor does it take a zoologist to tell if the 'extremities' of the range of a widespread species differ in any marked way. Much more difficult to detect, however, are cases of sympatric evolution—where two populations in breeding condition within the 'cruising range' of each other largely keep characters peculiar to itself. The problems of detecting this phenomenon, which is known in plants, are so great that it was 1957 before it was detected in the Meadow Brown Butterfly (see Ford, 1964). Clearly sympatric evolution could well be awaiting discovery in many species of Lepidoptera and other insects, but it is likely, I surmise, that it is very uncommon, if not rare, in zoology.

Temporal sub-species have been the domain of the palaeontologist, but recently I have found a case which suggests that isolation of this nature exists in *Maniola jurtina*. In a previous paper (Thomson, 1969) mention has already been made of voltinism in this Satyrid, a subject to which Verity (1953) and others have contributed. The facts, as we have them, are that *jurtina* has in some parts of its range an exceptionally long emergence and flight period—possibly seven months in some parts of the Mediterranean region. In spite of this the butterfly is univoltine and no case is known where breeding under various conditions has produced a second brood. This is probably partly explained by the fact that the larvae feed at very different rates. What is not so well known is that in many regions, mainly in the south of Europe (but, as we shall see, not exclusively so), the butterfly emerges in late spring or early summer, almost disappears for a few weeks at the height of the summer and then reappears. This second emergence is not simply the earlier specimens appearing again, but a quite fresh emergence of individuals of both sexes.

I collected material evidence of this during my two visits to France—one in 1968 and the other in 1970—and through the help of several friends who went out of their way to collect for me a series of *jurtina* in the south of that country and Spain. In the last week of June 1968 I collected in several parts of Vaucluse, Var, Alps Maritimes and the Basses Alps. Without exception, in these departments I had no trouble in finding a locality in which *jurtina* was common and I collected a series from several localities. In all cases, with the exception of the Esterol, both the males and the females were fresh, showing little sign of wear and tear. I collected such a series at Fountain de Vaucluse, St Valier and Digne. This year, but this time in the third week of July, I looked for the Butterfly at Fountain and found none, at St Valier with great difficulty I was able to get twelve and at Digne two days' hunting produced only four individuals. Although I had no previous experience to compare other localities with those of two years before, the difference between the number of *jurtina* in the two years in south-east France could be described as nothing less than considerable. In spite of this I received a number of fresh *jurtina* from Provence taken in August 1970. Clearly the butterfly had re-appeared after we had left.

Remarkable these facts may be in a species which has been shown, by other criteria, to be univoltine. The presence of a 'double emergence' in British *jurtina* would be surprising in the extreme—but this is, in fact, what has been found by Mr T. D. Fearnhaugh. In 1966 he wrote to me to say, ' . . . Last year an unusual event occurred in that there was a definite second brood. . . . last year (1965) the butterfly was about from late June to mid-September as usual, then on October 16th I was surprised to find a freshly emerged brood in good numbers. . . . '

Through Mr Fearnhaugh I have been able to gather together the following information concerning a population of *jurtina* on the Isle of Wight. For reasons which should be obvious, I would prefer not to disclose the actual location of this insect's haunt.

There exists on the Isle of Wight a population of *jurtina* which every year emerges towards the end of June or beginning of July (a little later than other localities on the island) with a flight period lasting until the beginning or middle of October depending upon the season. During this period there may or may not be a reduction in numbers at the end of August or the beginning of September about which time fresh males and females emerge in varying numbers. From what I can gather, the locality is, to all intents and purposes, similar to other localities on the island, yet in these the species emerges in the middle of June and is well over by early September by which time any stragglers are well worn. The situation throughout the United Kingdom is the same, although the insect comes out a little later in the

north, and I know of very few instances when *jurtina* was still flying in September. In the Isles of Scilly I have collected *cassiteridum* Graves fairly fresh in the second week of September. It is possible that the emergence period is extended there as they are still flying in good numbers when the butterfly has disappeared from the Cornish mainland. The long and double flight period of this Isle of Wight population is therefore similar to that known in the south of Europe, in Sicily, Malta and possibly elsewhere.

Had it been that the actual flight times were the only way in which these late individuals differed from the situation throughout most of its range, I would probably not have investigated the situation much further, accepting the fact that under certain conditions, probably environmentally controlled, some *jurtina* undergo a period of aestivation in the late larval or pupal stage emerging fresh in late summer. However, Mr Fearnhaugh very kindly sent me a series of seventeen specimens taken on the 18th September 1970 (six males and eleven females) all but two in very fresh condition, and two females taken on the 9th October of the previous year, once again fairly fresh. It was immediately apparent that they differed markedly from the long series I have from the island taken in June, July and August over a period of two years. They were consistently smaller than the Isle of Wight series, the males being only 44.2 mm and the females a mere 43.8 mm. This compares with the Isle of Wight averages of 49.9 mm and 55.3 mm—a difference in each sex of about 5 mm. The markings, too, were considerably modified. In both sexes the fulvous was more extensive, much more in the male with several specimens having it spread towards the central area in a fashion typical of the Irish *iernes* Graves. The fulvous of the female while being more extensive was distinctive, the width of the band being narrower, as in *cassiteridum*, and with a clear fulvous 'point' on the hindwings. Also in both sexes, the underside was considerably darker than most *insularis* Thomson and more striate, often approaching a greenish-grey, or greyish-brown but none with the clear yellow light band so frequent on the island in the female. Probably the most remarkable feature of the butterflies was the very small apical eyespot in the female which, furthermore, had the outer margins of the forewings rather more concave.

I then compared early (May and June) and late (August and September) *jurtina* from southern Europe to see if any parallel could be found to what exists on the Isle of Wight. By now, I was not surprised to find that these late *jurtina* also were, in general, smaller with the underside markings darker and more striate, they had the apical eyespot smaller and the fulvous, though more extensive, narrower. I should point out, however, that the occurrence of fresh *jurtina* in late August and September, even in the south of Europe, is not

common but I have evidence of it in the Basses Alps, Vauclose, Tarn and one or two spots in the north of Spain, although this is complicated by the fact that there is a very fluid situation in which there is no clear-cut line between a rather long emergence period and the cases in which an actual double emergence has taken place.

How then can we explain the fact that, although breeding experiments have been unable to show *jurtina* to be bivoltine (and have almost proved it not to be), field observations and the presence of the different phenotypes in some *jurtina* populations give all the indications that this is, at least very occasionally, the case? I can find no evidence to support the suggestion that there exists sibling species with slightly different emergence times. The genitalia of the two forms are identical. I can offer only one explanation—that in these double-emergence *jurtina* we are seeing the very early stages in the formation of a temporal sub-species, not the temporal sub-species of the palaeontologist, but one in which a certain degree of reproductive isolation has been created by a prolongation of the flight period to such an extent that these individuals which emerge early are effectively isolated from these that emerge much later. It would be difficult, I must admit, to prove such a hypothesis, but in the European butterflies alone there are cases where this could well have already occurred. *Euphydryas aurinea debilis* Oberthur, for instance, emerges when the other *aurinea* races are over, or almost so. Furthermore, in several genera in which most of the species emerge at approximately the same time, there is an odd species which flies much earlier or later than the others. The Satyrid, *Erebia serotina* Descimon and de Lesse is found in September when most of the other species of the genus are over. Perhaps it has become isolated in time from another (possibly extinct) closely related species. Nor is it surprising that we find such examples in genera of single brooded species as this type of evolution might well be their alternative to bivoltinism.

The fact that entomologists have not recognised the differences between the early and late *jurtina* has, no doubt, hindered the acquisition of knowledge of the pattern of races in southern Europe, not by confusing similar races, but by obscuring real differences between them. It would be extremely interesting to determine how widespread is the occurrence of late *jurtina* emergences in central and northern Europe, including the British Isles, to try to establish some pattern which would possibly give us further information about the nature of this interesting phenomenon.

Backcroft, Dunblane, Perthshire. 25.i.1971.

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The Manx Race of *Maniola jurtina* (L.) (Lep., Satyridae)

By GEORGE THOMSON, F.R.E.S.

The Isle of Man is, I am told, an accessible and popular holiday spot. This being so, it is a little surprising that the interesting nature of *Maniola jurtina* (L.) on the island has virtually escaped the attention of those who have worked on *jurtina* or the Manx fauna. Unfortunately, I have not had the opportunity to collect there myself, and it was not until this year that, through the kindness of Mr J. M. Chalmers-Hunt and his two friends Mr J. Pugh and Mr J. Hedges, that I was able to obtain a series of thirty-three specimens of the species (consisting of 19 males and 14 females) from various localities on the island, collected during 1970. This, although a short series, was remarkably homogenous for a *jurtina* sample and clearly indicated the nature of this race. Three specimens sent to me for examination by Mr P. W. Finbow pointed to the same conclusion which I am about to detail.

The only mention of the Manx race, other than as part of a distribution list, which I have been able to find was by Graves (1930) in his discussion of the British *jurtina*. He commented: (p. 75) '... *jurtina* of both sexes from the Isle of Man resembles very small Irish specimens ...'

Higgins and Riley (1970) include them with *splendida* B.-White, but it should be noted that they extend this name to cover not only the north-west Scottish form, but also the Irish (*iernes* Graves) and the Scillonian races (*cassiteridum* Graves).

[I believe this treatment of the situation in the British Isles is valid only if *all* the Atlantic races are included under the name *splendida* (i.e., *splendida*, *iernes*, *cassiteridum* and *insularis* Thomson) which is, after all, the earliest available name for a distinct British race. To exclude *insularis* from this group is to deny the fact that it is closer to the Irish race than to any other. Furthermore, the type of geographical variation seen in *splendida* and *cassiteridum* is in a direction away from that of central and northern Europe, while *iernes* is an intensification of it.]

On examining the specimens that I had received it was at once obvious that they belonged to a race much akin to that of Ireland. The most distinctive features of *iernes* are well developed in the Manx form: in the male, frequent bipupillation of the apical eyespot or a doubling of it (f. *erymanthoides* Esp.), a well developed sub-apical fulvous band, and a very distinct light sub-marginal band on the underside hindwing; while in the female, extensive fulvous on the upperside and a very bright, contrasty underside. Furthermore, seven of the thirty-three specimens (2 males and 5 females) were of the form *addenda* Mousley which is frequent in the Irish race. In spite of these characters linking them closely with *iernes*, they

contrasted sharply and consistently with them in size. Irish males are strikingly large with a wingspan of from 46 mm. to more than 57 mm., averaging nearly 52 mm., while the females range from 50 mm. to 62 mm., averaging nearly 56 mm. However, two series from the Aran Islands of Inishman and Inishmore, kindly collected for me by Mr T. C. Dunn in 1969 and 1970, are smaller than those from the Irish mainland, averaging almost 50 mm. in the male but very little smaller in the female. Graves also knew of an 'exceptionally small' race from Rush, Co. Dublin. Besides the Aran series the Manx specimens are diminutive. Indeed they are smaller than any of my series from individual locality in Britain or Europe, smaller even than the typical sub-species of Sweden¹. The actual measurements are shown in Table 1 together with figures for *jurtina* from south-west Sweden, British *insularis* and *iernes* from the two Irish Arans and the Irish mainland.

TABLE 1

Locality	Males			Females		
	average	largest	smallest	average	largest	smallest
A Isle of Man	45.2	48.0	40.0	48.9	53.0	45.0
B South-east Sweden	46.2	50.0	41.0	50.6	53.5	43.0
C Britain	48.0	55.0	38.0	53.0	60.0	42.0
D Inishmore, Aran	49.5	52.0	47.0	53.7	55.0	52.0
E Inishmaan, Aran	50.3	57.0	44.0	56.0	57.0	55.0
F Ireland	51.9	57.5	46.0	55.6	62.0	50.0

The wingspan in millimetres of various races and populations of *Maniola jurtina* (L.). All measurements taken as twice the distance from the centre of the thorax to the apex. The figures for Britain (C) exclude north-west Scotland, Ireland and the Isles of Scilly.

¹Verity (1913) in his 'Revision of the Linnean Types of Palaearctic Rhopalocera' said that the *jurtina* 'type' in the Linnean collection is of the North African race known as *fortunata* Alph. Although the specimen is certainly of southern European origin, I would say that it was more likely to be from south-east France or Spain. However, as Lindroth (1957) has pointed out, 'Linnaeus never designated any specimen as a type. Whether his description was based on one single or on several specimens it cannot even be taken for granted that these were preserved in his collection, or, the original specimen may later have been substituted by another, in better condition, by Linnaeus himself.' Mayr (1969) remarks, 'No nomenclatural decision should ever be made by relying on a "Linnean type". There is no such thing.' Thus, it should be clear that Verity's action in 1913 restricted the type locality of *jurtina* to 'North Africa' in spite of the doubtful origin of the specimen in the Linnean collection, Alpheraky's *fortunata* being sunk as a synonym, a solution which has been followed by de Lattin and others. The type locality of *janira* was at the same time restricted to 'Central Europe'.

One of Mr Finbow's specimens, a male taken in 1968, was a remarkable dwarf of the form *parafeminea* Thomson with a wing-span of only 36 mm. Populations consisting of smallish specimens occur in both *splendida* and *insularis*, but as far as I know neither of these races attain such diminutive dimensions as those of the Isle of Man. Little allowance need be made for annual fluctuation as size varies little from year to year in this species, and it is safe to say that the Manx population represents one of the smallest, if not the smallest race of *jurtina* anywhere in its known range, with the possible exception of the form *parvalua* Stauder, recorded from Monte Faito and S. Angelo (Sorrento) which was said to be the size of a female *Coenonympha pamphilus* (L.), but which, for lack of confirmation, must rank with the other apocryphal records of species whose nature or existence is somewhat less than certain.

Considering the geographical situation of the Isle of Man and the fact that morphologically they are close to *iernes*, it was interesting to compare them with samples from the adjacent mainland of Scotland, England and Wales. The very few specimens that I have examined from Galloway make no approach to the Irish race—much less indeed than the individual bright specimens which are found in parts of central Scotland and some maritime localities in the south of England. It would be extremely interesting, however, to examine a series from the extreme south-west peninsular which terminates in the Mull of Galloway as here we might see one of two interesting situations—an approach to *iernes* or a reverse cline. This is, in fact, what I have found in the Colwyn Bay and Great Orme region of north Wales. Here, although the size is almost identical to that of the *insularis* average in both sexes, and the males are also typical of the widespread British race, the females show a marked reduction in the extent of fulvous on the upperside. Often this is strongly veiled with scales of the ground colour. Furthermore, a number of specimens were of a rather unusual colour—a somewhat uniform light sepia—much less reddish or blackish than is usual in Britain, a colouration typical of the eastern races of the species. It is therefore, that much more remarkable that a few of the males have genitalia of the 'eastern type,' but this is a complex subject which is not directly relevant to this discussion and will be dealt with in a paper now in preparation. In short, the north Welsh specimens indicated a movement away from *iernes* to a greater extent than that found anywhere else in Britain. I can trace no approach whatsoever to the Irish form in *jurtina* from Westmoreland, although it certainly would be very interesting to examine the species on the Isle of Walney.

I hope that the individual nature of the Manx *jurtina* will now be recognised by those who have the fortune to see specimens from that Island. A name is not justified for this race, however, as it differs only in one character from *iernes* with which it should be placed but in which it should not be forgotten.

I have to thank Mr J. M. Chalmers-Hunt, J. Pugh, J. Hedges, T. C. Dunn and R. L. Dennis for their very generous help in obtaining material from the region which I have mentioned. Also Mr P. W. Finbow for the loan of three specimens from his collection.

Backcroft, Dunblane, Perthshire. 2.ii.1971.

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Inverness-shire in 1970

By Commander G. W. HARPER, R.N. Retd., F.R.E.S.

The last five years or so have shown a distinct climatic change from the previous fourteen that I have been residing in Badenoch. This change has been characterised in three main respects; first, a reduction in the severity of depth of winter snowfall and higher minimum temperatures, fewer occasions of Zero F. frost readings. This change has been accompanied by more prolonged winters, starting much earlier and extending well into May. Thirdly, the summers have become colder, windier and less sunny. I think that these three changes have probably helped predators such as birds and parasites to reduce the population of Lepidoptera, and certainly the bird population locally has made a good recovery from the severe winter of 1962-63. In addition to all this the human destruction of our small local entomological habitats by Forestry Commission and other developers proceeds apace in spite of the rare successes of conservationists. A classic example of this vandalism perpetrated by a proprietor and the Forestry Commission, which is officially committed to pay due attention to conservancy considerations should be publicised. About 1955 the Nature Conservancy, at my request and duly furnished by me with the facts of many rare and local plants and insects occurring on the western cliff and scree of Greag Dhub near Newtonmore, officially declared this most interesting and restricted habitat to be a S.S.I. (Site of Scientific Interest). About 1965 I noticed suddenly that a 40 acre strip of this steep and rough hillside had been cleared and fenced, and a year or so later planted with Douglas Fir, an entirely alien tree in the very centre of this area. When I drew the attention of the regional Forestry Commission Officer to this lamentable happening, he seemed to be sincerely sorry about it, and pleaded ignorance of

the S.S.I. but, of course it was too late to reverse the damage done

The 1969-70 winter was the earliest and longest with the coldest November officially recorded for many years. But it nevertheless remained an open one, with only a few heavy snowfalls and severe frosts. But no insects were seen at all until March, when the first snowdrops appeared together with a beautiful Waxwing cock and the first Songthrushes from the South. These were followed by a few early Oystercatchers and Plovers on 12th March. At last, on 13th *Phigalia pedaria* Fab. began to emerge on to the wooden posts up my glen. Starting the m.v. light trap in my spinney was the signal for more snow and frost, so that the first hibernating moths, *Conistra vaccinii* L. and *Xylena vetusta* Hb. together with the first *Orthosia incerta* L. did not appear until 30th.

April opened with a blizzard and continuous frost night and day, and I eventually found the first *Brachyonica nubeculosa* Esp. just emerged on a Birch trunk on 11th, and some sunshine the next day produced a few *Brephos parthenias* L. and hibernated *Aglais urticae* L. on the wing. The early Spring moths appeared slowly due to night frosts, and the Sallow blossom was not until the very end of the month together with the daffodils.

May welcomed Spring with mild and sunny weather, which resulted in a fine emergence of all the usual species earlier than I expected together with a rapid development of vegetation; *Odontosia carmelita* Esp. appeared in good numbers before the middle of the month, as also did the first *Pieris napi* L. and *Thecla rubi* L. flying in some nice sunshine among the moorland Vaccinium. Only a very few *Endromis versicolora* L. were reported to me and I saw none; this splendid insect's survival is far from assured. On 16th the only *Vanessa atalanta* L. seen this year briefly refreshed itself on my garden *Arabis* before I watched it resume a northerly course. By the 27th *P. napi* L. were abundant, and *Brethis euphrosyne* L. and *Anthocaris cardamines* L. rapidly becoming so, more than for some years. I also understand that good numbers of the pupae of *Amathes alpicola* Zett. were collected on the high ground. The month ended with a short rather cold spell.

Early June brought the arrival of our real Summer weather which has been the pattern now for three years, and this year lasted a little longer, nearly three weeks. It was briefly punctuated by a few very severe thunderstorms which disrupted electricity supply badly. The Spring broods of butterflies were in greater profusion than I have ever seen here before, especially *B. euphrosyne* L., *P. napi* L., *A. cardamines* L., and *E. tages* L. On 4th June I found male specimens of *Cupido minimus* Fues. commonly in its very restricted habitat, the earliest date so far. I noted no less than nine species of butterfly on that memorable day! On 13th June two more species were flying, *Brenthis selene* Schf. and a few very fresh

Pieris brassicae L. probably locally bred and of the northern single-brooded race; four days later a very large influx of immigrants of this species suddenly appeared in the Spey valley, very fresh and many pairs were seen in copula, a remarkable and unusual sight. Meanwhile the sunny weather was tempered by the prevalence of cool East winds and cold nights limiting my m.v. light trap catches, but the usual Summer moths appeared rather earlier than normal in recent years. But on 22nd June the weather broke and our Summer was virtually over. The month ended in cold rain storms with high winds from the north-west.

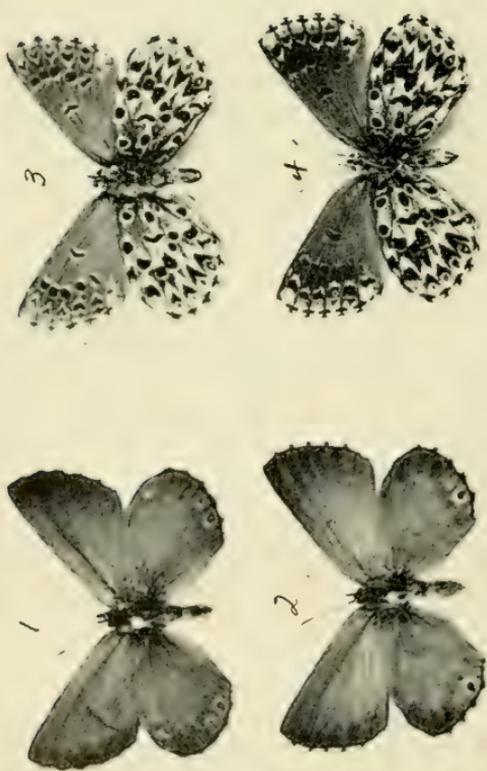
July was cold, wet and stormy throughout, though a brief sunny interlude on 8th showed a few *Argynnis aglaia* L., *Maniola jurtina* L. and *Coenonympha pamphilus* L. to be on the wing. The Lycaenids were, however, either scarce or disinclined to fly in such stormy weather. A full Westerly gale raged from 11th to 14th, heavy rain fell every day, with severe flooding on 20th, while snow crowned the high tops on 23rd! The month ended with further Northerly gales, heavy rain, and a few moths in my trap included a worn pale grey immigrant *Eurois occulta* L. on 31st.

August began well with one warm sunny week which produced a good emergence of *Erebia aethiops* Esp. only a few days later than usual; on 8th, however, the cold stormy weather returned culminating on 17th with very severe flooding in the Findhorn valley and widespread damage in the Firres area completely stopping any collecting there. I made further efforts to discover *Orgyia antiqua* L. in my Badenoch area by assembling with the offspring of Mr Noble's 1969 captures which failed again. Squally wet weather ended the month.

September continued the cold wet squally weather, so that night flying activity of insects was still low. Autumn species continued to emerge, but most were in small numbers as measured by light trap catches. There were sharp frosts on 15th and 16th of the month. So far this year, immigrant insects had been very few and far between but now a few *Agrostis ipsilon* Hufn. appeared in the light trap, probably locally bred from an earlier migrant. On 27th several immigrant *P. rapae* L. appeared again this year, which now seems to be a regular annual pattern. On 30th the month ended with a worn male *Herse convolvuli* L. being brought to me from the village pavement where the modern m.v. street lighting had apparently been too much for it.

October began with ten days of the usual squally cold wet weather and virtually no moth activity at all. This was followed by a fine sunny spell but the previous gales had killed off most of the Autumn species as well as removing half the leaves from the trees thus spoiling the colours. On 18th the winter snows arrived on all the low ground a fortnight earlier than last year and brought the season to an early close. To sum up, a very promising start in May and early June, especi-

PLATE III



Lepidochrysops jamesi sp. nov.

1, male upperside
2, female upperside

3, male underside
4, female underside

ally with large flights of Butterflies soon petered out with wretched cold wet windy weather and an early onset of winter. My total m.v. trap catch for the six month period from April to September inclusive was disappointing, even lower than in 1969 being only 3846 moths, and did not include even a single *Plusia gamma* L. for the record!

Nedaich, Newtonmore, Inverness-shire. 14.i.1970.

A new species of *Lepidochrysops* Hedicke (Lepidoptera: Lycaenidae) from the Roggeveld Mountains of the Cape Province

By D. A. SWANEPOEL

Lepidochrysops jamesi sp. nov., plate III, figs. 1-2 and 3-4.

♂ — Holotype: Exp. 35 mm., figs. 1 and 3. Head: frons dark grey; palpi below and at side white, black above, third joint fairly long; antennae black, shaft finely chequered with white, club very elongate and whitish below. Thorax: black above clothed with brownish hairs, below with whitish hairs and scales. Legs whitish. Abdomen: whitish below, brownish above and at sides with whitish rings showing abdominal segments.

Upperside: both wings dark brown with a coppery sheen. Bases black. Cilia: greyish-white and clearly chequered with dark brown.

Forewing: discocellular mark very narrow and indistinct. Apex rather pointed. Outer margin convex. Inner margin about three fourths the length of the costa.

Hindwing: same colour as forewing, discocellular mark absent, tornal spot round, black with orange ring which is broader on the inner side and a faint greyish mark in the centre of the tornal spot. The spot next to the tornal spot very indistinct with similar ones hardly visible along the distal margin towards the apex where faint greyish markings occur. Inner margin broad clothed with brownish hairs and scales.

Underside: Forewing, ground colour dark brownish grey. Discocellular mark slightly lunulate, black and edged with white. Six discal spots, darker than the ground colour and ringed with white, in cellules from 2 to 7. Those in 3 and 4 placed inwardly, that in 2 placed outwardly and rather indistinct in holotype but better developed in other specimens. Marginal spots heart shaped, black and surrounded with whitish, Cilia broadly chequered with white.

Hindwing: no tail, ground-colour much as in forewing, but with scattered white scaling in places, within the basal half of the wing. Five black spots ringed with white, two along costa, one in cell and a very small one just below it in adjacent area and one along inner margin. Discocellular mark black edged with white and slightly lunulate, and longer than

that of forewing. A row of six discal spots, black and ringed with whitish. That in area 3 shifted inwards, that in area 4 shifted slightly outwards, that in area 5 shifted more outwards, larger than the others and slightly oval, that in area 6 shifted outwards and that in area 7 shifted inwards. A row of distinct sagittate marks whose points touch the discal spots slightly. Those in areas 5 and 6 are smaller and placed more outwards. That in area 7 very blunt. Ternal spot round, black with yellow orange lunule outwardly, the centre with bluish grey scaling. Marginal spots blurred with whitish. Cilia as in forewing.

♀—Allotype: Exp 35 mm. figs 2 and 4. Upperside: colour same as in male but coppery sheen brighter and inclining to be more yellow. Internervular dark markings along distal margins. Ternal spot black with rather broad yellowish brown ring. A faint yellowish mark near ternal spot. Forewings broader than those of male. Underside: about the same as in male except that some of the discal spots are smaller and the whitish scaling in the basal half of the hindwings is more intense.

Remarks: one is inclined to compare this species with a number of similarly looking species of this genus e.g. *L. badhami* van Son, *L. mcgregori* Penn., *L. penningtoni* Dickson and even with specimens of *L. variabilis* Cottrell from Lesotho where the forms show much of the coppery sheen, though in a lesser degree, on their wings as this species. One is truly amazed at the degree of variation in the coppery colours of the various species. Perhaps the upperside colour of *L. mcgregori* Penn., which vary tremendously among individual specimens comes closest to this one. Other, rather similar to them are *L. bacchus* Riley and *L. penningtoni*. The prominent white markings of this species come closest to those of *L. badhami*, especially the scattered white scaling in the basal half of the hindwings. underside. Much resemblance is to be seen between this one and *L. mcgregori*. This is a larger insect, although a few specimens of *L. mcgregori* that were netted near the habitat of this one—though a mile or more away—are nearly as large. The forewing of this species is more elongate than that of *L. mcgregori*. On the underside the markings of *L. mcgregori* are very similar to this one but are more linear and the white scaling less intense. Material examined: Roggeveldberge (Sutherland district Cape province) 6.x.70, D. A. Swanepoel, ♂ holotype; idem 11.x.70 D. A. Swanepoel, ♀—allotype; idem paratypes 3 ♂, 2 ♀ 6.x.70, 1 ♂, 1 ♀ 10.x.70, 1 ♀ 14.x.70 all in my collection.

I discovered this species on the 6th October 1970 on the summit of one of the Roggeveld mountains some 35 miles north of Sutherland, Cape province, and some miles south of Middelpos. It flies fairly rapidly, sometimes slowly, in circles of zig-zags among some tall bushes, or over low shrubs. It seemed to be confined to a comparatively small area where it visited all

sorts of flowers. Now and then it would rest on the ground when clouds come over. It may be on the wing from September to November.

I have much pleasure in naming this beautiful coppery brown blue for my friend the late Arthur James who during his term of office as secretary of Clovelly Country Club, Kalk-bay, Cape Town, showed a warm interest in my activities—writing my book, *Butterflies of South Africa*. His friendly attitude was an inestimable stimulus spurring me on towards my goal.

New Forest Mercury Vapour Light Records for 1970

By L. W. SIGGS

In spite of abnormally high numbers in May, and more particularly in June, the yearly total of specimens coming to the trap at Minstead was below average.

	Nights	Total	Average
March	16	208	13
April	27	2493	92
May	25	1900	76
June	30	10294	343
July	30	6274	209
August	31	7462	242
September	30	2163	72
October	13	451	35
November	11	349	32

There were four additions to the Minstead list.

Oria musculosa Hübn. Unexpected in the Forest as there is no arable land nearby. The specimen, a male, was in mint condition.

Procus versicolor Borkh.

Lampropteryx otregiata Metc. (This is, of course, fairly common in parts of the Forest.)

Perizoma albulata Schiff.

Lobophora halterata Hufn. was taken in 1963 but was overlooked in submitting my annual lists.

During the year, several doubtful identifications have been checked, with the result that the following should be added to the list—

Eupithecia millefoliata Rossl.

E. intricata (ssp. *arcuethata*) Zett.

E. indigata Hübn.

E. sobrinata Hübn.

and the following should be deleted—

Euphyia picata Hübn.

Eupithecia tenuiata Hübn.

E. valerianata Hübn.

E. satyrata Hübn.

The following captures are worthy of note—*Nola albula* Hübn. (2), *Anaplectoides prasina* Fab. (2), *Pyrrhia umbra* Hufn., *Orthosia advena* Schiff., *Leucania obsoleta* Hübn. *Eremobia ochroleuca* Schiff. (2), *Procus literosa* Haw., *Celaena leucostigma* Hübn., *Moma alpium* Osbeck., *Perizoma flavofasciata* Thunb., *Asthena albulata* Hufn.

Lithophane leautieri Boisd. Five specimens, all male, were taken on 1.x., 4.x. (2), 10.x. and 3.xi. In 1969, a single specimen was taken and assumed to be a casual visitor, but the sudden increase this year suggests that a colony has been set up here.

Two remarkable late records (*Diacrisia sannio* L., 4.ix. and *Leucania comma*, 25.ix.) suggest the possibility of second broods. Both species normally occur in June and July. *D. sannio* is said to have two broods abroad (South).

MIGRANTS. 1970 was a poor migrant year.

Lithosia quadra L. (20), *Agrotis ipsilon* Rott. (237), *Peridroma porphyrea* Schiff. (6), *Laphygma exigua* Hübn. (1), *Plusia gamma* L. (112), *Rhodometra sacraria* L. (1), *Nycterosea obstipata* Fab. (2), *Nomophila noctuella* Schiff. (309), *Plutella maculipennis* Curt. (15).

POLYMORPHISM

<i>Biston betularia</i> L.		<i>Sterrha arversata</i> L.	
typical	66 (88%)	remutata	74 (75%)
carbonaria	7 (9%)	aversata	25 (25%)
insularia	2 (3%)		

Biston strataria Hufn. Typical 134, melanic 1 (previously reported *Ent. Rec.*, 82: 215).

Eilema deplana Esp. Typical 2, unicolor 2.

E. griseola Hübn. Typical 15, flava 4.

Agrotis exclamationis L. Typical 5867, melanic 1.

Apamea crenata Hufn. Typical 10, alopecurus 1.

Lomaspilis marginata L. Typical 138, pollutaria 1.

Semiothisa liturata Clerck. Typical 37, nigrofulvata 1.

Alcis repandata L. Typical 51, conversaria 3.

Sungate, Football Green, Minstead, Lyndhurst, Hants.

CORRIGENDA.—It has been brought to my notice by Messrs Bretherton, Warren and de Worms that my record of *Erebia eriphyle* Freyer on the Simplon would be improbable (*Ent. Record*, 82: 285-292). Unfortunately, the species which I identified as *eriphyle* was, in fact, *melampus* Fuessl. The record of *Leptidea duponcheli* Staudinger from the Col du Tende should be corrected to *sinapis* L., and we did not take *Colias hyale* L. at Ivrea as stated. To the list, however, should be added *Hipparchia alcyone* Schiff. which we found at Bolzano, Sospel, St. Valier, Grasse, Mt. Ventoux and Digne, fagi Scop. being taken at Ivrea, St. Valier, Fountain de Vaucluse, Ventoux and Digne.—GEORGE THOMSON, 98 George Street, Dunblane, Perthshire.

A Review of the Butterflies in the Bristol Area

By A. D. R. BROWN, F.R.E.S.

Introduction

Over the past ten years, much information has been collected about the local lepidoptera of the Bristol area, and especially the butterflies. The Entomological Section of the Bristol Naturalists' Society has been largely responsible for this, and every year members of the Society have been kind enough to send in observations of what they have seen, both privately and on organised field meetings.

It has been the custom of the Entomological Section to preserve these observations by recording them on index cards, and a report has been published annually in the Society's "Proceedings" giving details of the features of that particular year. Since this system was initiated many changes have taken place as a result of 'progress' altering the balance of flora and fauna in this area, and this has been especially noticeable with our lepidoptera. When Monks Wood had established its national lepidoptera mapping scheme, members of our Section formed a committee to co-operate with this scheme on a more local basis. We decided to concentrate on vice-counties West Gloucestershire and North Somerset, and in 1969 we published our first set of distribution maps in the Bristol Naturalists' Society's "Proceedings" together with the usual annual report.

This article is just a general survey of the various species of butterfly taken from our extensive records, and an attempt has been made by the author to give some idea of the situation in this part of the world, together with notes on the destruction of habitats, local variation and various other points. A series of distribution maps covering the two vice-counties in question has been included, and these are identical with the ones that we have previously published.

Owing to the shortage of entomologists in the Bristol area, it is not possible to cover the entire region from one year to the next, so, as can be expected, there will be many gaps in our knowledge of the precise locations and distributions of many of the species. However, where there is a certain lack of information, this has been mentioned while describing the species in question, and suggestions are made of likely haunts which need to be studied.

It is hoped that some benefit may be gained from this report, and that it may throw some light on the lepidoptera situation as a whole in this country.

DANAIDAE

Danaus plexippus Linn. (Milkweed)

During the great invasion of this North American migrant butterfly to this country in the autumn of 1968, two of them, out of total of over sixty, were observed in the Bristol area, one

from each vice-county. On the 14th October of that year, one was seen on the wing at Brent Knoll between Weston-super-Mare and Bridgewater, while a second was noted twelve days later at Churchdown in Gloucestershire.

SATYRIDAE

Pararge aegeria Linn. (Speckled Wood)

The Speckled Wood occurs in almost any suitable habitat in the Bristol area, but is never common. However, in certain isolated localities in the Cotswold and Mendip Hills, it has been observed in strength from time to time, mainly on the early summer bramble blossom. We usually see four broods every year, there being two parts to each generation. The first specimens appear on the wing in April and are of a particularly bright and even exotic character, with very prominent yellow markings. In the spring of 1967, the author captured two contrasting aberrations at one locality on the same day. They were both females, and had emerged during a warm sunny spell following a period of heavy frosts and bitter cold. With the first specimen, the characteristic yellow patch surrounding the eye-spots on the forewings was absent, whereas on the second one most of the yellow markings on the forewings had been extended into broad streaks, and the eye-spots themselves were enlarged. It is thought that the prevailing weather could have been responsible for these variations.

During the latter part of the year, specimens are seen on the wing right up to the end of October.

Pararge megera Linn. (Wall Brown)

Over the whole of the two vice-counties, this species has been seen at sometime or another, but only in very small numbers. Its strength varies from one season to the next, and occasionally it may be absent from certain popular haunts for quite a number of years. Unfortunately, it is extremely difficult to give any indication of the trends of this species, but in one or two localities its status never dwindles. These places are mainly in the open areas along the Cotswold escarpment in Gloucestershire, and Sand Point near Weston-super-Mare in Somerset also appears to be a stronghold of the Wall Brown. Despite extensive searches little in the way of variation has occurred.

Maniola jurtina Linn. (Meadow Brown)

There is little to say about this butterfly except that it is common nearly every year, and can be found on almost any suitable piece of ground. Those specimens with white blotches known as "bleaches" are met with in most seasons, but are not nearly so frequent as in South-East England. It might be of interest to note that the butterfly usually appears on the wing in mid-June and may be seen up to the end of October, if mild weather prevails.

Maniola tithonus Linn. (Hedge Brown)

This species, too, is found all over the two vice-counties but is not usually observed in very large numbers owing to its comparatively short season on the wing. However, this is quite deceiving since if one approaches a suitable haunt at the right time when the weather is good, the species may often be found to be plentiful. We have much evidence of this each year from various localities and so this conclusion is well founded. 1968 was an outstanding year for the Hedge Brown in the Bristol district, particularly in the City itself, where it 'swarmed' at Kingsweston Down. It may safely be said that nearly fifty per cent were of the form ab. *multiocellata* Oberthur, some being quite extreme. Examples of "bleaches" or ab. *transformis* were also taken. Our latest record is of one butterfly at Yatton in North Somerset on 12th September 1965.

Eumenis semele Linn. (Grayling)

Here we have a species which is renowned for its characteristic of inhabiting two quite different haunts. On the one hand it normally flourishes on limestone hills, whereas on the other it can be found in low-lying heathland areas. Although we have no records from West Gloucestershire, the above statement can be applied to North Somerset. In the Mendip Hills, which are primarily limestone, the Grayling butterfly has been noted in no less than five localities. On the rocky outcrops and open areas in Goblin and Brockley Combes it can also be found. In contrast, it is especially common along the coastal reaches either side of Weston-super-Mare, from Sand Point to Brean Down. Unfortunately, the author has not yet had an opportunity to compare specimens from both regions. It is of interest to note that we have no observations from the extensive marshy lowlands and moors south of the Mendip Hills, although one would assume this to be an ideal location.

Melanargia galathea Linn. (Marbled White)

This species, fortunately, does not appear to be in any danger, as indicated from the records. Although it is dying out in some of its former localities, we receive reports of new discoveries every year. In many of its Cotswold haunts, it is the most common of the Satyridae butterflies, and frequently 'clouds' of them have been observed. Whether this is an indication that the Marbled White is on the increase is difficult to assess, but there is certainly no evidence that it is on the decline. It is not only plentiful on the limestone hillsides but also in many of the country lanes and rough fields, extending between Gloucester and Bristol. At Kingsweston Down in northern Bristol, which incidentally is a Roman encampment surrounded by an abundance of various grasses interspersed with hawthorn trees, the Marbled White is common each year.

In 1967, a superb aberration was taken here, in which the normal black markings were replaced by those of a pinkish-buff colour.

In North Somerset, it occurs in nearly every type of habitat, ranging from the bleak open areas in the Mendip Hills, through to the coastal regions near Weston-super-Mare, including the inevitable Goblin Combe, and down across the Somerset lowlands south to the Polden Hills near Street. 1970 appears to be a peak year for the Marbled White, in Goblin Combe at any rate, where numbers of the butterfly were fighting for nectar on each flower head. A male specimen with normal forewings and near-transparent hindwings was caught at this time.

Aphantopus hyperantus L. (Ringlet)

As can be seen from the map, this species is quite widely distributed throughout the two vice-counties, and can be found in a variety of different habitats. It occurs in small numbers on the slopes of Stinchcombe Hill near Dursley in Gloucestershire, which is typical Cotswold limestone scenery containing rough open pastures interspersed with dense scrub. In other areas, such as Wetmoor near Wickwar and Michael Wood, not far from Stone, the Ringlet can be seen in far greater numbers, where there is thick deciduous forest with overgrown rides. Unfortunately, in the latter locality, numbers have been drastically reduced owing to extensive clearing and widespread damage from the development of the M5 motorway.

In North Somerset, the picture is in complete contrast. The butterfly occurs all over the Mendip Hills wherever there is sufficient scrub or woodland, and particularly in the deserted lead-mine areas around Charterhouse and Priddy. In the marshy peat lowlands south of the Mendips, the Ringlet is widely scattered and often very common. However, nearer Bristol, a colony exists in what might be termed a 'unique' locality. This is Goblin Combe, a deep ravine in the limestone uplands not far from Bristol's Lulsgate Airport. More will be said about this spot when describing other species. In Goblin Combe, the Ringlet is perhaps more abundant than in any of the surrounding areas. As can be expected, there is considerable variation with such numbers, and *ab. parvipuncta* and *caeca* are occasionally met with. These two forms are being bred experimentally in the hope of increasing the strength of their populations. *Ab. magnipuncta*, a much rarer variation, has also been found here, and in July of this year (1970) a superb asymmetrical "bleach" was captured.

Coenonympha pamphilus Linn. (Small Heath)

Over the past eight years, the numbers of this little butterfly have increased noticeably, especially in the Bristol district, and reached a peak in 1969. In the early 1960's, only two or three specimens would ever be seen on a particular day,

generally being more plentiful in the first generation.

Starting with West Gloucestershire, including Bristol, the Small Heath was quite scarce on Filton Golf Course but in 1965 there was a marked increase in its strength. In other places such as Wetmoor, Tockington, and Kingsweston Down, the situation has been exactly the same, the last named colony being quite variable owing to its growing status. In more recent times many new colonies have been discovered in the Cotswold Hills, with equally encouraging results. During 1970, we received a bulk of reports from the somewhat built-up areas east of Bristol, such as Purdown, where no fewer than fifty specimens were counted on a day in August.

In North Somerset we have further evidence that this species is on the increase, especially from 1965 onwards. Observations come from a number of localities in each type of habitat, ranging from the Mendip Hills westwards to the extensive sand dunes along the Somerset coastline, and south across the moors and lowlands to the Polden Hills. It appears to be the most common each year at the coast, but a reason cannot be given for this.

NYMPHALIDAE

Euphydryas aurinia Rott. (Marsh Fritillary)

This butterfly, whose numbers appear to be declining elsewhere in Britain, still maintains two strong colonies in the Bristol area. At present, only one remaining locality is known to the author in Gloucestershire, but at one time the Marsh Fritillary was widespread along the Monmouthshire border near the River Wye. Recent flooding is believed to be responsible for the extermination of at least one of these colonies near Tintern. As for the still surviving colony, it appears in strength about every four years at its haunt at Wetmoor, an extensive region of deciduous forest and marshy clearings, located between Wickwar and Hawkesbury Upton. Mild damp winters, typical of the West of England, seem to be detrimental to the hibernating larvae, and this could be the cause of the continual fluctuation in numbers from one year to the next. There is very little in the way of variation within this colony, although quite dark specimens appear from time to time.

The situation in Somerset is a little more encouraging, as can be seen on the map. This species occurs in two of the areas up in the Mendip Hills, where there are ancient lead mine workings, but has not been observed from one of them in more recent years. There are several possibilities which could account for this sudden absence. Due to the altitude and lengthy cold bitter winters in these hills, it is unlikely that the climate can be blamed for this, as opposed to the colony in Gloucestershire. There are two picturesque lakes which are popular with sight-seers, but owing to the rough

terrain it is not very probable that the suitable breeding spots get trampled over. Nearby, much of the heathland has been taken over by the Forestry Commission, but here again the most likely areas have been untouched. The final factor, and the one which I believe to be the prime cause, is the widespread destruction by fire. The remaining flourishing colony near Charterhouse was nearly wiped out by fire a few years ago, but managed to be saved. This colony has long been known to local entomologists and possesses certain unique characteristics. Lastly, there are several sparse colonies down on the Somerset moors, but their survival is threatened by peat cutting.

Argynnis selene Schiff. (Small Pearl-Bordered Fritillary)

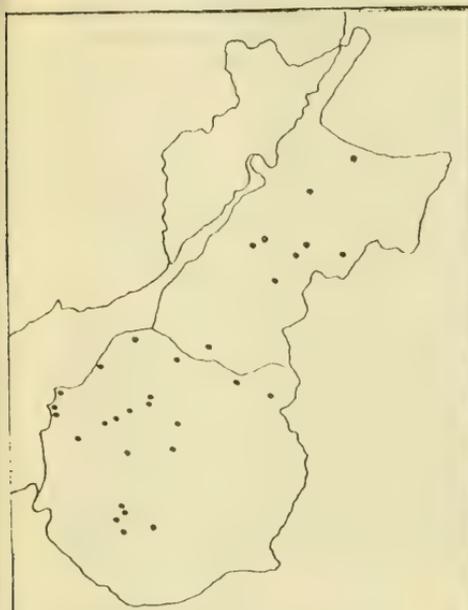
At the present time it is difficult to estimate the range and strength of this butterfly in Gloucestershire for various reasons. Until recently a flourishing colony thrived in Michael Wood near Stone, as shown on the map, but its chief breeding ground was completely devastated last year when the M5 motorway development scheme ploughed straight through the woodland. Small patches of Michael Wood are still remaining, in particular those areas owned by the Forestry Commission, where the butterfly may still be surviving, but it is too soon to give any idea of the long-term effects of this ruthless destruction. The Small Pearl-bordered Fritillary has been discovered in considerable strength at two localities in the Forest of Dean, but it is highly probable that many others exist owing to the superb and unharmed natural conditions. This region may easily have the potential that the New Forest once had. There is little threat from tourists, since they usually confine their activities to the picnic areas and nature trails; the greatest problem is undoubtedly the steady onslaught and the notorious hardwood-conifer conversions by the Forestry Commission. Let us learn our lesson from the case of the New Forest and prevent a similar catastrophe from ruining this last of the great forests.

In Somerset, the butterfly is usually met with in the same haunts as the Marsh Fritillary (*Euphydryas aurinia* Rott.), such as the old lead mines in the Mendip Hills and on the marshy lowlands, but is never common. Goblin Combe, mentioned earlier, is an ideal locality for this species, and it is observed there in abundance every year.

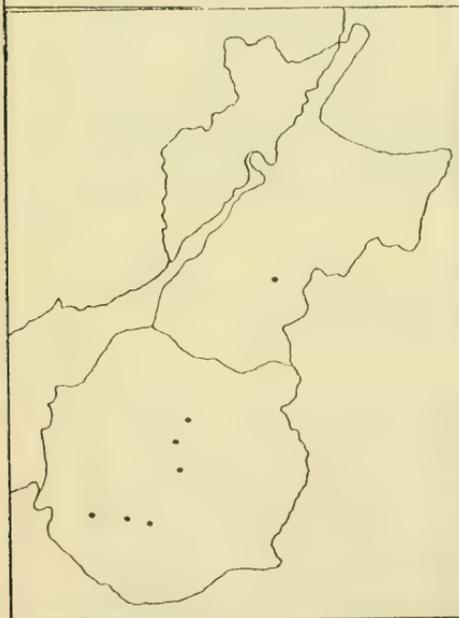
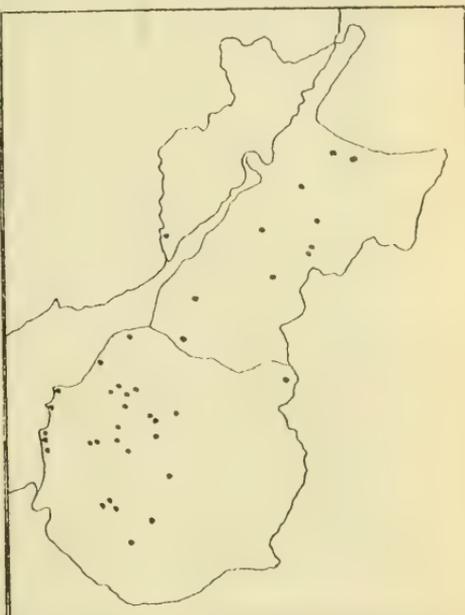
Argynnis euphrosyne Linn. (Pearl-Bordered Fritillary)

This species is far scarcer in the West of England than the one previously described. The apparent widespread distribution in Somerset is rather misleading; sightings of the Pearl-bordered Fritillary were recorded from these localities during the early 1960's by members of the British Naturalists' Society, but only in very small numbers, and there is doubt as to their authenticity. None have been recorded in more recent years,

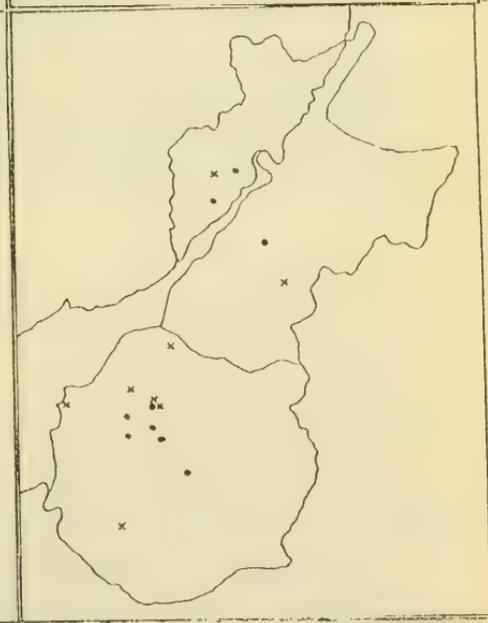
Aphantopus hyperantus L.
(Ringlet)



Melanargia galathea L.
(Marbled White)



Euphydryas aurinia Rott.
(Marsh Fritillary)



Argynnis selene Schiff.
(Small Pearl Bordered Fritillary)
× *Argynnis euprosyne* L.
(Pearl Bordered Fritillary)

and it is possible that they could have been confused with its cousin, the Small Pearl-bordered Fritillary (*Argynnis selene* Schiff.) which is on the wing at the same time of year and which, itself, occurs in most of these places. However, there is one definite exception, and that is a predominant colony of this butterfly existing alongside its relatives in the area around Goblin Combe. As with *selene*, it is seen here every year, although the first specimens are on the wing about a fortnight earlier. An unusual asymmetrical aberration was taken here in 1966 by the author, where some of the black markings on the forewing (right) are united by an extra black bar, whereas the left-hand side of the specimen is completely normal.

At Wetmoor in Gloucestershire, which incidentally is now a nature reserve under the management of the Gloucestershire Trust for Nature Conservation, the butterfly is only occasionally met with and is frequently absent during some years. Across the River Severn in the Forest of Dean, the future prospects for the Pearl-bordered Fritillary look most promising. This year, the butterfly was observed in profusion along some of the old deserted railway cuttings between Lydney and Coleford, and I have received several reports regarding discoveries of other colonies in this region.

THE PROFESSOR HERING MEMORIAL RESEARCH FUND

The British Entomological and Natural History Society announces that awards may be made from this fund for the promotion of entomological research with particular emphasis on:—

- (a) Leaf miners
- (b) Diptera, particularly Trypetidae and Agromyzidae
- (c) Lepidoptera, particularly Micro-Lepidoptera
- (d) General entomology

in the above order of preference, having regard to the suitability of the candidates and of the plan of work proposed.

It is envisaged that awards would be made to assist travelling, and other expenses necessary for field work. In total they are not likely to exceed about £100 in 1971 or 1972.

Applicants should send a statement of their qualifications, of their plan of research, and of the precise objects for which an award is sought, to R. F. BRETHERTON, C.B., M.A., F.R.E.S., Hon. Treasurer, Folly Hill, Birtley Green, Bramley, Surrey, as soon as possible, and in any case not later than 30th September 1971

Applicants need not be resident in the United Kingdom, and research in any part of the world may qualify.

A Note on the Genera *Adrama* Walker and *Meracanthomyia* Hendel (Diptera : Tephritidae)

By V. C. KAPOOR

Associate Professor of Entomology, Punjab Agricultural University, Ludhiana, Punjab, India.

(Division of Entomology)

Indian Agricultural Research Institute, New Delhi, 12.

Adrama Walker and *Meracanthomyia* Hendel belong to the tribe Adramini in the subfamily Dacinae. These two genera are presently separated by the presence in the former of short pendant antennae, absence of antennal prominence, strong anterior supra-alar and basal scutellar bristles and well bristled r4-5, and in the latter of long porrect antennae, well-defined antennal prominence, absence of basal scutellar bristles, vein r4-5 not bristled. In recent years male genitalia characters are also considered important in generic segregations. These have been largely neglected in Tephritidae though workers like Munro (1947) and Hardy (1951) have given some importance to genitalic studies in fruitflies. In view of this the author has studied these two genera with reference to their male genitalia with common examples available to him, namely *Adrama determinata* Walker and *Meracanthomyia kotiensis* Kapoor (in press). The male genitalia of the former are figured (figs. 1-3) here while those of the latter can be compared with those under publication. The most important

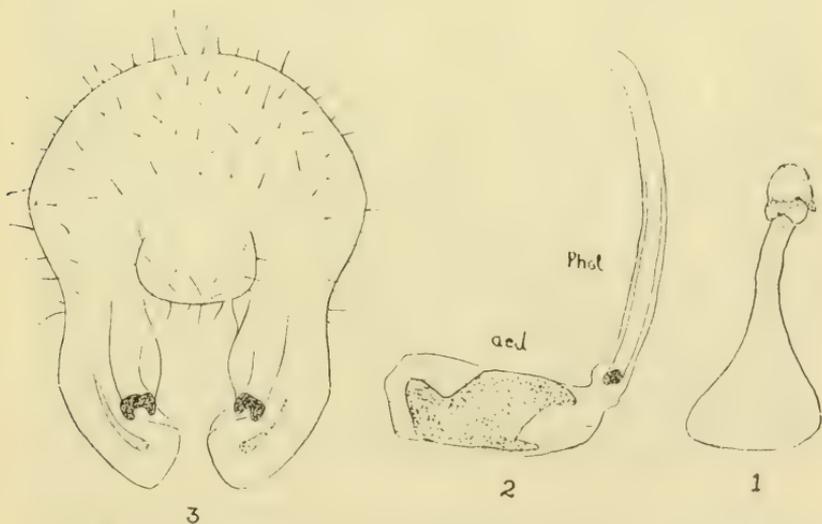


Fig. 1—Ejaculatory apodeme; Fig. 2—Aedeagus (aed) and Phallosome (Phal.); Fig. 3—Ninth tergum (rear view).

difference between these two is the presence of tubular structures on the phallotheca in *M. kотиensis* while such are totally absent in *A. determinata*. This difference appears to be of generic importance, though the author has had no opportunity to study the genitalia of the typical species of both the genera.

Acknowledgments

The author is grateful to Dr M. G. Ramdas Menon, Senior Systematic Entomologist, for valuable suggestions and to Dr S. Pradhan, Head, Division of Entomology, Indian Agricultural Research Institute, New Delhi—12, for facilities.

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Warwickshire M.V. Recordings, 1970

By DAVID BROWN

This was my third full year with the m.v. trap. As opposed to previous years it was operated throughout at a higher level in order to take advantage of the aspect of some miles of flat countryside. Only on nights when I was away or on nights of very high winds or severe rainstorms was it not switched on. Indeed, to allow operation even in adverse conditions, I arranged a permanent covered protection anchored firmly to the flat roof on which the trap stood. Previous to this I had lost expensive lamps by the chilling action of the rain against the hot lamp in the middle of the night.

This year, too, I eventually realised that birds were entering the trap for usually it would be seven or eight in the morning before the trap was brought indoors for inspection. A suitable arrangement of wire in the aperture prevented further nuisance from this source. Nevertheless, I have almost resolved to be up with the dawn next year as I am sure a considerable number of species—especially the prominent—are lost in the vicinity of the trap itself.

I also found it advantageous to have sessions about the light, as I have often wondered how many moths are attracted to it but which, in the event, do not actually enter the trap. It was during such sojourns that I ensured the boxing of three

Mormo maura L. (Old Lady) and four *Zeuzera pyrina* L. (Leopard).

Species not previously recorded at the Charlecote Trap:—*Apocheima hispidaria* Schiff. (Small Brindled Beauty), 1st March, 11th April; *Panolis flammea* Schiff. (Pine Beauty), 16th April; *Drepana lacertinaria* L. (Scalloped hooktip), 12th May; *Clostera curtula* L. (Chocolate-tip), 12th May; *Acasis viretata* Hübn. (Yellow-barred Brindle), 15th May; *Itame wauaria* L. (V moth), 9th June; *Ceramica pisi* L. (Broom Moth), 9th June; *Apamea unanymis* Hübn., 15th June; *Comibaena pustulata* Hufn., 18th June; *Abraxas sylvata* Scop. (Clouded magpie), 26th June; *Scopula imitaria* Hübn. (Small Blood-vein), 2nd and 4th July; *Bupalus piniaria* L. (Bordered White); *Zeuzera pyrina* L. (Leopard), three on 4th July; *Geometra papilionaria* L. (Large Emerald), 8th July; *Apamea ophiogramma* Esp. (Double Lobed), 22nd July and 3rd August; *Mormo maura* L. (Old Lady), 3rd, 15th and 29th August; *Perizoma alchemillata* L. (Small Rivulet), 3rd August; *Pelurga comitata* L. (Dark Spinach); *Plusia gracilis* Lempke (Lempke's Gold Spot), 22nd August; *Trichiura crataegi* L. (Pale Oak Eggar), 29th August; *Steroha emarginata* (Small Scallop), 26th September; *Agrochola macilentata* Hübn. (Yellow Line Quaker), 8th, 11th and 15th October; and *Tiliacea aurago* Schiff. (Barred sallow), 8th, 11th, 12th and 14th October.

I felt that such a long list of newcomers must have been due to the exceptionally long period of warm weather during June and July. I also found it strange that some species such as *T. aurago* and *Z. pyrina* should occur in such good numbers in a single week. It was a coincidence that my friend ten miles away at Cubbington caught his first *pyrina* on the same night as my first three.

The following were absent in 1970:—*Lampra fimbriata* Schreber (Broad-bordered Yellow Underwing), *Orthosia munda* Schiff. (Twin-spot Quaker), *Lithomoia solidaginis* Hübn. (Golden Rod Brindle), *Lithophane semibrunnea* Haworth (Tawny Pinion), *Antitype chi* L. (Grey Chi); *Apatele leporina* L. (Miller), *Anchoscelis helcola* L. (Flounced Chestnut), *Hydraecia oculea* L. (Ear), *Pyrrhia umbra* Hufn. (Bordered sallow), *Heliothis peltigera* Schiff. (Bordered Straw); *Rhizedra lutosa* Hübn. (Large Wainscot), *Arenostola pygmina* Haw. (Small Wainscot), *Nonagria typhae* Thunb. (Bulrush Wainscot), *Miltochrista miniata* Forst. (Rosy Footman), *Lithosis griseola* Hübn. (ab. *flava*) (Dingy Footman), *Cosymbia porata* L. (False mocha), *Nycterosea obstipata* Fabr. (Gem.) *Perizoma flavifasciata* Thunb. (Sandy Carpet), and *Theria rupicaparia* Schiff. (Early Moth).

The most common moths were very similar to previous years and the following table indicates some species which I was very pleased to find on the increase:—

	1968	1969	1970
<i>Deilephile porcellus</i>			
(Small Elephant Hawk)	1	0	2
<i>Cerura vinula</i> (Puss Moth)	1	0	2
<i>Notodonta dromedarius</i> L. (Iron prominent)	0	2	3
<i>Cucullia verbasci</i> L. (Mullein Shark)	0	1	3
<i>Tiliacea citrigo</i> L. (Orange Sallow)	0	1	3
<i>Cirrhia gilvago</i> Schiff. (Dusky Lemon Sallow)	2	18	40
<i>Apatele alni</i> L. (Alder Moth)	0	3	6
<i>Erombia ochroleuca</i> Schiff. (Dusky Sallow)	1	0	8
<i>Cosmia diffinis</i> L. (White Spotted Pinion)	8	25	40
<i>Pseudoips prasinana</i> L. (Scarce Silver Lines)	1	0	2
<i>Catocala nupta</i> L. (Red Underwing)	3	41	23
<i>Gastropacha quercifolia</i> L. (Lappet Moth)	1	0	7
<i>Selenia lunaria</i> Schiff. (Lunar Thorn)	4	28	30
<i>Plagodis dolabraria</i> L. (Scorched Wing)	10	15	31

With the revised position of the trap it became quite a common occurrence to record totals upwards of a thousand per night and, by the end of the season, I became quite experienced at sorting and recording such vast numbers.

19th June	1,300
4th July	1,100
6th July	2,500
7th July	6,000 (Record for Charlecote)
16th July	1,052
3rd August	1,772
5th August	1,391
6th August	2,252
7th August	3,000

I would be interested to hear the size of other collectors' most prolific catches.

PARASCOTIA FULIGINARIA L. — Following Dr G. A. Neil Horton's Monmouthshire records in 1970 (*antea*: 25), I have captured *Parascotia fuliginaria* L. at my home in Gloucestershire, about 24 miles north-east of Usk, regularly for the past four years. The numbers captured have varied from 2 to 7 in one year. Last year a female was captured, all the other specimens being males. Whether or not the fact that I have not seen it prior to the last four years may or may not be coincidental since it is only in these years that I have run a mercury vapour trap.

Since *P. fuliginaria* L. is known to feed on bracket fungi common on birch and pine, I suggest that the insect may be well established in the Forest of Dean and surrounding areas, since the Forest is continually being replanted with birch and pines where oak woodland once stood. Both Usk and Westbury-on-Severn are reasonably near to the Forest.—R. A. WATSON, Vine Tree Cottage, Westbury-on-Severn, Glos. 19.iv.1971.

PLATE IV



ARCHIBALD JOHN WIGHTMAN, 1884-1971

Obituary

ARCHIBALD JOHN WIGHTMAN

1884-1971

With the death of A. J. Wightman British lepidopterists have lost an outstanding figure. He died on 21st January 1971 aged 86 years, after a lifetime crammed with adventure, originality and prodigious activity; and the greater part of these energies were expended on the study of British noctuid moths and their varieties which he collected and reared on a scale hitherto unknown.

He was a Sussex man, born in Lewes on 6th November 1884, and apprenticed in London to his father's trade of ironmongery. He was sent in 1909-10 to Australia where he took his chance living rough in the Queensland bush and where he learned much of the insects, birds and animals of that country. After his return to England he married Alice Holder, a Lewes girl, in 1915. He saw service in World War I as a tank commander and then instructor. Between the wars he lived at Pulborough where he was branch manager of an old-established ironmongers. He retired soon after the war but remained at Pulborough, his wife dying in 1957. There were no children.

He was interested in everything and fascinated by all. His was a questioning mind that sought answers in classical fields as well as in everyday matters, his judgment was sharp, his experience immense and his power of debate quite indomitable. Above all he was an acute observer of every facet of people and life and of all forms of wildlife; he never accepted the commonplace, nor took things for granted, instead he endlessly asked himself why creatures behaved as they did, and how they came to be as they were. His entomological career spanned a revolutionary change from the old-world concept of collectors and collecting to the modern genre of conservation and environmental study, and he took in his stride, self-taught, the growing sciences of evolution, ecology, genetics and practical taxonomy with its attendant snares of nomenclature.

His entomological interests date from when he would elude his nurse to watch Swallowtail moths at dusk, through his early working life when he would spend the night collecting and return directly to work in the shop. He came to the fore in 1908 discovering *Nonagria neurica* with Sharp at Eastbourne at a time when its separate existence from *N. dissoluta* was in question. His special interest in the noctuids had already developed so his early and lasting friendship with Edelsten and Cockayne followed. He quickly built up a reputation for first-hand knowledge of this group of moths, especially of where and how to find them and their early stages; it is not easy for us to-day to understand how rudi-

mentary was the knowledge then of life histories of so many noctuids, and especially of the reed and internal feeding species known only from moths collected at hand lanterns. The work of Wightman in discovering the smallest details of these insects both in the wild and in his cages is still too little known. He used his colossal energy to ferret out the secrets of the Sussex fauna and had his taste of collecting further afield until the Second World War intervened.

During his life he was father-figure to a succession of Sussex entomologists to whom he gave shape and purpose in their study and collecting as indeed he did to all who were fortunate enough to work with him, both the youthful and the not so young. After the Second World War he threw himself into the new era of collecting with a vigour and success that continued to astound all of us. After the death of his wife he realised long-cherished dreams by residing in turn in the classical collecting grounds of the fens, west country, Ireland and Scotland and by making excursions to wherever else his interests lay. As he grew older he seemed to become yet more active; his sixties found him walking all night long lamp in hand at Salisbury and Dungeness or coming in at dawn at Woodwalton; his seventies found him clambering over the Burren limestone and trudging the Manx cliffs, at 83 he went further into Borth bog at night than any of his juniors, and we wondered what ninety might bring.

But the loss of friends and colleagues years younger than himself began to sap the spirit even of this remarkable man, and the death of Don Odd especially saddened him; now he, too, is gone.

His writings on *A. xerampelina* and *A. luneburgensis* reveal but a glimpse of the professional scholarship he exercised in his researches. Although his published work spans his full active career it comprises but a fraction of his labours which instead lay for years in scattered manuscript except for his Diary, but recently he sorted these papers into loose-leaved volumes. These constitute a rich source of forthright comment, an uninhibited testament of uncommonly erudite candour, an anthology of lepidoptera collecting since 1900.

The depth and scope of his work is best seen in the unique collection he built and developed; the precision of nomenclature and organization of material is quite unequalled in private collections, while the quality of the specimens and scope of material is of the highest possible order. Wightman's comprehension and breadth of knowledge of his subject nurtured this collection to a dimension quite unknown in British Noctuidae. He was fastidious to a degree and observed the most scrupulous of standards. The scale on which he worked is exemplified by his success with a favourite species *Atethmia xerampelina*; these he collected as larvae each spring by ingenious trapping and then reared in cages designed to provide for their special feeding requirements on

expanding ash flowers. From 1940 to 1965 he bred over 30,000 moths, a staggering achievement with a species scarcely known to collectors outside the light trap.

His recollection of personalities and events remained always lucid, his anecdotes and collecting dates were a legion. He was intensely practical both in commonsense approach to planning work and in the construction of his own glazed cases, rearing equipment or collecting gadgets, of which he invented novel implements for special jobs. Of robust physique and large frame he was in every way a big man, who for the most part enjoyed sound health and iron constitution; indispositions that bothered him in later life derived from the indifferent way he treated his digestive system.

A. J. Wightman enjoyed the distinction, achieved by few British lepidopterists, of becoming a legend in his own time; others have been equally well loved or respected or admired but few have commanded such compelling authority derived from original work of such calibre.

A great man is gone.

G. M. HAGGETT.

Notes and Observations

COSYMBIA PUPPILLARIA HUEBNER IN BRITAIN: ADDENDA AND CORRIGENDA.—Since my "Survey of *Cosymbia puppillaria* Huebner in Britain" (*Ent. Rec.*, **82**: 93-100) was written, the following additional records have been published or have been kindly communicated to me privately, and may be added to the list given to it:—

- 1964 Martyr Worthy, Hants, 22.ix, female (D. W. H. ffennell, *in lit.*).
- 1967 Tattenham Corner, Surrey, 30.ix, female in good condition in m.v. trap in the garden. (R. B. Wallis, *in lit.*).
- 1969 Martyr Worthy, Hants, 7.x, male; 13.x, male; 17.x, female (D. W. H. ffennell, *in lit.*); Shillingford, Oxon, 19.x, male in fair condition (M. Bourne, *Ent. Gaz.*, **21**: 64); Watts Common, Aldershot, Hants, 19.x, female at m.v. light; eggs obtained and adults reared (W. G. Kittle, *Ent. Rec.*, **82**: 101-102); Micheldever, Hants, 22/23.x, male at m.v. light (C. H. Dixon, *in lit.*); Lee, Kent, one 20.x (de Worms—C. G. Bruce, *Lond. Naturalist*, **49**: 84, 88); Totteridge, Middlesex, one 22.x (de Worms—R. Lorimer, *Lond. Naturalist*, **49**: 84).

These ten additions bring the total recorded in the wild in Britain to 73 (including one larva). They also make 1969, with 20 records, decisively the best year. I have not heard of any occurrence of the species in 1970.

In the original list, Sir Robert Saundby's record at Burghclere was erroneously referred to Berks. This should be corrected to Hants. Mr R. A. French has kindly pointed out to me

that the date of the second record at Bishopsteignton, S. Devon, in 1964 should be 20.ix. (not 1.ix. as printed); and that altogether *three* specimens were reported there in 1964, though the date of the third is uncertain. He also tells me that for Minstead, Hants, 1965, there is only a single record, on 27.x. (not two, on 27.viii. and 24.x., as printed). — R. F. BRETHERTON, Folly Hill, Birtley Green, Bramley, Surrey. 10.i.71.

HELOPHILUS CONSIMILIS MALM (DIPTERA: SYRPHIDAE) IN EAST GLAMORGAN.—My observations over the past five years have led me to the conclusion that this attractive but allegedly rare hover-fly is not only maintaining a foothold in one East Glamorgan habitat (the precise location of which is withheld for conservation reasons) but may even be increasing its numbers.

The colony first came to my notice on June 5th 1966, when four insects which I had on first sight assumed to be either *Helophilus versicolor* F. or *H. frutetorum* F. proved, on closer examination, to be *H. consimilis*. The discovery of this species has prompted me to revisit the site each year since, at approximately the same date.

The 1967 and 1968 visits were fruitless, possibly due to the unfavourable weather conditions prevailing at those times, but on June 7th 1969 I was again rewarded by the sight of three males of *H. consimilis*, this time in company with *H. pendulus* L. and *H. lineatus* F.

This year, on June 6th 1970, although no other species of the genus were recorded, *H. consimilis* was again present and in such numbers that I was unable to count it.

With the solitary exception of one male, taken at Hawthorn blossom at a height of about eight feet above the ground, all the specimens observed, on all three occasions, were flying low over or amongst damp lakeside vegetation, and none were seen to stray more than a few yards from the water's edge. Could these unobtrusive habits have perhaps given the species an undeserved reputation of rarity, when "local" may be a more apt definition of its distribution?—A. W. PEARCY, 6 Melbourne Road, Llanishen, Cardiff. 13.xii.1970.

HALISODOTA TESSELLARIS ABBOT AND SMITH (LEP. ARCTIIDAE)—A batch of ova which I received from North America in late June, were spherical and shining pearly white; less than a week later the heads of the developing larvae were clearly visible as large black spots occupying most of the space inside the top third of each egg.

The newly hatched larvae consumed very little, if any, of their eggshells, and during this first stage, they were very pale grey, virtually hairless and with large black heads.

In their natural state they feed on the foliage of many kinds of trees and shrubs, seeming to have a special liking for *Robinia*, but among various foodplants offered in captivity, rambler rose seemed to be preferred. During the later stages,

oak and sallow were readily accepted, but willow was refused.

At the second instars a few hairs appeared and the thoracic and eleventh segments became yellow. Later the larvae were sparsely covered with whitish hairs, the body being light yellowish grey with black subdorsal lines edged inwardly with numerous small black dots. The head remained black throughout larval life.

At the penultimate instar the larvae were fairly densely clothed in whitish grey hairs, partly hiding the body markings which had become darker, and included a dark dorsal line. The deep yellow colour fore and aft being still visible through the hairs. In addition there were long slender tufts of black hairs at the front and rear of the larva, reminding one of some of the *Lymantriids*.

In the final instar the likeness to the *Lymantriids* was increased when further long slender tufts, some black and others white, made their appearance, the thoracic tufts pointing upwards, sideways, and straight forward, whilst a pair of black tufts on the eleventh segment were directed outwards and rearwards at an angle of about 45° to the body. At this stage the remainder of the body was covered with greyish brown tufts of shorter hairs.

In September the full-fed larvae descended to the bottom of the cage, and constructed their light greyish-brown close-fitting cocoons, with more body hairs than silk. Some were just below the soil surface and others were spun en masse on top of the soil. The cocoons were not attached to anything, and even where several larvae had selected the same corner of the cage, the individual cocoons were not attached to each other, and were very easily separable.

The shining reddish brown pupae were typical *Arctiid* shape, and the moths which emerged the following June were surprisingly large for the cocoons which had contained them. The illustration of this moth in W. J. Holland's *The Moth Book* does not do full justice to this species, either in the earlier edition or in the later one. The body and legs are pale yellow. The ground colour of all the wings is light cream, and the darker cross lines of the forewings are finely edged with black. The forewing markings are quite distinct, but the hindwings are without markings. On the edge of the lappets there is a small pale blue streak which is nevertheless conspicuous on account of its strongly contrasting colour. — JOHN L. GREGORY, 17 Grove Road, St. Austell, Cornwall. 6.ii.1971.

THE FUTURE OF THE NEW FOREST. — Many readers will probably be aware that the future of the New Forest is at present under consideration, the outcome of which could cause probably more profound changes than at any time past. Basically it is whether the forest should be developed to a far greater extent for the production of softwoods (i.e. conifers). I understand that the Minister of Agriculture, who will be making the decision, is intending to visit the New

Forest in April to assess the case for or against such development. It need hardly be said that despite its comparatively depleted state compared with earlier days, it is still a valuable reserve for all forms of wild life and also provides a most essential area of "wilderness" for the increasingly heavily populated and over-developed counties of Southern England.

It would, I think, be most beneficial if anyone who feels as I do that the New Forest is an asset too valuable to lose to mere timber production, would write to the Minister of Agriculture before April, and also to his M.P.

Such action just may help to save a unique and splendid heritage.—S. L. MEREDITH, 283 The Broadway, Dudley, Worcs. 17.i.1971.

Current Literature

A Field Guide to the Butterflies and Burnets of Spain by **W. B. L. Manley** and **H. G. Allcard**, 192pp+41 coloured plates; **E. W. Classey**, £15.

With the increasing travel facilities available, the study of entomology in an ever widening sphere has become possible to many more people interested in the subject. In some cases the travellers have published their observations for the benefit of others contemplating similar journeys, but in all too few cases has it been possible for them to collect their observations and those of others into a comprehensive book which can serve amateur and professional entomologists alike. The present book is the result of many visits to the Iberian collecting grounds, and in their Introduction the authors explain the scope of the work, their sources of information, and their methods of setting these out in the book. They appreciate the fact that some of the conclusions reached may not be the last word on the subject, and they must be congratulated for having set these conclusions down none the less, for failure to publish deprives those who would follow the matters up of the foundations for their work.

The treatise follows, in which the species are treated individually. It is divided into four parts, the main part being notes on the species of the Iberian peninsula, including France on the south side of the Pyrenees and Andorra. The smaller sections cover the Balearic Islands, The Canary Islands, and Madeira respectively. In dealing with the species, the authors have left the descriptions in the main to the excellent coloured plates, and begin with general notes on the species, including outstanding features, the terrain favoured, and its range. This is followed by a general note on its variation, and mention is made of any subspecies or forms described from the area. In the smaller sections, in the case of the Balearic Islands, all the species are known also from the mainland, and mention is only made of one or two of particular interest in the notes on the fauna. In the cases of the Canaries and Madeira, the species

are mentioned individually as in the main treatise but only details concerned with the local forms and habits are mentioned.

The authors are to be congratulated on their hard work in coordinating the great amount of information available from their own research work and from their many helpers with their own observations.

The main treatise is followed by a systematic check-list, divided similarly to the treatise, with a reference to Zerkowitz, *Journal of the New York Entomological Society*, 54: 51-87, 115-165, 211-261 for a list of the species to be found in Portugal. Synonymy and references to original descriptions being given for species and sub-species.

The Bibliography section is divided so as to be available for easy reference into General publications, those referring to the Balearic Islands, to the Canary Islands, to France south of the Pyrenees, and Andorra, to Gibraltar, to Madeira, and to Portugal. In all, nearly 600 titles are mentioned.

A short list of addenda covers four species added since the writing of the book.

The alphabetical index includes genera, species and sub-species, with synonyms in italics, reference being made both to the mention in the systematic list and the treatise, the main paragraph dealing with the insect being in heavy type.

The coloured plates illustrate the species and sub-species, the name and data for each specimen being given on the tracing paper fly leaf or leaves preceeding the plate. Where the absence of material from the particular district under discussion has made it necessary to include a specimen from elsewhere to illustrate the subject, the fact is mentioned in the data, and the entry is also marked by an asterisk. These specimens are included to give an idea of the insect in question but the authors call attention to the fact that they must not be taken as exact representatives. These plates are composed of specimens specially selected from the collections of the authors, supplemented where necessary by specimens on loan from the British Museum (Natural History), the Hope Department of the Oxford Museum, and from various private collections.

The mounting of these specimens for photographing is a task which must have called for the greatest skill and patience to bring all the insects into focus, for each plate is photographed as a whole. The very few blemishes to be found in these 41 plates, which comprise 1155 actual specimens, speak volumes for Mr F. Hall's work in photographing them. Most of these consist of pencilled border lines which had to be included because one or more specimens had overlapped the line, and in no way detract from the value of the plate. The small remainder consists of cases where portions of an insect are slightly out of focus, but these are very few indeed.

The quarto format allows for a good clear type; the paper is of good quality, and the binding strong. The plates are

specially bound in after the letterpress, and these are on good art paper, with the captions, as mentioned, on strong tracing paper fly leaves.

The edition is limited, and should soon sell out, for it is a book which should be included in the libraries of all natural history museums and scientific university libraries, beside having a strong appeal to all those private workers able to afford the price.—S.N.A.J.

The Butterflies of Trinidad and Tobago, by Malcolm Barcant;
314 pp. + 28 Plates (16 in colour), Collins, 8vo. £2.75.

The Author, with nearly fifty years of experience behind him, sets out with this work to bring the joys of studying butterflies to the young and inexperienced people of the islands, rather than to produce a scientific text book for students, though students will only have themselves to blame if they ignore the book on that account. For his purpose he presupposes ignorance of entomology and explains matters for the beginner. The better informed may avoid this part if they wish, but I have always resented instructors who fail in their task because they have not the courage to risk the displeasure of a few stilted know-alls in their audience by explaining the simple as well as the complicated.

Six hundred and seventeen species are recorded from these islands, of which 230 belong to the Hesperiidæ; the 387 others all receive individual treatment, but the Hesperiidæ are only given treatment by family representatives, which should enable the reader to identify the genus. They are, however, fully listed in the systematic list.

The author opens with a short description of the four stages of the life cycle; section 2 is headed "The Butterfly, a study" and first deals with its structure, illustrated on the opposite page by annotated drawings. The nervous system, breathing and circulation, and breeding are the subjects of sub-headings. A compliment is paid to the almost complete friendliness of butterflies to man, and finally, a rough idea of nomenclature is given. Section 3, headed "Enemies, protective devices, rarity" groups the enemies as parasites, predatory animals and insects, the natural elements, and man. Against these are mentioned the many protective devices and finally refers to the rarity or common-ness of certain species as a direct result of these devices are enemies mentioned. Section 4 covers methods of collecting and completes Part I. It mentions certain aspects of collecting met with in the tropics. Mention is also made of the Riker mount system, where the pin is extracted after setting and the specimens placed on cotton wool in shallow glass-lidded drawers.

Part II commences with the subject of population and mentions the general decline in butterfly populations as one moves away from the equator. The author mentions the numbers of butterfly species found in various Caribbean islands, showing

Trinidad having far and away the most species of any. This is followed by a brief historical note, mentioning collectors of note who have worked the area under discussion; this ranges from 1891 to the present time. There follow notes on the local seasons and collecting grounds, at first in general, and then listing 32 favourite collecting grounds with a short description of each and a map showing their positions and also features separating the north side of Trinidad from the south. These sites are finally tabulated showing what families and genera may be expected from each. This is followed by family classification in which each family receives attention. The popular names of the groups included head its paragraph and the salient points are set out in simple form, giving habits and habitats, rarity, variation, early stages and other details. In all 13 families are represented. There follows a six page table of the families and genera with headings: Flight, Resting, Feeding, Rarity, Association, Time of Activity, Migration, Distribution and Environment. This table is important to the reader, for, in this work the author has grouped the butterfly fauna under habits, habitats, etc. Section 6 gives information of this grouping and instructions on how to use the book, the eleven groups adopted being listed. Thereafter these groups are taken in turn and their species detailed under families, with serial number, scientific name, vernacular name and page reference for the illustration. These are followed by range, foodplant, description, and habits and habitat. The plates also bear cross references to the descriptions.

The plates, both coloured and half tone should give good guidance to the collector, and although the colour work cannot be described as first class, it is a very long way from deserving adverse criticism, and I only mention the quality of the colour having in mind the really superb colour work in some more expensive books recently published.

The systematic list follows with references to serial number, plate number and page number. The species occurring also in Tobago have this fact noted. This again, is followed by a list of vernacular names with the same serial number and page references, and finally there are half a dozen blank pages left for the collector's own notes.

The author's departure from the conventional systematic arrangement leaves one wondering whether this is going to be of assistance to the amateur collector or not, but it may well be that his long experience has shown it to be so. The more scientifically minded reader is left, however, to refer to several plates, sometimes some distance apart, to enable him to compare members of a genus. Let us not, however, be too critical of this, but rejoice that resident collectors and visitors have now a reasonably priced pocket sized book to use in the determination of their catches: after all, it is made clear that the book is firstly intended for the use of beginners, and the more sophisticated will certainly find it easier to carry

around than the relative volume or volumes of Seitz! As travel facilities make it progressively easier to visit distant places, there should be an increasing demand for excellent small books of this nature.—S.N.A.J.

The Norwegian Species of Tribus Olethreutini Obratzov, 1946
(Lep., Tortricidae) by M. Opheim. (Ent. scand. I, 1970: 241-257).

In this paper, Mr Opheim mentions 59 species of Olethreutini from Norway of which *Eudemis porphyrana* Hübn., *Apotomis fraterculana* Krogerus, *A. algidana* Krogerus and *Argyroploce tiedemanniana* Zeller make new records for Norway. Of the 59 species, the author withdraws *Endothenia oblongana* Haworth in a postscript, after Mr Jäkh had pointed out probable confusion with *E. marginana* Haworth.

The paper is in the English language and the author has given a short account of each species, illustrated with some genitalia details of closely allied species, distribution maps for *Apotomis algidana* and *A. demissana* Kennel, and photographs of *Apotomis* and *Endothenia* species. This paper is another of this author's efforts to get the Norwegian microlepidoptera covered by up-to-date information, and is a valuable contribution.—S.N.A.J.

Two papers from Josef Moucha from Acta Faunistica Entomologica Musei Nationalis Pragae 12: 35-42 and 13: 67-70 give an account of macrolepidoptera encountered during two Czechoslovak expeditions into Mongolia. These are in the German language and some 92 species are mentioned.

From Alfred Borkowski I have a separate from Polskie Pismo Entomologiczne entitled Studien an Stigmelliden (Lepidoptera) Teil II. *Fedalmia thymi* sp.n.—eine neue Art aus Mitteleuropa. An account is given of this new species with a black and white drawing of the adult, the male genitalia, and also the interesting mine, which involves two leaves of *Thymus pannonicus* All., the larva moving from one leaf to the other by boring through the leaf stems and the branch. There are also two photographs of typical localities for this species, and it is hoped that microlepidopterists visiting similar sites will find time to look for these interesting mines.—S.N.A.J.

The Teen International Entomology Group Newsletter, Fall 1970, Vol. 5, No. 3, has just reached me. This contains abstracts of six papers by young finalists with entomological projects in the 21st International Science Fair held in Baltimore, Maryland. These include four projects with *Drosophila*, and others with a beetle, a satyrid butterfly, and the American cockroach. There are many and varied articles of personal and scientific interest; an assembling cage is described, and there is a table setting out food and locality for 17 Sphingidae species. It is good to see that this active junior society seems still to prosper; these juniors are the seniors of tomorrow.—S.N.A.J.

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1. *U. clareae* sp. n. ♂ Holotype, Fiji, Savusavu.
2. *U. l. stigmata* Roths. ♂, Fiji, Lautoka.
3. *U. p. marshallorum* Roths. ♂, Fiji, Savusavu.

The Genus *Utetheisa* Hübner in Fiji with a description of a new species (Lepidoptera, Arctiidae)

By GADEN S. ROBINSON

(Department of Zoology, University of Durham)
South Road, Durham City, England

Summary

A new species of *Utetheisa* Hübner is described from Fiji. The morphology, distribution and biology of the three described *Utetheisa* species inhabiting the western Pacific is reviewed. A possible explanation of their relationship to the Asian and Papuan representatives of the genus is discussed.

Introduction

When Jordan (1939) revised and redescribed the Old World species of the genus *Utetheisa* Hübner very few specimens from the south-west Pacific were available and only a single Fijian specimen of the genus, this in the Tring Museum.

Roepke (1941) revised the Javanese species but, apparently ignorant of Jordan's work, synonymised *Utetheisa pulchelloides* Hampson with *Utetheisa lotrix* (Cramer) and described a specimen of *U. lotrix* as a new species, *indica* Roepke. Viette (1950) synonymised *indica* with *lotrix*.

Viette (1949) referred to *U. salomonis* Rothschild as *U. lotrix* (Cramer) subsp. *salomonis* Rothschild and recorded *Utetheisa pulchella* (L.) from the New Hebrides and Gambier Is. I consider that the New Hebrides and Gambier Is. "*pulchella*" are specimens of *U. lotrix stigmata* Rothschild and *U. pulchelloides marshallorum* Rothschild as Viette (1950) recorded the two latter species from the respective localities above. Viette (1950) referred to *U. salomonis* Roths. as *U. pulchelloides* Hampson subsp. *salomonis* Roths.

Fletcher (1957) recorded *U. salomonis* Roths. as a good species from Rennell and Bellona Is. (British Solomon Islands Protectorate). Comstock (1966) recorded *U. p. marshallorum* Roths. from Tutuila, American Samoa, and mentioned individuals with a somewhat different appearance from Swain's I., American Samoa. This latter observation will be mentioned again below.

Bhattacharjee and Gupta (1969) revised the Indian representatives of *Utetheisa* and recognised five sympatric species, an apparent fragmentation of *U. pulchella* (L.) at the edge of its range.

Collections of *Utetheisa* have been made on the island of Viti Levu, Fiji, by H. S. Robinson and me. A number of specimens were collected at Savusavu, central southern Vanua Levu, Fiji, in March 1970 by H. S. Robinson. On examination, the latter collection was found to be apparently divisible into three groups of specimens on the basis of wing pattern. Jordan

(1939) recorded *U. lotrix stigmata* Roths. from Fiji and one group, clearly separable from the rest in that the males possess no line of scent-hairs in the anal fold of the hindwing, is clearly referable to this species. The two other groups were both found to possess an anal fold scent-organ of apparently identical structure in the two groups and at first glance, both might be identified as *U. pulchelloides marshallorum* Roths. Indeed, one group is clearly this species, specimens of which were found by H. S. R. flying around flower-beds near the shore with *stigmata*, two hundred yards away from where specimens of the third group were collected, on or flying around a bush of *Messerschmidia argentea* (Linn. f.) Boraginaceae). Larvae collected from this same bush by H. S. R. and me in December 1969 and by H.S.R. in March 1970 produced only adults referable to this third group (H.S.R. pers. comm.). The third group differ from *marshallorum* in wing pattern, vesica ornamentation and antennal structure in the male and the shape of the female seventh sternite. This third group of specimens is described as a new species below and the characteristics of the other *Utetheisa* species inhabiting the southwest Pacific are discussed.

All type material and genitalia preparations have been deposited in the British Museum (Natural History), (B.M. (N.H.)).

Scale lines on all drawings are 1 mm.; on the plate 1 cm.

Utetheisa clareae sp.n.

Male: Wings patterned as in plate fig. 1. Forewing yellow-buff patterned with black and bright scarlet. Head and prothorax bright yellow dorsally, meso- and metathorax pale buff patterned with black. Abdomen white. Hindwing with fold in anal angle containing pale yellow scent-hairs. Antenna (fig. 1) with well-defined pectinations. Genitalia similar to *U. salomonis* Roths.; vesica with extensive scobinate area but only one group of cornuti (fig. 5). Tip of valve straight (fig. 11).

Female: Similarly patterned to the male. Seventh sternite with a narrow, elongate medial emargination posteriorly (fig. 8).

Diagnosis: Immediately separable from *U. p. marshallorum* Roths. and *U. l. stigmata* Roths. by wing pattern (compare plate figs. 1, 2 and 3) but wing pattern is similar to that of *salomonis*. Male possesses scent organ in hindwing, absent in *salomonis* and *stigmata*. Vesica with only one group of cornuti: *marshallorum* and *salomonis* have two (compare figs. 5 and 6). *Stigmata* has a single large cornutus. Tip of valve more flattened than in *marshallorum* (compare figs. 11 and 10), and similar to that of *salomonis* (compare figs. 11 and 9). Antenna of male differs substantially from *marshallorum* (compare figs. 1 and 2) but similar to that of *salomonis* (compare fig. 1 with 3 and 4.) Females are separable from those of *marshallorum* on the shape of the seventh sternite (com-

pare figs. 7 and 8).

Holotype: ♂, Fiji, Vanua Levu, Savusavu, Namale Estate, 27-29.iii.1970 (H. S. Robinson), in B.M.(N.H.).

Paratypes: ♂, 2 ♀♀, same data as holotype, in B.M.(N.H.).

Distribution: Known only from the type-locality.

Biology: Larvae feed on *Messerschmidia argentea* (Linn. f.), and were taken in large numbers on a bush just above high-water mark. The bush was always partly defoliated by the continuous-brooded larvae. No dispersal has been noted, the adults remaining firmly attached to the bush on which they developed. The individuals on a bush are thus thought to be much inbred. *M. argentea* is the foodplant of *U. p. marshallorum* Roths. throughout its range. *Marshallorum* Roths. is recorded as feeding on *M. argentea* on Viti Levu by R. H. Phillips (1937) but the specimens on which this record was based do not appear to have survived so we do not know whether Phillips' "*pulchelloides*" was *pulchelloides* or *clareae*. The foodplant of *Marshallorum* on Vanua Levu in the possibly competitive presence of *clareae* is unknown. *Messerschmidia* is the only native member of the Boraginaceae in Fiji (Parham, 1964) and *marshallorum* is not known to feed on anything but *Messerschmidia*. The colony of *clareae* at Savusava occupies two *Messerschmidia* bushes twenty yards apart. The colonies appear to be composed of only *clareae*. The origin of the day-flying specimens of *marshallorum* collected two hundred yards from the *clareae* colony is a mystery.

Remarks: Comstock (1966: 16) states:

"We also took a series of *Utetheisa* on Swain's I. which had a uniformly larger wingspan, and heavier red spots on the primaries than the Tutuila examples. This may well represent an unnamed race or subspecies of *U. pulchelloides*. The larvae were observed there feeding on the same tree, *Messerschmidia* (= *Tournefortia*), Samoan name Tausuni".

I cannot locate Comstock's specimens from Swain's I. but it is unlikely, though possible, that they might represent *U. clareae*. In Fiji *U. clareae* has a slightly smaller wingspan than *U. p. marshallorum* Roths. but its red spots are heavier. If, like *clareae*, *marshallorum* lives in discrete, inbreeding colonies, it is likely that each colony will exhibit a consistent wing pattern which could well differ slightly from that expressed in a series from a different island or even a different colony on the same island. Further observations will no doubt resolve this question and that of the problems of co-existence of two *Messerschmidia*—feeding species on Vanua Levu.

Utetheisa pulchelloides Hampson subsp. *marshallorum*
Rothschild

Hampson (1907): *Ann. Mag. nat. Hist.* (7) **19**: 239.

Rothschild (1910): *Nov. zool.*, **17**: 182, no. 52.

Male: A male Fijian specimen is illustrated on plate fig. 3. Forewings cream marked with black and scarlet. Hindwing with scent-organ, white marked with black. Abdomen white; head and thorax markings similar to those of *U. l. stigmata* Roths. Jordan (1939: 282) describes the subspecies and figures the male genitalia of *U. pulchelloides* subsp. *vaga* Jordan (ibidem) (258, fig. 228). The aedeagus and everted vesica are illustrated in fig. 6 and the tip of the valve in fig. 10. Jordan (1939: 285, figs. 250, 251) illustrates the antenna: the antennal segments of a Fijian specimen are shown in fig. 2.

Female: Similarly patterned to the male; illustrated by Comstock 1966, (pl. III, fig. 1). The seventh sternite is illustrated in fig. 7.

Diagnosis: Separable from *U. clareae* by its indented hindwing pattern and less dense forewing markings (see diagnosis for *clareae*). Males with hair fold in hindwing immediately separable from *U. l. stigmata*.

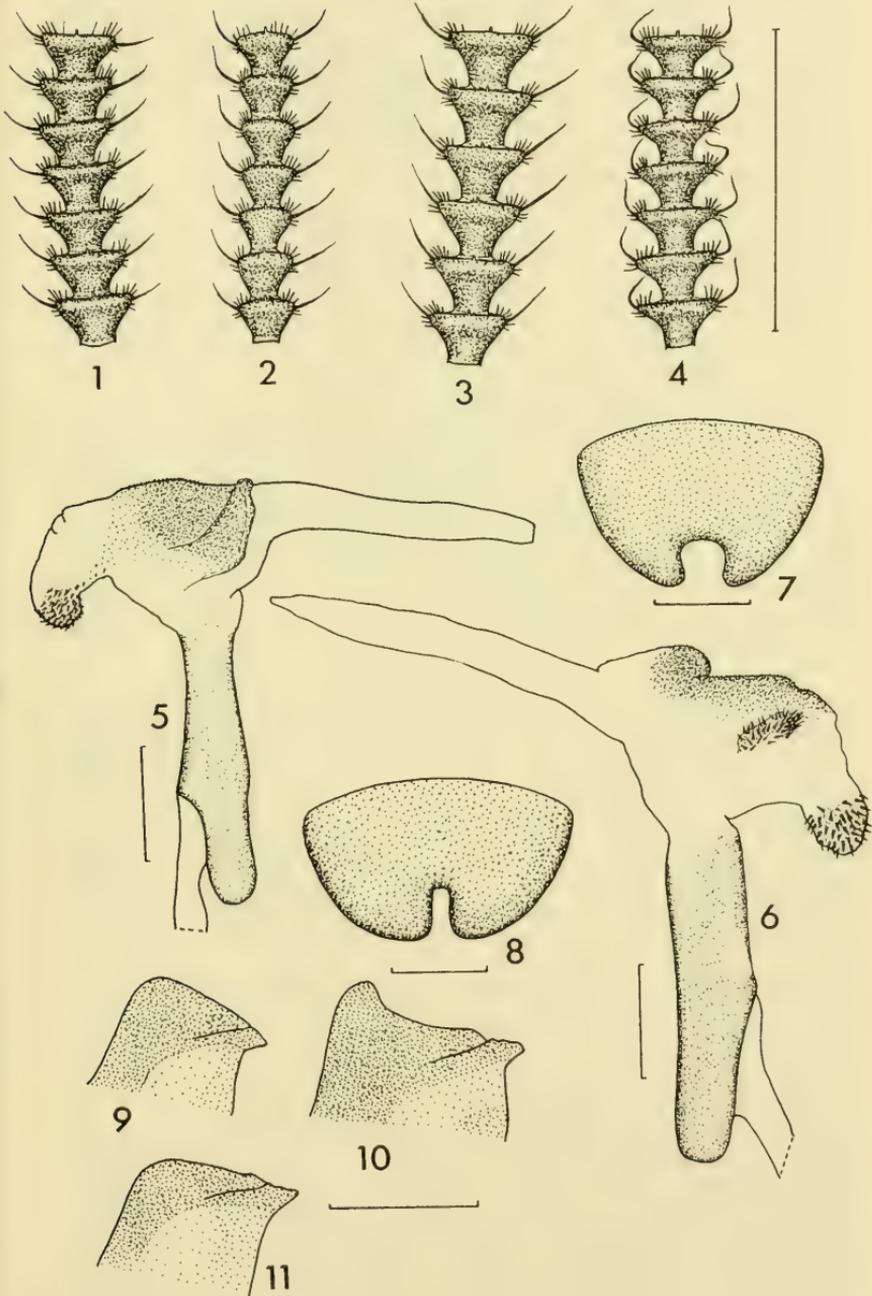
Local distribution: Known only from Savusavu, central southern Vanua Levu. This species is presumed to be present on Viti Levu from the notes made by Phillips (see above) but we have not found it.

World distribution: *U. pulchelloides* ranges eastward from Madagascar through the Oriental region forming a number of subspecies (see Jordan, 1939). *U. p. marshallorum* Roths, inhabits an arc from Wake I. and Bikini southwards through the Marshall Islands and Gilbert and Ellice Is. to Fiji and south-east to Tonga. It occurs in Samoa and the Tokelau Is. and its range extends further south-eastwards from Samoa to the Cook Is. and on to the Society Is. and Tuamotu Archipelago reaching the eastern limit of its range in the Gambier Islands.

Biology: *U. p. marshallorum* feeds on *Messerschmidia argentea* (Linn. f.) throughout its range. Comstock (1966: 16) described its life history on Tutuila, American Samoa, and illustrated the egg, larva, and pupa in colour (ibidem pl. IV, fig. 1).

Legend to figures

1. *U. clareae* sp. n. Paratype—part of ♂ antenna.
2. *U. p. marshallorum* Roths. Fiji—part of ♂ antenna.
3. *U. salomonis* Roths. Loyalty Is.—part of ♂ antenna.
4. *U. salomonis* Roths. Guadalcanal—part of ♂ antenna.
5. *U. clareae* sp. n. Holotype—aedeagus with vesica everted.
6. *U. p. marshallorum* Roths. Tokelau Is.—aedeagus with vesica everted.
7. *U. p. marshallorum* Roths. Fiji—♀ sternite VII.
8. *U. clareae* sp. n. Paratype—♀ sternite VII.
9. *U. salomonis* Roths. Loyalty Is.—tip of valve.
10. *U. p. marshallorum* Roths. Tokelau Is.—tip of valve.
11. *U. clareae* sp. n. Holotype—tip of valve.



Utetheisa salomonis Rothschild

Rothschild (1910): *Nov. zool.*, **17**: 181

Male: Illustrated by Rothschild in Seitz (1914: pl. 13k as *ruberrima*, pl. 24g as *salomonis*). Pattern extremely variable, similar to *U. clareae* but black markings much more extensive. The medial antennal segments of a male from "Guadalcanar" (Guadalcanal, British Solomon Islands Protectorate) are illustrated in fig. 4 and the corresponding segments from a specimen from the Loyalty Islands in fig. 3. The latter appear to be of slightly more robust structure, a little larger than those of the Guadalcanal specimen. Jordan (1939: 277) redescribes the species and illustrates (*ibid.*: 277, fig. 242) the valve. Viette (1950: 86) illustrates the uncus and valve. Hindwing without scent-organ but there is evidence that this character once present, has been lost (Jordan, 1939: 264). The tip of the valve is illustrated in fig. 9.

Female: Similarly patterned to the male.

Diagnosis: Characteristic wing pattern. Differs from *U. clareae* and *U. p. marshallorum* Roths. in absence of scent-organ in male hindwing. Aedeagus and vesica similar to that of *marshallorum* but tip of valve shaped differently (compare figs. 9 and 10). Antennal segments different from those of *marshallorum* (compare figs. 2, 3 and 4). Black markings much more extensive than in *U. l. stigmata* which does not have dentate male antennae.

Local distribution: Not known to occur in Fiji.

World distribution: From New Britain south-eastward to the Loyalty Islands through the Solomons and New Hebrides. Apparently not recorded from the Santa Cruz and Banks Islands or New Caledonia. All too few specimens are known of this interesting species.

Biology: Details of life history and foodplant unknown. Possibly feeds on Boraginaceae (? *Messerschmidia*) in common with *U. p. marshallorum* Roths. and *U. clareae*.

Remarks: I follow Jordan (1939) and Fletcher (1957) in considering *salomonis* as a good species.

Utetheisa lotrix (Cramer) subsp. *stigmata* Rothschild

Cramer (1777): *Pap. Exot.* ii, pp. 29 and 149, pl. 109, figs. c and f.

Rothschild (1910): *Nov. zool.*, **17**: 182, no. 48.

Male: A male Fijian specimen is figured on plate fig. 2. Forewings cream patterned with black and red; hindwing white patterned with black. Head and prothorax pale yellow marked with black; abdomen white. Jordan (1939: 289) describes the species and figures the genitalia (*ibidem*: 258, fig. 229) as does Roepke (1941: 6 and fig. c on page 3 respectively) under the name *indica* Roepke. Viette (1950: 86) figures the valve and uncus. The vesica bears a scobinate area and a single large cornutus.

Female: Similarly patterned to the male. Jordan (1939;

258, fig. 233) figures sternite VII.

Diagnosis: Apart from the highly characteristic male genitalia with the posterior ventral edge of the valve extended and clothed with stout spines and with a much wider uncus than the other three species considered here, the wing markings of *U. l. stigmata* Roths. are distinctive. The head and prothorax are a paler yellow than in *U. clareae*. The males lack the anal fold scent-organ.

Local distribution: Widespread and common on the island of Viti Levu, occurring from sea level to the highest point investigated, 1000 metres. Has been collected from Suva, Sawani, Vunidawa, Kakiraki, Lautoka, Nandi, Namaqumaqua, Nausori Highlands and Nandarivatu. Also from Savusavu, Vanua Levu.

World distribution: *U. l. stigmata* Roths. has been collected throughout the New Hebrides, New Caledonia and the Loyalty Islands. It reaches its eastern limit in Fiji. *U. lotrix* (Cramer) extends from west Africa to Fiji, forming a number of local subspecies (see Jordan, 1939).

Biology: Neither the life history nor the larva appear to have been described although *stigmata* is recorded as feeding on the following members of the Papilionaceae: *Crotalaria retusa* L., *C. mucronata* Desv., *Desmodium* spp., *Vigna marina* (Burm.) and *V. sinensis* (L.). It is said to feed on the green pods of *Crotalaria* (Veitch & Greenwood, 1921). There is a record (queried) of its feeding on *Cassia* spp. (Caesalpinaceae).

Discussion

U. p. marshallorum Roths., *U. clareae* and *U. salomonis* Roths. form a complex of closely related species. The geographical distributions of the first two overlap on the island of Vanua Levu, Fiji, where they do not interbreed. All three species are morphologically distinct. *Salomonis* is apparently geographically separated from *marshallorum* and *clareae*. *Clareae* has apparently closer affinities with *salomonis* than with *marshallorum*. *Salomonis* has lost the hindwing scent-organ present in the other two species and *clareae* has lost one group of cornuti, present in the other two species. The male antennae of *salomonis* and *clareae* are similar, reminiscent of the subspecies of *U. pulchelloides* having pectinate or strongly dentate antennae (i.e. *U. p. pectinata* Hampson— islands of the Arafura Sea; *U. p. umata* Jordan—Guam; *U. p. aphanis* Jordan— islands off south-east New Guinea). These subspecies have very restricted distributions and I consider it likely that these, with *salomonis* and *clareae*, are the remnants of an early stock which spread radially from the Papuan subregion, possessing dentate and pectinate antennae. Isolation and subsequent division of part of this ancestral stock in the south-west Pacific has resulted in the present occurrence of *salomonis* and *clareae*. Derivatives of this stock with abbreviated pectinations have been dispersed possibly from New Guinea (*U. p. papuana* Strand, the New Guinea subspecies,

has sub-dentate antennae) westward through south-east Asia (*U. p. vaga* Jordan) and across Micronesia to meet (and occasionally hybridise with) *umata* on Guam and further to the Marshall Is. and across the arc now occupied by *marshallorum*. Dispersal into Fiji of *marshallorum* possibly from Tonga or via Wallis and Futuna, has resulted in the meeting of two species, both from the same ancestral stock, but now incapable of successful hybridisation after their isolation while following different routes of dispersal.

Acknowledgements

I am particularly grateful to Mr Allan Watson of the Department of Entomology, British Museum (Natural History) and to my supervisor, Dr Lewis Davies of the Department of Zoology, University of Durham, for their help and encouragement and for checking the draft of this paper.

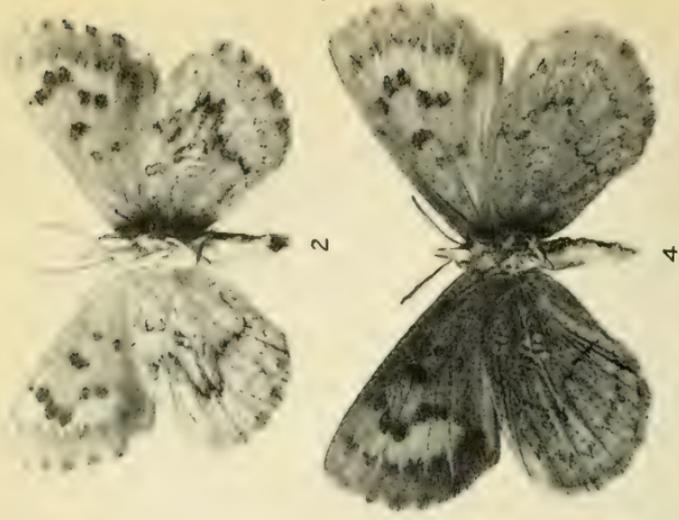
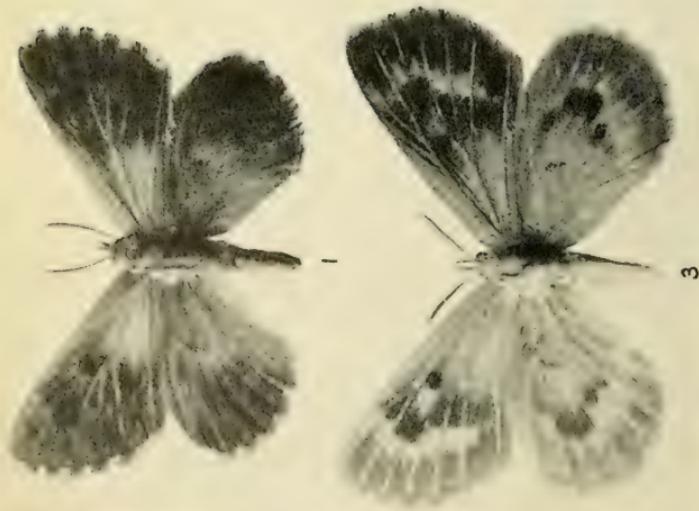
My thanks are also due to Mr Eric Henderson and Mr John Richardson of the Department of Zoology, University of Durham, for technical assistance.

I am indebted to the Trustees of the British Museum (Natural History) and to the University of Durham for providing facilities for this research to be carried out.

The preparation of this paper was undertaken during the tenure of an S.R.C. research studentship by the author.

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Thestor kaplani sp. nov.

Fig. 1. ♂ Holotype (upperside). Fig. 3. ♀ Allotype (upperside)
 Fig. 2. ♂ Holotype (underside). Fig. 4. ♀ Allotype (underside).
 Fig. 5. ♂ Genitalia (×28).

Figures of imagines 1.54 times natural size.

Photo: H. N. Wykeham.

No. 24.

A New Western Cape Species of *Thestor* Hübner (Lepidoptera : Lycaenidae)

By C. G. C. DICKSON and R. D. STEPHEN

This most striking *Thestor* is remarkable in so far as the male is concerned in having an unusually simple colour-pattern on the upperside, consisting of a chiefly golden-ochreous inner, basal area, which contrasts strongly with the rest of the wing-surface, which is very broadly dark, blackish-brown. It comes closest to *Th. compassbergae* Quickelberge & McMaster (*Entomologists' Record*, **82**: pp. 319-323, Pl. XVII, 15th Dec., 1970) but, apart from the features enumerated below, it is of greater average size and, in the male, has less elongated forewings than in this species.

Thestor kaplani spec. nov.

Male Upperside.

Forewing. Golden-ochreous extends to a black spot at end of cell (but with a sprinkling of dark scaling in the cell, which is very pronounced and largely obscures the ochreous colouring in one of the paratypes), and with its lower edge running about half-way along innermargin (less in some paratypes). Costal area above cell broadly brownish-grey. Black spots, which are arranged as in *Th. compassbergae*, generally show to some extent against the usually rather less dark background of the main area of the wing (in which there may also be a slight trace of ochreous scaling.) Veins 1 and 2 stand out against the ochreous area owing to their being fairly darkly grey-scaled; while the "sex-patch", which is well developed in some species of *Thestor*, is represented by grey scaling, in the usual position, on veins 2-4. Golden-ochreous portion of wing below vein 1 partly obscured by dark scaling, especially near base of wing. Cilia blackish-brown to dark-grey at end of veins, with intervening greyish-white spaces; at end of vein 1, usually only slightly darkened.

Hindwing. Golden-ochreous area (when fully developed, as in the holotype) spreads out to well beyond cell and, inferiorly, almost to anal-angle; the basal area suffused with dark scaling. (In some of the paratypes the dark clouding is extended and the ochreous colouring between this clouding and the rest of the wing is much reduced—in two specimens, little of it remaining.) Costal area above cell greyish-brown or dark-brown like the other dark portion of the wing. A generally very dark brown streak at end of cell, but not closing it completely, inferiorly. Some dark discal marking, which normally just enters the ochreous area—but which contrasts only slightly with the very broad dark-brown or blackish-brown surface of the wing, into which the ochreous area merges rather gradually. There is a not very prominent black marginal line (which is present, though rather less obviously so, in the forewing

also). Cilia with the dark portions less clear as a rule than in the forewing.

Underside.

Forewing. Buff-coloured (in some of the paratypes much sullied by dark scaling), spotted with black and bordered broadly with shades of grey to dark-brown. A small blackish spot beyond middle of cell and a similar one, more outwardly placed, in area lb; a fairly large lunulate black marking at end of cell, and a very irregular series of black spots as follows:—two round ones in areas 3 and 4, the second more outwardly placed than the first; three larger ones in areas 5-7, lying at about 45° to the two just mentioned and much more outwardly placed; and a very small one in the form of a dot above the uppermost of the last three, almost at edge of costa. A series of black sagittate markings bounding buff area outwardly and continuing above it. (In some of the paratypes there is variation in the relative sizes, shape and clearness of the forewing spots and markings). Costal area broadly grey as far as upper discal spots; beyond the latter is a conspicuous white patch, which changes to greyish-white apically; and the remaining broad space between the sagittate series and the distal-margin is fairly dark, to dark greyish-brown, darkening further towards posterior angle of wing and with this dark shade merging gradually into the buff area, well basad, in the space below vein 2. Cilia nearly as on upperside but sometimes more prominently white at apex.

Hindwing. Whitish-grey (with certain portions practically white); a markedly irregular, very dark brown transverse discal streak, with spots and markings of the general type usual in the genus between the wing-base and this streak (but apparent, mainly, due to their dark edging). The discal streak with usually acute outward projections in areas 4 and 5 which together form a prominent W-shaped marking. A series of very fine, black sagittate markings, not of uniform shape and smaller and far less apparent than in forewing, well removed from the wing-margin. Cilia much as on upperside but with the dark and light spaces, on the whole, a little clearer in relation to one another.

Length of forewing: 16·5-18·5 mm. (17·25 mm., in holotype): but one abnormally small specimen with a measurement of only 14·25 mm.

Female.

Forewing more rounded outwardly than in the male.

Upperside.

Ochreous colouring extensive and forming a background to the heavy black to blackish-brown marking of the wings.

Forewing. Costal area broadly brownish-grey except where the dark markings intrude into this area. A black marking at end of cell and a very well developed black discal band (outwardly sharply defined), its upper portion strongly angled out-

wardly and the lower portion considerably more inwardly placed and reaching vein 1 at about two-thirds of the length of the vein from wing-base. The very broad dark distal border 3-4 mm. in breadth, more or less incised inwardly by ochreous rays (the latter with fairly dark-scaled veining between them—which is present also in the ochreous area basad of the band). At its lower end, there is an inward extension of this band which unites it with the discal band. Cilia as in the male—allowing for some variation in different specimens.

Hindwing. Costal area almost as in forewing. Ochreous colouring extends to the broad dark distal-border, merging rather gradually into it. A dark, curved streak at end of cell, which does not completely close it. Discal band very strongly if somewhat roundedly angled, wide and most prominent in areas 5 and 6; ill-defined inferiorly and not visible below vein 1c. The dark marginal border incised by the ochreous colouring. A black marginal line is present (in all wings) as in the male. Cilia as in the forewing, but the divisions less distinct.

Underside.

Duller, on the whole, than in the male and the main markings, at least in the hindwing, giving a less dark and prominent impression.

Forewing. The main buff-coloured area lighter than in the male, and no white areas present in the wing; the portions surrounding the buff area dull beige but with dark clouding at the lower end of the series of black more or less sagittate markings and from here, running basad.

Hindwing. Dull beige-coloured with thin brownish-black edgings to a few spots or markings near the base of the wing and an elongated marking at the end of the cell (these markings frequently being lighter than the general background, and inclined to be whitish); the very irregular discal streak of the same coloration as the dark edgings and more linear than in the male. The series of sagittate markings more obvious than in the male, thin and not very regular in shape. Some whitish clouding, which is not always distinct, adjoins the upper angle of the wing. Cilia much as on upperside.

Length of forewing: 19-22 mm. (20·5 mm., in allotype); but an unusually small specimen, in poor condition, with a measurement of only 16 mm.

Thorax dark brown to blackish above, in both sexes, with brownish or brownish-grey hairs which, at least in the female, produce a lighter colour-effect. The legs blend in colour with the light greyish underside of the thorax. Abdomen beige-coloured above and light greyish to whitish below. Palpi dark brown above and light grey to whitish beneath and on much of the sides, but the terminal joint wholly or largely brown. The short antennae dark-brown above and whitish-grey beneath and on the outer sides, with the junctures of the joints finely darkened, and largely orange- or somewhat reddish-brown on the inner sides up to the tips. (Much of the light scaling of the

antennae has been lost in the less fresh specimens under examination.)

♂ Holotype, WESTERN CAPE PROVINCE: Rivier Zonderend Mtns., near Greyton, 25.xii.1970 (Dr Jeffrey Kaplan); British Museum Reg. No. Rh. 12748.

♀ Allotype, W. CAPE PROVINCE: data as holotype, 1.i.1971; British Museum Reg. No. Rh. 12749.

Paratypes in the authors' collections: C. G. C. D., data as holotype, 1.i.1971, 1 ♂, 1 ♀; R.D.S., 1.i.1971, 1 ♂.

Paratypes in Coll. Dr J. Kaplan: as holotype, 25.xii.1970, 3 ♂♂ 1.i.1971, 3 ♂♂, 3 ♀♀.

Paratype in Coll. D. J. Rossouw, as holotype, 1.i.1971, 1 ♂.

Paratype in Coll. C. W. Wykeham, as holotype, 25.xii.1970, 1 ♂.

All these specimens have been captured by Dr Kaplan, who has generously donated some of them as indicated above. One aberrant male is very pale on the upperside and is obscurely coloured and marked on the underside, with the hindwings particularly light.

Considering the great distance which separates the two butterflies, it is of much interest that the present species, though possessing far more dark colouring in both sexes, should be most closely related to *Th. compassbergae* from north of Graaff-Reinet. The underside pattern of both these species and the form of discal marking in the hindwing of the males, show an affinity to those of the *braunsi* v. *Son—dicksoni* Riley section of the genus.

The male genitalia of one of the paratypes are figured in the accompanying plate and some of the main features are referred to in the following paragraph.

Uncus with the acute, forked portion commencing at about two-fifths of distance from base. *Falces* long and strongly angled and curved, as shown in the illustration. *Labides* relatively narrow and long, with an upward curvature before their acute ends. *Valves* of the usual, general shape found in the genus, the outline being clearly shown in the plate, except that in this figure the lower projection at the distal end is turned inwards and appears short — but is in fact a long "finger". *Aedeagus* with the basal end, with its rounded extremity, narrow; curved downwards after the main opening towards the base and upturned before the pointed distal end. *Juxta* with each half fairly narrow, wider at the upper end, somewhat curved in the lateral view and with an obtuse angulation on one side (the right-hand side in the figure) less than half the distance from the top. (The shape of the *juxta* cannot be seen very clearly in the illustration.) *Saccus* of moderate length and fairly thick.

Thestor kaplani was found in spots over a narrow area about half a mile long, on top of a north-west facing slope at an altitude of 3,200 ft. above sea level. The specimens seemed to favour flat, sandy areas, sparsely vegetated, where they settled

on ground which matched closely the whitish colour of the underside of their wings. Conspicuous in flight, they were easily captured. Only yards away on the rocky northern slope, *Th. braunsi* van Son was flying at the same time, and *Th. stepheni* Swanepoel has also been found by Dr J. Kaplan and one of us (C.G.C.D.) half a mile to the west.

This most attractive *Thestor* is a welcome addition to the rapidly increasing list of Cape Lepidoptera and is a credit to the efforts of its discoverer. We confidently expect more discoveries of this interesting genus in the near future.

[Dr Kaplan himself has written as follows in connection with this butterfly:—

“This *Thestor* was taken on the 25th December 1970, when the only specimens collected were males. It was obvious to me that the specimens I had just captured were not in my collection, where I have a number of different *Thestor* species. I returned the next week and was fortunate in capturing two females. Specimens have the typical, easy, low flight of the *Thestors* and are easily distinguishable in flight as a whitish-looking insect. This is due to the remarkable, light underside. Their location, 1000 feet above the Greyton and Genadendal range of mountains in a valley between the peaks, is on patches of white stones or white sand. Walking through the area flushes them out, and as they settle frequently and fly upwards into the net they are easily caught. The further specimens taken on the 1st of January were in the same limited area, roughly 300 yards in diameter. Mr R. D. Stephens, to whom I went for identification, seemed convinced that they were a new species and Charlie Dickson confirmed this. He kindly offered to do a microscopic examination of the genitalia and prepare an article for publication. On accompanying Mr Stephen to the site of the holotype’s capture, he confirmed that it was on the southern slopes of the same range where he had first discovered *Thestor stepheni*.”]

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EARLY BUTTERFLIES IN DENBIGHSHIRE.—On Easter Sunday, April 11, 1971, while walking on Moel Famma, Denbighshire, I was most surprised and delighted to see amongst an abundance of peacocks (*Nymphalis io* L.) and small tortoiseshells (*Aglais urticae* L.), a single comma butterfly (*Polygonia c-album* L.). The only other time I have ever seen any sign of this insect in the Merseyside area was a single caterpillar on nettles in Liverpool in 1955.—MAURICE A. S. PONS, 5 Alvestone Road, Wallasey, Cheshire. 12.iv.71.

Notes on some of the British Nepticulidae (Lep.)

By Lieut. Col. A. M. EMMET, M.B.E., T.D., M.A., F.R.E.S.

(Continued from p. 83)

BETULA spp. (Birch)

The British Nepticulid mines on birch are, except for two, easy to distinguish, and the following dichotomous table may be helpful to this end.

- | | |
|---|-----------------------|
| 1. Mine forming a blotch | 2 |
| Mine forming a gallery | 3 |
| 2. Blotch roundish, frass, at least initially, forming a dark central blob | <i>argentipedella</i> |
| Blotch rhomboidal or triangular, frass irregularly dispersed | <i>woolhopiella</i> |
| 3. Gallery completely, or very nearly, filled with dispersed frass | 4 |
| Gallery with a central line of frass, leaving well defined, clear margins | 5 |
| 4. Mine at first light brown, often so contorted as to form a small blotch, then completely filled with greenish frass; mine inconspicuous, clouded | <i>continuella</i> |
| Beginning of the mine blackish, the black frass throughout arranged in arcs, usually leaving a very narrow pale margin | <i>distinguenda</i> |
| 5. Mine long, frass, at any rate latterly, forming a continuous, very thin central line with broad, clear margins | 6 |
| Mine shorter, more contorted, with the frass-line broader and tending to be broken into blobs | 7 |
| 6. First quarter of mine entirely filled with cloudy green frass | <i>lapponica</i> |
| First quarter of mine, like the remainder, with a thin central line of black frass | <i>confusella</i> |
| 7. Mine often much contorted at the start, frass-line tending to be narrower; larva with a paler head | <i>luteella</i> |
| Mine less contorted at the start, frass-line tending to be thicker; larva with a darker head | <i>betulicola</i> |

The table does not feature *Stigmella betulicola nanivora* Pet., the status of which was discussed in a recent paper (Brown 1970). Other common lepidopterous mines in birch leaves, which might be mistaken for Nepticulidae, are (a) *Lyonetia clerkella* L. which makes a very long narrow gallery with a central line of frass. If the larva is present, its size, length and incised segments serve to distinguish it; if it has gone, the length of the frass-free chamber which finally housed the larva is the point to look for, as also is the cylindrical white cocoon, slung hammock-wise under the leaf. (b) *Bucculatrix demaryella* Stt. which makes a very small, short mine in its first instar, generally following a rib. The final chamber is relatively long, narrow, and often angled.

Some notes on the eight birch species follow.

Dechtiria argentipedella Zell. is one of our commonest neps, with a single generation of larvae spread out from late August till the beginning of November; October is the best month for them. I find it a difficult species to rear, for I do not seem to be able to get the larvae to spin up. Others are more successful, so my failure must be due to mismanagement.

D. woolhopiella Stt., on the other hand, is one of the rarest species in this group, though it may be more common near the Herefordshire village from which it derives its name. I met with it for the first time in the autumn of 1970, when I found three mines in Kent, two near Westerham and one at Farningham. I understand from Mr J. M. Chalmers-Hunt that these constitute a new record for the county. Only one of my mines was tenanted, but the larva left its leaf before I reached home and suffered an accident; so that was that.

Nepticula continuella Stt. seems to be widely distributed in two generations, and is easy to rear.

N. distinguenda Hein. is a very local moth. Meyrick (1895 and 1928) and Tutt (1899, p. 283) give the distribution as Sussex and Hereford though the latter questioned the authenticity of the former's Sussex record. Waters does not mention it. I found vacated mines sparingly at Farningham and Westerham in north-west Kent in 1969, and again more plentifully in 1970. The species is said to be bivoltine and I looked assiduously for the second generation of larvae, which eluded me apart from a single tenanted mine whose occupant I carelessly allowed to spin up among the other birch-feeding species taken. I am unable to account for the apparent failure of the second generation. I found a single vacated mine at Quendon in Essex on the 2nd October 1970; I believe this and the examples from Kent to constitute new county records, though Mr Jacobs tells me that he anticipated me in finding the mines in Kent (in his case at Hayes, 2nd October 1943, Westerham, 12th October 1947 and Chislehurst Common, 14th October 1950, all these mines having been determined by A. G. Carolsfeld-Krausé) but he neglected to record them.

The mines of *N. lapponica* Wocke and *N. confusella* Wood were confused (as the latter's name may indicate) until Wood and then Waters pointed out the difference (see Hering, 1951, p. 88). [Who was the author of the name *confusella*? Meyrick (1928), Waters (1929), Ford (1949) and Heslop (1964) say Walsingham. Hering (1951 and 1957), Borkowski (1969) and the draft of the new edition of Kloet & Hincks's check-list say Wood; while Tutt (1899) says Walsingham and Wood. Wood (1894, p. 272) launched the species, but invited Lord Walsingham to describe it for him. Wood, therefore, is the author.] The difference between the mines of the two species is quite obvious when they are fresh, but becomes obscured as the leaves wither, especially if wet gets into the mines.

All authorities agree that *confusella* is univoltine, but there is local variation in the time of larval appearance. June to

early July seems to be the most favoured season, though I have found larvae still feeding in late August in the west of Ireland. On the other hand, there is disagreement over the number of larval generations of *lapponica*. Meyrick (1928) and Ford (1949) give two, and Tutt (1899) says it is partially bivoltine. Wood (1894, p. 96), Hering (1957) and Borkowski (1969) say there is only one brood and my own experience leads me to think that they are right. The larvae of *lapponica* come early in the year, before those of *confusella*, and I invariably miss them.

The mines of *Stigmella luteella* Stt. and *S. betulicola* Stt. are very hard to differentiate, and my key gives little help. The larvae themselves are just distinguishable, since that of *betulicola* is more yellow, and that of *luteella* is more green, but when the larva is seen in the mine the colour of the leaf tends to obscure this distinction. Both have the dorsal vessel bright green when they are feeding; Ford has done a disservice in mentioning this feature only in the case of *betulicola*. The relative colours of the head are not of much assistance unless larvae of each species are at hand for comparison. Hering (1957) says that *betulicola* mines venter upwards, while *luteella* does so venter downwards, but this, too, is hard to observe. Mines on seedlings, and leaves containing many mines, are usually *betulicola*; *luteella* seems to prefer the larger bushes and there are seldom more than two mines to a leaf. When the larvae spin up, *betulicola* makes reddish and *luteella* white cocoons. Both species are common and widely distributed in two generations, the second of which is more plentiful.

CRATAEGUS spp. (Hawthorn)

"Confusion now hath made his masterpiece!" I shall start with an apology to the reader. We have got ourselves into such a muddle over the hawthorn-feeding Nepticulidae, and the mistakes that have been made interact on each other to such an extent that the pages which follow will not make easy reading. My notes will fall into three parts. First I shall deal with the mistakes, treating them historically, and I shall attempt to put them right; secondly I shall give a dichotomous table to help in the determination of the mines and larvae of the species; and thirdly, I shall give random notes on their biology and distribution.

The easiest way to introduce the problem is by symbols rather than names. Five species are involved. Let us for the moment call them A, B, C, D and E.

Species A has been given two different descriptions for the female in our literature and it still is uncertain which is correct. Its mine is almost identical with that of B and the continental authors say that the only certain way of distinguishing A and B is by the examination of the genitalia.

Species B has been confused by some authors with A and by others with C. For a long time it was credited with C's

larva and there is still conflicting evidence regarding the colour of its true larva.

Species C is one of our commonest "neps" but it was not named until 1936 and it was not recognized as British until 1961, when a foreign author was responsible for adding it to our list. Its larva has often been mistaken for that of D and its vacated mine for that of D or E. For over sixty years it was equated with B, and many (perhaps most) specimens in collections labelled B are in fact C.

Species D is distinct as an imago, but its mine and larva have constantly been confused in literature and in practice with those of C. In one of our most famous entomological books, the figures of the larva and mine purporting to be those of D are in fact those of C.

Species E is also distinct as an imago and as a tenanted mine, but the vacated mine is often confused with those of C and D.

Needless to say, there is also a certain amount of trouble over nomenclature.

Now you are not intended to assimilate all the detail of what I have just written. My immediate purpose is to show that there are errors and ambiguities involving these species, all of them interacting on one another and so giving rise to a situation of no little complexity. Minor mistakes have added to the confusion. If we are to achieve any measure of clarity in unravelling this tangle, we must proceed by easy stages.

Let us start by naming in the same order the five species represented by letters above. They are *Nepticula ignobilella* Stt., *Stigmella hybnerella* Hüb. (*gratiosella* Dup.), *S. crataegella* Klim. (= *gratiosella* sensu auct. nec Dup.), *S. oxyacanthella* Stt. and *Nepticula pygmaeella* Haw.

When Stainton (1859) described *ignobilella*, he said that the head of the imago was red; Wood (1894) contradicted this, saying that it was red only in the male, but black in the female. In his description of "*gratiosella*" (to use the superseded name), Stainton said the larva was yellow; Wood denied this, too, and asserted it was green. I will let Wood tell his own eloquent story (1894, p. 47).

"Let me take first four species that feed on hawthorn (*Crataegus oxyacantha*). They divide themselves naturally into pairs, the one characterised by having bright green larvae and gallery mines with coiled frass, and the other by yellow or yellowish larvae and blotch mines.

"The gallery mines are *gratiosella* and *oxyacanthella*. With regard to the former, the ground wants a little clearing first. Some years ago, in the pages of this magazine, Mr Threlfall suggested that *gratiosella* and *ignobilella* were the sexes of one and the same species. Subsequently, my own experience in breeding *ignobilella* appeared to confirm his view. From yellow larvae collected in the autumn and carefully separated from the only other two yellow larvae, viz. *regiella* and *pygmaeella*, that could be found on the hawthorn (*gratiosella*, let it be

remembered, was said to have a yellow larva and to feed in the autumn), I bred a long series of the perfect insect, some with red heads and some with black; as the former were all males and the latter females, they could clearly be nothing more than the sexes of one species, and *gratiosella* as a species seemed doomed. It was not, then, till the question arose what the green *oxyacanthella*-like larvae, feeding in July and August, could be, and until moths were reared from them which answered accurately to the description of *gratiosella*, that its position was restored. The diagnosis in the "Manual" is perfect, so far as the imago goes. It is a smaller insect than *ignobilella*, with the head black in both sexes, and a violet rather than purple hind margin to the fore-wings: on the other hand, the larva is bright green, not yellow as there described, and instead of feeding in September and October as stated in the "Entomologist's Companion", is fed up and over by the end of August.

"The general cut of its mine varies according to where the egg is laid, and to some extent according to the size and fleshiness of the leaf. The favourite spot for the egg is underneath the leafy frill edging the stalk. The mine travels at first for a short distance down the stalk, I mean in the direction of the trunk: it then turns round and proceeds in the opposite direction till it reaches the blade; here it keeps accurately to the edge for some little way, and then makes one short turn back on itself and ends, or, if the leaf be especially large and fleshy, the last turn is omitted. This form would be quite *sui generis*, were it not occasionally mimicked to a turn by *pygmaeella*: still, as the one larva is green and the other yellow, there is no risk of confusing the full mines, whilst the empty ones, as I have already pointed out, may be told from the position of the eggs [on the underside with *gratiosella* and the upperside with *pygmaeella*]. Sometimes, instead of a single turn back upon itself, two or three are made, if the leaf be small and thin, yet for all that the mine is so small that it manages to keep within the limits of the lobe. The other position for the egg is under one of the ribs. In this case the small twisting gallery keeps within the narrow compass in the middle of the leaf or in one of the lobes. To compare it now with *oxyacanthella*.

"The eggs of both are laid on the underside, but whilst *gratiosella* prefers the stalk to a rib, *oxyacanthella* has a greater liking for the ribs. The mines are very similar. But *gratiosella*'s is smaller and its course more timid, the gyrations being short and keeping close together; whereas in *oxyacanthella* the curves are sweeping and pass across or round the lobes from one side of the leaf to the other, and even when the egg is laid upon the stalk and the mine comes out along the edge as in *gratiosella*, it turns off sooner or later into the body of the leaf and pursues its usual bold and wandering course. The best distinction, however, lies in the larvae. The head of *gratiosella* is of palest brown, so that little more than the mouth-parts are visible in the mine; that of *oxyacanthella* is

grey or black, and is always distinct, and sometimes very distinct; *oxyacanthella* also shows, but obscurely, the cephalic ganglia, of which there is no trace in the other. I think, too, that the ground-colour is more bluish in *gratiosella* than in *oxyacanthella*, but never having had the two side by side, I speak doubtfully. In these parts, and I am fairly well south [Herefordshire], both species are single-brooded. I never find the larva of *oxyacanthella* in July and August, nor that of *gratiosella* in September and October, and I have given the hawthorn hedges a good deal of attention."

I cannot proceed until I have paid a tribute to the beauty and clarity of Wood's prose and the accuracy of his observation. Unfortunately, he made a not unnatural but serious mistake when he jumped to the conclusion that his "green *oxyacanthella*-like larvae were those of "*gratiosella*". He had, in fact, discovered a new species, but tried to fit it into the then known range of hawthorn-feeding nepts. We must remember that he was writing before the development of the technique of dissecting genitalia, and he was dealing with moths which superficially are almost indistinguishable. Wood's description is, as far as I know, the first and most detailed to be made of this species. It had to wait till 1936 before it received a name at the hands of Dr Klimesch, who had found it in central Europe. He called it *crataegella*.

Meanwhile our text-books had accepted Wood's interpretation, and were ascribing the life-history of *crataegella* to "*gratiosella*". The study of the Nepticulidae was in the doldrums in this country, and no-one seems to have paid much attention to Klimesch's new species. After a lapse of a quarter of a century A. G. Carolsfeld-Krausé, a Danish entomologist (1961), pointed out to us in the "Entomologist's Record" that we should add *crataegella* to the British List on the evidence of Wood's article, but still we took no notice. Perhaps Carolsfeld-Krausé himself was partly to blame, because, instead of announcing this new addition to our fauna with a fanfare of trumpets, he tacked the news on, almost in parenthesis, to a dry discussion of the authorship of the name "*gratiosella*". So unobtrusive was the pronouncement that Heslop (1964) failed to pick this species up either for his original list or in any of his supplements, in spite of the fact that Carolsfeld-Krausé was his mentor for the Nepticulidae.

Two years later it was rediscovered, quite independently, it seems, by Mr S. C. S. Brown, who found the mines in Bournemouth and had them identified by Carolsfeld-Krausé. On the strength of these mines (but not Carolsfeld-Krausé's paper of 1961), Ellerton (1970) included *crataegella* in his list of species recently discovered in Britain. For confirmation, Mr Brown sent a further batch of mines to Dr Klimesch last autumn and he proffered the same determination as that given by Carolsfeld-Krausé.

Mr Brown told me of his discovery and was kind enough to send me some pressed leaves containing mines. I at once

recognized them as closely resembling mines which I had been determining as a first generation of *oxyacanthella*. About this time, I read Wood's article (1894) and spotted that his "gratiosella" was in fact *crataegella*. Preening myself in my discovery, I submitted my theories to Dr Klimesch, whom we revere as the doyen of authorities on the Nepticulidae, and he duly confirmed them, drawing my attention to the article by Carolsfeld Krausé of which I was previously unaware. (A Dane records a new British species of the Nepticulidae, in our literature, and an Austrian brings it to my attention. A hundred years ago, in Stainton's day we were a great power in the study of this family; how are the mighty fallen!)

I read Carolsfeld-Krausé's paper with mixed feelings. I felt rather as Scott must have done when he reached the South Pole only to find that Amunsden had got there first. On the other hand, I was gratified to have my views corroborated by such powerful authorities. I have more to say about *crataegella*, but it must wait for the moment, as my task of dealing with the mistakes and uncertainties surrounding our hawthorn-feeding neps is far from done.

The theme of what follows next falls into the category of uncertainty rather than error, for though mistakes have undoubtedly been made, I cannot as yet identify them. I am referring to the problem of distinguishing *ignobilella* from *hybnerella* (*gratiosella*). Wood, as we have seen, found them so much alike that he brought in a third species: he added two and one and made the answer two. By making *crataegella* stand for "gratiosella", he "lumped" the true *gratiosella* and *ignobilella* together, and we must now try to prize them apart. As I shall make rather heavy weather of this, I apologize in advance to the reader.

The descriptions of the life-history of *hybnerella* (*gratiosella*) in Tutt (1899), Meyrick (1928) and Ford (1949) are wrong, since they are based on Wood and refer to *crataegella* (Tutt also quotes an accurate description by Frey but makes no attempt to reconcile it with the longer description by Wood which dominates the passage). We must therefore turn to continental writers. Let us consider in turn the mines, the larvae and the imagines of the two species.

The mines of both start as a slender gallery with a central excremental line, leaving clear margins. This abruptly leads into a wide, irregular blotch. According to Hering (1957) the frass line in the early gallery is wider and fills more than half the gallery in the case of *ignobilella*, whereas it is narrower, filling less than half the gallery, in *hybnerella*. Borkowski (1969), however, states that the width of the frass depends on whether the mined leaf is in sunshine or shade, and he regards the colour of the larva as the only certain means of distinction. I have studied the large number of mines attributed to each species in the Hering herbarium, and I have failed to find any reliable character by which they may be separated. (To be continued.)

Mostly South Essex 1970

By R. TOMLINSON

Any delay in this paper must be ascribed to the recent post office strike. Like many others, I should imagine, it is rather late in going to press. This notwithstanding, it has been one of the finest collecting seasons I have ever had, and I will plunge straight into it with the reader's indulgence.

My young friend Graham Glombek and I went to the local Coombe Wood in Langdon Hills on 24th March, set up the generator in a sheet operation there from 8.10 p.m. until 9.55 p.m. Only two of our target quarry came into our mercury vapour light. *Orthosia munda* Schiff., and I kept the both. Other species were what I had already obtained. We went there again with the light and sheet on 11th April, and had two fine examples of *Biston strataria* Hufn. Owing to my purchase of a motor cycle, Coombe Wood will feature again and again in this article, and places beyond.

The Robinson trap in my garden captured a melanic *Lycia hirtaria* Clerck on 18th April, with 11 other moths but all were released, the *hirtaria* being rather worn.

Out of 29 pupae, 24 *Saturnia pavonia* L. emerged between 1st and 4th May. These were from eggs laid by the female mentioned in my last account (*Ent. Rec.*, 82: 145).

Among 64 moths in my Robinson trap in my garden on the rainy night of 6th May was an ab. *fuscata* Tutt of *Menophra abruptaria* Thunbg., and another appeared in the trap on 19th May.

One of the first, and most satisfying field trips of the year was made to Fryerning Woods near Blackmore on 23rd May, with my friend R. Cook. We set the generator going with a 125 watt m.v. lamp over a white sheet, and we ran the light on this mild night from 10 p.m. to 11.30 p.m. Twenty-eight species of macros came in, six of them new to me; *Calocasia coryli* L. was the commonest moth, with *Cosymbia albipunctata* Hufn. a close second. We also had *Drymonia dodonaea* Schiff., *Notodonta trepids* Esp., *Trichopteryx carpinata* Borkh. and one *Rheumaptera cervicalis* Scop.

I made my next trip to Coombe Wood on 29th May with four members of the newly formed Basildon Natural History Society, and ran the m.v. light and a Heath trap from 9.35 p.m. until 12 midnight. Twenty-seven species of macros came in, including one *Lopophora halterata* Hufn. A day trip to this wood on 7th June resulted in my boxing an *Abraxas sylvata* Scop. from vegetation beneath a very large wych elm tree. Persistence had paid off, and at last I had discovered the whereabouts of this very local moth. This same night, my garden Robinson trap took a worn *Semiothisa notata* L.; this was its first record for me in this locality. A good specimen of *Selenia lunaria* Schiff. was in the trap on 9th June.

Another day trip to Coombe Wood on 16th June enabled

me to take another four *A. sylvata* from beneath the same wych elm as before. Among about 1000 moths in the garden trap this same night were one *Euchoeca nebulata* Scop. and one *Apatele leporina* L.

On 13th June I made a rendezvous with R. Cook at the "Halfway-House" just off the A.128 and went to Thorndon Wood near Brentwood, and ran the m.v light and the Heath trap from 10 p.m. until 12.15 a.m. in a promising area. Dusking produced several *Haplotis venustula* Hübn., and 25 species came to the sheet while 10 species were caught by the Heath trap. I kept seven moths among which were *Polia nebulosa* Hufn., *Macrothylacia rubi* L., *Ectropis extensaria* Hübn., and one micro.

The next day I led a field meeting in this area with the British Entomological and Natural History Society; an all day trip. The best capture of this expedition was a possible new species for Essex netted by R. Payne from ivy growing on Mucking church wall. At the moment Payne is sifting the literature to find out whether this fly is really a new record for Essex or not. A fuller report will appear in the society's journal later this year.

I made another visit to Coombe Wood, this time with my friend A. Cox, on 19th June and ran the mercury vapour light from 10.30 p.m. until 12.10 a.m. It was a clear night, but still and warm, and a full moon rose about midnight. It was a good night, and my small flask of Bourbon whisky never tasted so good. Thirty-six different species of macro came in including about two dozen *A. sylvata*. A welcome addition to my collection were two *Lithacodia fasciana* L. My garden trap on this night caught about 1000 moths including, perhaps surprisingly *H. venustula* and a *Hadena compta* Schiff.

The next field trip was with my friends Ron and Ray Pigney to the stamping ground of my tried friend G. Pyman at Little Baddow, on 20th June. We ran the m.v. light in Pheasanthouse Wood by the sphagnum bog, and the Heath trap elsewhere in the area from 10.40 p.m. until 1 a.m. There was no cloud cover but it was a still mild night. Collecting was very good indeed with no less than 64 species of macro coming in to the sheet. Geoff Pyman was with us, of course, and he agreed it was the best nothing night he had ever taken part in. The Heath trap which had been placed in the northern tree nursery, held about 100 moths of 17 different species. I kept 14 moths among which were *Semiothisa liturata* Clerck, one of which was ab. *nigrofulvata* Collins, and two *S. notata* L. one typical and one quite sooty specimen, of which Mr Huggins had never heard before. He urged me to take this and one or two other moths to the British Museum (Natural History) for them to check over. This I will do, and their subsequent findings will appear later on in the pages of this magazine. It may not be too much to hope that the dark *S. notata* is a new form.

This same night my garden Robinson trap held more than 1000 moths, of which I kept two, one *Deilephila porcellus* L.

and one *A. leporina* L.

My friend R. Cook drove over to me on the evening of 22nd June and said "come with me to Ham Street". I accepted at once, not having had the opportunity to visit this wonderful area before. We drove there and set up the generator in a promising looking drive and ran two lights from it, an 80 and a 125 watt bulb over white sheets from 10.10 p.m. until 1.15 a.m. The night was clear but fairly mild and we had 77 species at the sheet. I kept 15 moths which included *Apoda avellana* L., *Euphyia luctuata* Schiff., *Gryposia mesomella* L., *Atolmis rubricollis* L., *Miltochrista miniata* Forst., *Drymonea dononaea* Schiff., and *Moma alpium* Osbeck.

I rode to Coombe Wood on 25th July on a fine sunny afternoon, and wandered along the paths; I succeeded in netting *Limenitis camilla* L. but this was chipped, so I released it. I did manage to net three fine *Stryminidia w-album* Knoch by a bramble patch in the wood.

Ray Cook and I drove to Chippenham Fen in Cambridgeshire on 27th June. We got there about 9.30 p.m. and set up the generator with 80 and 125 watt bulbs off one of the droves, in a place which reminded me very much of the "copper field" at Wood Walton Fen. As some light still remained we went dusk and caught several *Colostygia didymata* L. from a hedgerow on the fen approach. We ran the lights from 10.30 p.m. until 1 a.m. and 59 species of macros came in. Of course the prizes were *Eustrotia bankiana* Fabr., *Leucania pudorina* Schiff., *Meliana flammea* Curt. and *Phragmatoecia castaneae* Hübn.

The Pigneys and I ran the m.v light in Coombe Wood on the night of 3rd July for three hours and had 58 species of macro in to the sheet, the only new one for me being one example of *Cosmia pyralina* Schiff. A day visit to the same locality on the following day resulted in my boxing a *C. didymata* from the trunk of a large ash tree. This same night the garden trap caught an *H. venustula*, and I feel sure that it must occur somewhere locally, for I do not think that it is a moth which is to be found far from its haunts. This seems to bear out Mr Huggins's explanation that "the thing is spreading" and I hope I can find its locality here in 1971.

I went to Little Baddow on the evening of 1st August, set up the m.v. light in the hollow square formed by the Woodham Walker Common, Pheasanthouse Wood and Poors Piece Wood, most of the area being under the management of the Essex Naturalists' Trust, and therefore an important venue. G. Pyman, myself and four friends ran the light for over three hours. Fifty-eight species of macro arrived at the sheet, including *Parastichtis suspecta* Hübn., *Zenobia subtusa* Schiff., *Drepana lactertinaria* L. and *Harpyia bifida* Brahm.

On 9th August, Ray Cook and I drove in his car to the New Forest, booked in at the excellently appointed Forest Lodge Hotel in Lyndhurst. Cook being keen to start proceedings, we

wandered over the nearby heath adjoining the golf course, and I netted a male and a female *Plebejus argus* L. and a *Selidosema brunnearia* ssp. *scandinaviaria* Staud. That same evening we drove to a certain enclosure, set up the generator with a 125 watt bulb and white sheet, put the Heath trap further into the Forest, and also ran 52 sugar patches. We operated for three hours, and although it was a clear night it was fairly mild; moths were not prolific but we had a goodly number arrive at the sheet. Several rounds of the sugar produced nothing startling except two frogs and a toad at the foot of three sugared trees.

At the sheet, a *Catocala promissa* Schiff. came in and Cook promptly captured it saying "all it wants now is for one to come in for you", and immediately one flopped in right by me on the sheet, and I quickly boxed it. Other species from the sheet that night were one *Pachycnemia hippocastanaria* Hüb., two *Lymantria monacha* L., one *Amathes baja* Schiff., and from the Heath trap one *Hyloicus pinastri* L.

The next morning, 10th August, we were greeted with much rain. After breakfast, we drove to Minstead, where we called on L. W. Siggs whom we found pottering around in his greenhouse. He made us most welcome, and showed us his admirable collection and his methodical notes upon it; an object lesson, I thought, to all. We bade farewell to him and drove back to Lindhurst for lunch.

That evening, after a drink or two at the hotel bar, we went back to the same enclosure as the night before, and ran the m.v. light and Heath trap in positions different from those used the night before, and painted 25 sugar patches. The night was overcast, mild, though fairly windy. I had a nice *Lithosia deplana* Esp. soon on the sheet, and a welcome *Lampropteryx otregiata* Metcalfe from the Heath trap, but precious little else of note.

The next morning we drove to Beaulieu Heath, where I caught two *Eumenis semele* L. We then went to another enclosure, captured several *Argynnis paphia* L. but all were past their best. We found the same at Blackmoor Copse on our way to Tilshead, Wilts. Upon arriving at this village, we had a couple of beers at the Rose and Crown, heard from the landlord that he had seen "an old boy making a blue light up on the downs" and deduced that he referred to the late Captain R. A. Jackson running a light there. We knew then that we had come to the right place for the Brighton wainscot. Cook and I drove up a side road to the downs, chose a place to run the light between expansive corn fields, and ran the lights (m.v. and Heath) for over three hours. During this time we were treated to a proper firework display by the military with stars, tracer bullets and garish explosions further over on the downs. A rather weird backdrop to moth collecting, we thought. From the sheet, I kept two *Oria musculosa* Hüb. and from the Heath trap placed approximately 150 yards away three *musculosa* and three *Perizoma bifasciata* Haw.

We drove home most of the night pausing only for a short sleep at Viriginia Water, arriving home at 7.15 a.m. on 12th August.

End of the season notables were a *Tiliacea citrago* L. in the m.v. trap at Mucking on 11th September, a *Lithophane semi-brunnea* Haw. from there on 27th September, and one *Griposia aprilina* L. at light on a field trip to Little Baddow on 10th October. Thus ended my season 1970, a season in which I had added 44 new species to my collection.

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Incomplete development and reduction in quantity of scales occurring occasionally in specimens bred in captivity

By B. C. S. WARREN, F.R.E.S.

In a paper on hybridisation (Ent. Rec. Dec. 1970), I suggested that scales obtained from bred specimens might in certain cases be used in research provided it was known that such specimens were the progeny of wild-bred parents, not previously inbred for generations under unnatural conditions (l.c.p. 311). Actually it now appears that the use of scales derived from experimentally-bred specimens is not always to be relied on.

Recently, Mr S. R. Bowden and I had experienced difficulty in comparing the results of some observations so he kindly sent me a few of his microscopic slides to compare with my own. Among these were one of British *P. napi*, one of Swiss *P. bryoniae* and one of Scandinavian *P. adalwinda*, made from specimens he had bred at different times.

I examined the *P. napi* first and found a number of abnormal scales. The specimen was pure-bred, but showed some scales approximating those known in hybrids between that species and *P. bryoniae* but differing from such in being well-developed distally, but practically undeveloped in their proximal half. As I could not gain any information from this slide I turned to that of *P. bryoniae*. This was even more abnormal. There was not one typical *bryoniae*-scale in the mount, all were abnormal and undersized, so I turned to the *adalwinda* slide. Here again I met similar results. As the three specimens came from three different batches of larvae, some unnatural factor must have affected each.

The specimens were of the first generation forms (i.e. spring

generation), but the data showed that all had been retarded artificially and had not emerged until later in the summer. Mr Bowden had told me he found it necessary to hold emergence back by placing the pupae in a low temperature, so as to check emergence until required for some other experiment. It is known that the scales only attain full development shortly before emergence. I can therefore only conclude that the unnatural check in development resulted in this strange disturbance in the scales. Mr Bowden doubts this was the cause of the trouble, but is unable to give any exact reason. In this case it is not an accidental one occurring once but some more or less usual occurrence connected with his method of breeding. Further he had mentioned many times that "thinly scaled" specimens occurred among those he bred, though such are very rare in *Pieris* species in nature. I can only attribute this reduction in quantity of scales to the same cause: interference in development. Whatever the cause may be, the fact remains that some factors in breeding produced these abnormal results.

Mr Bowden thinks his specimens are not otherwise adversely affected and I have no doubt his methods are the same as those of most experimental breeders. But if the trouble was the result of some other cause or causes this only makes it worse, for it will only be waste of time and work examining scales from specimens bred by methods which may, or may not, give abnormal results. I have had bred specimens from Mr Bowden that gave perfectly developed scales, but can only think such specimens were simply bred from eggs of wild specimens and allowed to complete their emergence at the natural time. Possibly development checked at the normal time cannot be resumed at a later period.

In view of these uncertainties I must strongly advise those who wish to study the scales to work from wild-bred specimens only. This is most unfortunate, but certainly no specimen from the "stock" of an experimental breeder could be trusted to give normal results, for one must remember that such "stock" may have been inbred in captivity for a period of several years.

What makes the scales of such value as indications of relationship is their response to specific nature, as is shown by their correlation with the structural characteristics of the genitalia in many genera. (See the hundreds of detailed photographs of scales and genitalia in my "Monograph of the genus *Erebia*"). As the scales can in no way be affected by the genitalia or connected with the structural developments of those organs, their correlation is entirely a matter linked to specific nature. When the genitalia are of simple nature and show little tendency to develop specialised specific characters, the greater sensitivity of the scales is especially useful, though owing to their minute size they may require greater care and accuracy in observation.

Earwigs attracted to Light

By A. BRINDLE

Most species of earwigs appear to be nocturnal, hiding by day in suitable crevices, and emerging at night to feed. These nocturnal habits are probably the reason, at least partially, for the past misconception of their ability to fly. Although the presence of wings in the common European earwig, *Forficula auricularia* Linnaeus, has been known at least since the eighteenth century, its ability to fly has been doubted as recently as the years preceding the last war. These doubts were not entirely ill-founded, and were partly based on the lack of recorded observation on flight, or their rarity, and also partly due to observations such as those of Mallock (1919), who stated that "In the case of earwigs, at any rate of the species found in England, it seems more than doubtful whether the wings are ever used. The thorax only contains traces of flight muscles and I have not been able to distinguish any folding muscles in the wings themselves". The lesser earwig of Britain, *Labia minor* (Linnaeus) has long been known to fly, but its undoubted ability in this respect was thought to be partly due to its smaller size.

As late as 1939, Burr thought it desirable to collect observations on flight by the common earwig, and to put on record their ability to do so. In the same paper, however, Burr notes that although he has never doubted their ability to fly, he has never seen a common earwig in flight. As far as entomologists are concerned it is rare to see a common earwig flying, and such flights are probably short and infrequent. The wings can be very quickly unfolded previous to flight and as quickly refolded afterwards, and the necessity for flight probably arises infrequently; added to their nocturnal habits, this may account for the rarity of observations on their flight. Any short notes on such features, however, are of great interest, such as the recent one by Baker (1969) who records several specimens of *Anechura asiatica* Semenov in flight, several feet above the ground, in the Sardabrud Valley, Iran, on 6th November 1965. It would be interesting to know of the weather conditions at the time and the duration or length of these flights. It is likely that weather conditions do affect the flight, since *Labia minor* seems to fly most readily during hot weather.

Verhoeff (1917) took the view that the common earwig can only unfold its wings under unusual circumstances, such as a "strong muscular development" during a prolonged period of hot and humid weather, so that earwigs in north temperate countries rarely experience suitable conditions. The wings are folded lengthwise, like a fan, and then folded transversely, so that they lie beneath the elytra with only the tips protruding; the elytra are locked in place by a system of hook-like structures on the underside of each elyvtron and on the metanotum. Burr (1939) quotes Verhoeff (1917) as suggesting that to over-

come this locking device great muscular effort is needed, and this must be developed through "great excitement"; apparently the common earwig is phlegmatic and never succeeds in being worked up to such a pitch of excitement. The vision of an excited earwig taking to flight is fascinating, and perhaps the use of a word other than the ambiguous "excitement" may have been better, but the general idea seems to be clear.

Earwigs are mainly tropical or subtropical, and are poorly represented in Britain. The ubiquitous *Forficula auricularia* is the only common species, although the lesser earwig, *Labia minor* is widely distributed but less often recorded. Earwigs are attracted in the evening to the lepidopterist's sugar, as the older lepidopterists who remember this possibly out-of-date method of moth-hunting, will probably recall, but they are also attracted to light. The increasing use of light and light-traps in the tropics has resulted in many more records of flight in earwigs. Not all the earwigs recorded at light have flown in, however, since occasional ones are without wings, but the majority do seem to have used their wings. Earwigs can climb well, since some have been recorded in the crowns of *Pandanus*, and various palms in the tropics, so there would be little difficulty in entering some light traps without the use of wings. Some of the records may also refer to light used on a sheet.

During the past years, a large number of tropical earwigs, taken at light, have been examined by the present author, and whilst the following notes are not exhaustive, they do suggest that the attraction of light for earwigs is fairly general throughout the order. All the records noted below are of earwigs taken at light; some records do refer to light traps and a few specifically to M.V. lamps.

In the family Diplatyidae, *Diplatus macrocephalus* (Beauvois) from Africa, and both *D. fletcheri* Burr and *D. greeni* Burr from Ceylon, have been noted. Most of this genus are fully winged and flight in some species has been previously known. In the Pygidicranidae, only *Pygidicrana bivittata* (Erichson) from Surinam, and *Echinosoma yorkense* Dohrn from the Solomon Islands are noted; this heterogenous family includes both winged and wingless species but many are rather large and apparently ill-adapted for flight. The family Carcinophoridae is very large, but it is typically composed of apterous species; a minority are fully winged. *Euborellia annulives* (Lucas) and *E. femoralis* (Dohrn) have been recorded from the Western Pacific, the latter species being fully winged whilst the first species is entirely apterous. *E. janeirensis* (Dohrn) a species with short elytra and aborted wings, has also been recorded from Surinam. The small family Labiduridae is represented by *Labidura ripara* (Pallas) from Africa, Ceylon, and the Western Pacific; and *Nala lividipes* (Dufour) and *Dendroiketes corticinus* (Burr) from Ceylon. Most species of this family have wings, but *L. riparia* is variable and may have fully developed wings or the wings may be aborted.

The large family Labiidae is the best represented. *Labia minor* (Linnaeus) from Africa; *L. curvicauda* (Motschulsky) from the Solomon Islands and Ceylon; *L. pilicornis* (Motschulsky) from Ceylon, the Solomon Islands, and the Western Pacific; *Spongovostox assiniensis* (Bormans) and *S. tripunctatus* Borelli from Africa, and *S. feae* (Bormans) from the Western Pacific, *Marava arachidis* (Yersin) is frequent at light in the Western Pacific, and is also recorded from the Solomon Islands, whilst *Marava alter* (Burr) is recorded from Surinam. This family is as large as the Carcinophoridae, but is generally composed of smaller species, typically fully winged. The Chelisochidae is represented by *Proreus laetior* (Dohrn) from the Solomon Islands and Western Pacific; *P. delicatulus* Burr from Ceylon, and *Hamaxas nigrorufus* (Burr) from the Solomon Islands. Although *Chelisoches morio* (Fabricius) is common from New Guinea to the Solomon Islands and the Pacific, it is rarely recorded at light, but this is due to it being diurnal, and active through the day; it flies readily during the day. Although the family Forficulidae is large, only a few records have been noted, including *Hypurgus humeralis* (Kirby) from Ceylon; *H. ova* (Bormans) from Angola; and *Diapterasticus erythrocephalus* (Olivier) from Africa. Although this family is mainly fully winged, the size of the species is generally larger than in the Labiidae, and it is possible that size does play a part in the frequency of flight. However the most notable instance known to the present author of earwigs in flight and being attracted to light, concerns the Forficulidae.

Mr J. A. Whellan (in litt.) records that he runs a light trap at Limbe, Malawi, mainly for Lepidoptera. Up to the night of 7/8th August 1968, only one specimen of an earwig, *Forficula senegalensis* Serville, had been found in the trap. On the night of 7/8th August, however, which was full moon, there were 140 specimens of this insect taken in the trap. On the following night there were more, and they began to arrive as soon as the trap was switched on, at dusk, about 6 p.m., but it is not known if they continued to arrive throughout the night. On the next nights the numbers of these insects dwindled to 20, 10, and 2. This species is common and distributed throughout Africa, south of the Sahara.

These specimens have been examined, and the range of the size of the male forceps is large. In many earwigs, such as the common earwig of Britain, the forceps of the males vary in size, from small (microlabic) to large (macrolabic). Each branch of the smaller forceps of *F. senegalensis* has an inner wider flattened part at the base, as in *F. auricularia*, but more rectangular, whereas the base of the branches of the forceps of the large form is not greatly widened, but the branches are much longer. At first these specimens with the long slender branches of the forceps were thought to be *F. brolemanni* Borelli, but more specimens of *F. senegalensis* from Angola

have since been examined, and these show a gradation from the small to the large form, and correspond with those from Malawi.

The greater use of light traps in the tropics, as in Britain, is leading to a better knowledge of the insects other than Lepidoptera for which the traps are mainly used. Such records of earwigs at light are useful in understanding the weather conditions under which earwigs are attracted to light, which is possibly the same as for most insects, and also for the frequency of flight. Further records of flight other than to light traps are, of course, equally desirable.

I am most grateful to Mr J. A. Whellan, for the opportunity to examine the specimens of *Forficula senegalensis* Serville, and for the details of his remarkable observation of an apparent massed flight of these insects.

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 Burr, M., 1939. Another earwig problem. *Discovery* (NS), **2**: 407-411.
 Mallock, H. R. A., 1919. Some points in insect mechanisms. *Proc. zool. Soc. Lond.*, **1919**: 111-116.
 Verhoeff, K. W., 1917. Kann *Forficula auricularia* fliegen? *Zeitsch. wiss. Insbiol.*, **13**: 96-97.

Notes and Observations

LARVAL ECDYSIS OF BUCCULATRIX SPP. (LEP. LYONETIDAE): The construction of "moulting cocoons" by the larvae of *Bucculatrix* species is well known, though not mentioned in our standard text-books; however, I at any rate did not know until today that the manner of ecdysis is also unusual in this genus. Inside their moulting cocoons the larvae curl themselves into a tight circle. When the moult takes place, instead of the old skin peeling backwards, bunching up as it goes, the larva walks straight out of its skin, leaving it fully extended and inflated, exactly in the attitude the larva had assumed. Consequently the cocoon looks as if it still housed a live larva, and it is only if the leaf to which it is affixed is held up to a strong light that the skin will be perceived to be empty. On the other hand, the moult for pupation is normal, and the cast larval skin contracts into the usual little bundle, with daylight showing between it and the anus of the pupa.

This observation is based on the examination of the moulting cocoons of seventeen larvae of *B. nigricomella* Zell. It is highly probable that my remarks hold good for all the species in the genus; certainly in the past I have found moulting cocoons of some of the other species which contained larvae which subsequently appeared to be "dead".—A. M. EMMET, Labrey Cottage, Victoria Gardens, Saffron Walden, Essex. 6.iv.71.

NYMPHALIS ANTIOPA (L.) AT SOUTH HARROW, MIDDLESEX IN 1970.—A male specimen of *Nymphalis antiopa* (L.) in fair condition was captured in a garden at South Harrow, Middlesex, on the morning of 31st August 1970, by Mrs B. J. Houghton who has kindly presented it to the Department of Entomology, British Museum (Natural History).—T. G. HOWARTH.

BUTTERFLIES SEEN AT ST NINIAN'S CAVE, WIGTOWNSHIRE, ON 14th JUNE 1969.—On a visit to this beautiful and historic spot in perfect June weather, on emerging from the path through the wood on to the pebble beach at the far end of which St Ninian's cave is situated, I came upon a colony of the dingy skipper, *Erynnis tages* L. Other butterflies noticed were *Pieris napi* L., *Lycaena phlaeas* L., *Polyommatus icarus* Rott., *Aricia artaxerxes* Fab. and *Pararge megera* L. The presence of *E. tages* is interesting, as this locality is not marked for the species, nor for *P. icarus*, in the Provisional Atlas of the Insects of the British Isles, Part 1 (Butterflies).—J. L. CAMPBELL, Isle of Canna. 24.iii.1971.

THE PYRALID AND PLUME MOTHS OF SUFFOLK.—I have often wondered why the map in Bryan P. Beirne's 'British Pyralid and Plume Moths' showing the total number of species recorded from different counties in county lists published between 1898 and 1948 gives only 77 species from Suffolk. I have therefore checked the number of species listed in the 1937 Memoirs of the Suffolk Naturalists' Society and find that the total is 137 not including 3 doubtful records. This total includes 17 recorded before 1900 so that with these deducted the number still stands at 120.

Of those recorded before 1900 at least two have since been found in the county. These are *Gymnancyla canella* Schiff. of which I took a specimen at Thorpeness in 1963 and *Adaina microdactyla* Hübn. found in various places since 1937. I have also taken single specimens of *Alispa angustella* Hübn., *Salebria semirubella* Scop. and *Diasema ramburialis* Dup. since 1937 and have discovered a colony of *Euzophera cinerosella* Zell.

The recently discovered *Perinphela perlucidalis* Hübn. has also been recorded from the county both by Mr Denzil, W. H. fennell and myself. The present total recorded for Suffolk since 1900 is therefore 127, according to my records. Perhaps there are other collectors who could add to this total.—H. E. CHIPPERFIELD, The Shieling, Walberswick, Suffolk. 25.ii.71.

Current Literature

Proceedings and Transactions of the British Entomological and Natural History Society; Vol. 4, Part 1, February 1971.
30 pp.+3 pl. Published by the Society; £0.55.

This part gives an account of indoor meetings from 25th

June until 10th December 1970, including the Annual Exhibition, plates 2 and 3 illustrating outstanding insects exhibited on that occasion. Plate 1 gives magnified photographs of the pronotum of *Pediacus dermestoides* (F.) and that of *P. depressus* (Herbst) to illustrate an exhibit on 22nd October 1970. Field meetings reported cover the period between 18th April and 8th November 1970. The index for the 1970 volume is included with this number.—S.N.A.J.

Pleasure from Insects by Michael Tweedie; 170 pp.+16 pl.
David and Charles, Newton Abbot, 90p.

This book, reviewed Ent. Record, 81: 121, has now been issued in a paper cover edition, the text remaining unaltered.

The Butterflies of New Zealand by W. B. R. Laidlaw; 4to 48 pp.
+16 coloured plates. Collins, £1.40.

One is surprised to hear that there are only 17 species of butterfly noted from these islands, and of these five are occasional migrants. This shortage of species seems to be the result of the isolated position of New Zealand. The book, while written mainly for the uninitiated, is written by a man who knows his subject, and he puts it before his readers in a way which will not have to be relearned should they take up the subject more seriously. He sketches out the systematic position of butterflies, gives some account of their wing pattern as related to protection and explains concealment, the mimicing of distasteful species and warning colours. The use of eye-spots and tails is also mentioned.

Distribution is discussed and behaviour gets a good share of attention, some aspects, novel to the amateurs, being brought forward. Metamorphosis is explained with a page of drawings of the stages, and the adult morphology followed by that of early stages is explained with several pages of explanatory drawings of anatomical details.

Super-family and Family characters are then set out.

Part Two follows in which the species are treated. The Author relies on his own fine drawings of each species for descriptions. These are enlarged to two diameters with the exception of the little Boulder butterfly which is $\times 3$ to show more detail. With each species are given the scientific name, the vernacular name and plate reference. Distribution, Habitat, Frequency, Season and Larval food plant. There is a page of 18 references and a glossary of technical terms used in the book.

The printing is in large type on good paper, and the book is bound in paper covered boards printed with a sample of the Author's plates, and it is protected by a strong paper jacket similarly printed. It should be of interest to all who like to have an idea of the butterflies of other parts of the world.—S.N.A.J.

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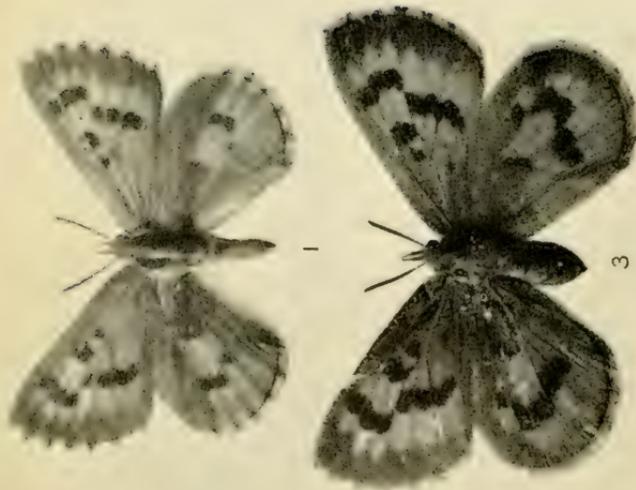
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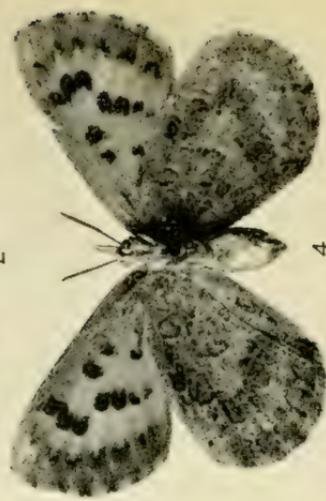
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Thestor rossouwi sp. nov.

- Fig. 1. ♂ Holotype (upperside). Fig. 2. ♂ Holotype (underside).
 Fig. 3. ♀ Allotype (upperside). Fig. 4. ♀ Allotype (underside).
 Fig. 5. ♂ Genitalia.

Figures of imagines 1.56 times natural size.
 Figure of genitalia 28 times natural size.

Photo: H. N. Wykeham

A further New Species of *Thestor* Hübner (Lepidoptera:Lycaenidae) from the Western Cape

By C. G. C. DICKSON

Although a well defined species, this *Thestor* bears, on the upperside, the basic pattern of dark markings on a fairly deep yellow-ochreous background which is common to other species of its group, including *Th. strutti* van Son (which has a lighter upperside) and *Th. montanus pictus* van Son. It comes closest, however, to a smaller insect found by Swanepoel between Still Bay and Riversdale (nearer the former locality) on 11th November, 1970, which has more acute forewings, in the male. is of a lighter ochreous colour, has the discal band of the forewings more even on both surfaces, and less perpendicular between veins 1-4, and which shows a difference in the disposition of some of the markings of the underside of the hindwings—to mention several of the more obvious points of dissimilarity. The forewings of the present species (when taking into account the males of the group) are of the less acute shape, as found in *strutti* and certain other species. It is a reasonably large *Thestor*, the females sometimes being quite big specimens.

Thestor rossouwi spec. nov.

Male. Upperside.

Forewing. Basal and costal areas dark greyish-brown. A fairly small black spot beyond middle of cell and a large one at its end. Upper portion of the prominent black discal band at about right-angles to costa and the portion below this considerably more basad and at a different angle, and more outwardly placed at the top than the bottom, where it may (as in the holotype) have a final inward curvature in area 1b. The broad distal blackish-brown border, some 2.5 mm. in width, inwardly diffuse and more or less incised, at least as regards its upper half, by rays of the ochreous ground-colour. Veining dark-grey to dark-brown, usually chiefly grey in the situation of the sex-patch (and often with some greyish scaling here on the wing-surface itself). Area 1b at least partially and often largely dark-scaled. A fine black marginal line is present, but is less distinct towards apex. Cilia black at end of veins, with broad white (sometimes greyish-white) intervening spaces—and the wing-surface also white marginally, between the veins and on the inner side of the black line, down to area 2 or 3—but with this light scaling varying in intensity in different specimens.

Hindwing. The whole of cell and a very broad strip below costa, down to vein 5 or a little below it, dark greyish- or blackish-brown, and with less dense, dark scaling over a wide portion of the wing adjoining the inner-marginal concavity, which is rather prominently whitish. Streak at end of cell

noticeably darker than the main area within the cell. Discal band with its upper portion, in areas 4-5 (sometimes with an indistinct more inward marking in area 6), usually (as in the holotype) solidly black and confluent with the dark area below costa; lower portion of band, in areas 2-3, normally much more inwardly placed—but in some specimens (as in the holotype) incompletely developed, or almost absent. The marginal black line more apparent in the hindwing. Cilia very much as in forewing.

Underside.

Forewing. Main portion of wing pale-buff, spotted with black and bordered broadly with shades of grey. A very small blackish sub-basal spot in cell, a small black one well beyond middle and a rather lunulate marking at end of cell. A small black sub-basal spot in area 1b with a black or blackish streak running from it to a black spot below but more outwardly placed than the second one in cell; and a very irregular discal series of black spots as follows:—four in areas 1b-4, in a straight line and lying at an angle similar to the corresponding portion of the discal band on the upperside (but the lowest spot, which may be greyish instead of black, quite in line with the others); and five spots, of which two close to the costa are very small, at the same angle as the upper portion of the band on the upperside. A series of black sagittate markings bounding the buff area outwardly. Costal area broadly grey—whitish-grey beyond the discal bar and where it combines with the apical area; the broad space between the sagittate markings and the distal-margin, grey. Cilia greyish-black to black at end of veins, with broad whitish-grey intervening spaces.

Hindwing. Whitish-grey—in parts almost white; a very irregular and broken discal band, grey with some extremely fine black edging, disposed as on upperside but with an additional portion in areas 6 and 7 much more basal than the following portion, and the band also extended inferiorly. Some less distinct marking present in the more basal portion of the wing, and a black or dark-grey streak at end of cell. Wing-surface lightly irrorated with darker grey; a submarginal series of not always distinct small black sagittate markings. Cilia less dark at end of veins than in forewing.

Length of forewing: 16.75-17.5 mm. (17.25 mm., in holotype).

Female. Upperside

Forewing. Very much as in male, apart from absence of sex-marking. In the allotype (a richly coloured specimen) there is a small black elongated marking in area 1b, 6 mm. from base of wing, and, in right wing, a minute black dot beyond this marking. Costa edged with white scaling near apex, but no white scaling adjoining distal margin. Cilia with the light spaces light-grey, less whitish than in the male, and variegated with black along inner third.

Hindwing. Largely as in the male, but with noticeable dark suffusion submarginally—less apparent or tending to disappear towards anal-angle. The broad costal region and the cell not as dark as in all females as is usual in the males but (as in the case of the allotype) lightened by an admixture of ochreous scaling. Upper, more inward portion of discal band in area 6, always at least apparent (very clear in allotype) and often with a patch of ochreous colouring adjoining it outwardly. Inner-marginal area not whitish but either brownish-ochreous (as in the allotype) or dark greyish-brown. Cilia light-grey, with very indistinct dark portions at the end of some of the veins, but with a black or dark-grey line along its inner-third and the space between this and the wing-margin partly darkened.

Underside.

Forewing. Similar to that of male: the black marking at end of cell and most of the spots of the discal band relatively a little larger, even when allowing for the larger size of the female; the black, more or less sagittate markings always large. Broad costal area duller grey than in the male and the whitish-grey area towards the apex reduced. Cilia with the light portions mostly duller than on the upperside.

Hindwing. Ground-colour of a decidedly duller grey than in the male and with a suggestion of a brownish tone. Discal band darker, relatively broader and more continuous—and the other markings towards base also darker, if less distinct against their background in some specimens; the sagittate markings larger than in the male. Distal-margin more broadly, but as sharply, edged with dark scaling inwardly, than in the forewing. Cilia more clearly dark at end of veins than on upperside.

Length of forewing: 19.5-20 mm. (the former measurement, that of allotype).

In both sexes the thorax is black above with brownish-grey hairs, and beneath grey; abdomen similarly coloured, with the scaling, above, brownish-grey. The legs blend with underside of thorax. Palpi blackish or dark brownish-grey above, tipped with light-grey, and light-grey beneath. The short antennae blackish above, white or whitish-grey just before the tip and at least partly whitish or light-grey beneath, with the junctures of the joints dark. A reddish tone may be apparent along the distal two-thirds of the inner side of the antennae. The under-surface of the body tends to be lighter in the male than the female.

♂ Holotype, WESTERN CAPE PROVINCE: Farm "Plut-rug", Stanford district, 26.xii.1970 (D. J. Rossouw); specimen to be presented by Mr Rossouw to the Transvaal Museum.

♀ Allotype, W. CAPE PROVINCE: data as holotype, including allocation of specimen.

Paratypes presented to British Museum (N.H.), data as holotype, 1.i.1971, one ♂, one ♀ (C.G.C.D.). Rh. 17250 and

Rh. 17257 respectively.

Paratypes in the author's collection, as holotype, 1.i.1971, three ♂♂, one ♀ (C.G.C.D.).

Paratypes in Coll. D. J. Rossouw, as holotype, 26.xii.1970, two ♂♂, one ♀. 2.i.1971, one ♂.

Paratype in Coll. Dr. Jeffrey Kaplan, as holotype, one ♂ (D.J.R.).

Paratype in Coll. E. J. de Villiers, as holotype, one ♂ (D.J.R.).

Paratype in Coll. W. H. Henning, as holotype, 1.i.1971, one ♂ (C. W. Wykeham).

Paratype in Coll. K. M. Pennington, as holotype, one ♂ (D.J.R.). 26.xii.1970 and 17.i.1971.

Paratypes in Coll. D. A. Swanepoel, as holotype, two ♂♂ (D.J.R.).

Paratypes in Coll. C. W. Wykeham, as holotype, 1.i.1971, nine ♂♂, one ♀ (C.W.W.).

This is a fairly constant species in colouring and marking and the male in particular is readily distinguishable from other species of the group, on external characters alone. The ochreous portions of the upperside may in some examples be distinctly darker than in the majority of specimens of this species.

The male genitalia, which are figured in the plate, are referred to hereunder.

Uncus forked at about two-fifths of its length from base; the entire length not quite as long as in some allied species. *Falces* long and curved; roundedly angled nearer base. *Labides* basally very broad; decreasing in width towards the well rounded distal end, though still remaining broad; some very small serrations on the dorsal margin, towards the distal end. *Valves* of the characteristic broad form, the upper projection being, in this species, well produced and the lower projection of about the same length (or a little longer) but of almost even width (slightly constricted in the middle) to its rounded end. *Aedeagus* thick basally and decidedly robust as far as the beginning of the distal portion, which terminates acutely. *Juxta* moderately broad and with curved margins in the lateral view. *Saccus* rather thick and of about average length for this genus.

Several distinct differences have been apparent, in the preparations that have been made, between the genitalia of this species and the one found by Swanepoel. In these preparations the uncus is shorter in the former species; there is less reduction in the width of the labides towards the distal end; the valves have a narrower upper projection at the distal end and a considerably longer lower one, which is not tapered as in the other species (its length not apparent in the figure); the basal portion of the aedeagus is more robust; and the saccus is thicker.

The discovery of this butterfly was directly due to Mr Rossouw going out on the occasion in question specially to

search for a new species of *Thestor* and his choosing the most likely locality for this purpose. It is therefore most fitting that this fine Lycaenid should bear his name. For several seasons he had been exploring the wide mountainous area above Hermanus itself, with very interesting results. Amongst the butterflies he encountered there were the comparatively rare and localised species *Poecilmitis nigricans* (Aur.) and *Thestor montanus montanus* van Son; also what appears to be a somewhat divergent form of *Th. dukei* van Son. The writer and his nephew, C. W. Wykeham, were introduced to the locality near Stanford by Mr Rossouw on 1st January 1971, and were able to procure a useful series of the new *Thestor*. Another, very distinct, member of the genus (*Entomologist's Record*, **83**: pp. 155, pl. vi, 15th May 1971) was found by Dr Jeffrey Kaplan near Greyton, not far from Hermanus, on 25th December 1970; and it is astonishing that a second new *Thestor* should have been discovered by Mr Rossouw, quite independently, on the following day.

Mr Rossouw has supplied the following note relating to his butterfly:—"I discovered this handsome species of *Thestor* on the 26th of December 1970 on a mountain peak on the farm "Platrug" in the Stanford district. It was Mr Charles Dickson of Cape Town who originally aroused my interest in the mountain ranges to the east of Hermanus—an area that has not been worked well enough in the past.

"The species behaves in the typical *Thestor* way by suddenly rising up before one's feet and settling down again on another spot a few seconds later. It looks rather dark on the wing, with a flush of the light underside now and then. I was also struck by its fondness of settling on low vegetation. The species seems to prefer the northern side of the peaks".

"Blencathra", Cambridge Avenue, St. Michael's Estate,
Cape Town.

Ross-shire and Sutherland Lepidoptera Records

By DEREK C. HULME

(Continued from *Ent. Rec.*, **82**: 124-127)

PART THREE — ROSS-SHIRE 1969

The following were additions to my Ross-shire list given in Part One. All were observed at Muir of Ord (NH55) except for the first and last named species.

Parage aegeria L. A small colony found at Munloch (NH65) on 27th July was recorded in detail in *Ent. Rec.*, **81**: 284.

Phalera bucephala L. One on 13th June.

Orgyia antiqua L. A larva on blackcurrant on 1st August.

Cybosia mesomella L. A welcome addition taken on 29th June.
Released after examination.

- Euxoa nigricans* L. Seven attracted to blended light on 11th/12th August.
- Amathes depuncta* L. One taken at b.l. on 10th August.
- Mamestra brassicae* L. One on 6th June.
- Leucania impura* Hübn. One ssp. *scotica* Cockayne at b.l. on 10th August.
- Gortyna micacea* Esp. One on 8th September.
- Agrochola circellaris* Hufn. One at b.l. on 12th August.
- Cirrhia icteritia* Hufn. An ab. *flavescens* Esp. on 10th August and a typical specimen two days later—both at b.l.
- Lyncometra ocellata* L. One on 29th June.
- Scoparia ambigualis* Treits. One ssp. *atomalis* Doubl. on 14th July.
- Laspeyresia pomonella* L. An imago found in our house on 29th June may have bred in windfall apples we brought from Worcester in October 1968. *Meyrick* 1895 gives the distribution as "Britain to the Clyde."
- Orthotaenia undulana* Schiff. Three on 29th June.
- Dasycera sulphurella* F. One taken at Munloch (NH65) on 15th June. *Meyrick* 1895 gives the distribution as "Britain to the Clyde".

New 10 km squares in Ross-shire were recorded for the following species:

- Pieris brassicae* L. The 74 counted in 1969 between 21st June and 20th September was the highest annual total we had recorded here and included distribution in two new squares (NG74 and NH54).
- P. napi* L. This species was more widely distributed in 1969 and was noted for the first time in squares NG95, 96, 99: NH04, 08 and 52.
- Maniola jurtina* L. Three seen at Ullapool (NH19) on 31st July and one seen in Strathconon (NH25) on the following day.
- Vanessa cardui* L. Four seen in August: two on 10th at Torridon (NG85), one on 12th on Tanera Beg (NB90) in the Summer Isles and one on 14th at Applecross (NG74).
- Aglais urticae* L. A record year with 119 specimens counted in Ross-shire and two new squares added (NG74 and 99). The first 10 km square reference mentioned for this species in Part One (*Ent. Rec.*, **81**: 169) should read NH19. NC19 is an inhospitable square of sea well north of Cape Wrath!
- Argynnis aglaia* L. One in Strathconon (NH25) on 1st August.
- Polyommatus icarus* Rott. A total of eight recorded on two August dates in Strathconon (NH25).
- Lasiocampa quercus* L. Larvae found in squares NG74 and NH25.
- Macrothylacia rubi* L. Larvae common in Strathconon (NH25) on 9th September.
- Saturnia pavonia* L. A larva in Strathconon (NH25) on 13th August.

- Parasemia plantaginis* L. A ♂ at Rosemarkie (NH75) on 15th June.
- Arctia caja* L. A dead ♀ found at Urray (NH45) on 22nd July. Larvae swarming on 30th August and seen crossing the road in numbers on a journey from Strathpeffer to Inverness through squares NH45, 54 and 55.
- Noctua pronuba* L. One at Redcastle (NH54) on 27th July.
- Cerapteryx graminis* L. One at Applecross (NG74) on 14th August.
- Plusia gamma* L. Only three observed in Ross-shire in 1969: two at Muir of Ord and one in new square NB90 on Tanera Beg, 12th August.
- Colostygia multistrigaria* Haw. Seven lying in puddles on forestry track at Contin (NH45) on 27th April.
- Euphyia bilineata* L. Two at Urray (NH45) on 22nd July.
- Lygris populata* L. One at Munloch (NH65) on 28th August.
- Dysstroma truncata* Hufn. Singles at Muir of Ord on 10th and 24th August.
- Bupalus piniaria* L. Mass emergence in pines by Loch Clair, Glen Torridon (NG95) on 16th June. Though outwith the two counties under review, this species was noted as common three days later by Loch an Eilein, Inverness-shire and many specimens, grounded by a strong wind, were captured by wood ants.
- Crambus pratellus* L. Common on Tanera Beg (NB90) on 2nd July.

PART FOUR — 1970

This list mentions species recorded in new squares only in Ross-shire and Sutherland. A few new species were noted at home in Muir of Ord (NH55).

- Pieris brassicae* L. One at Luichart (NH35) on 27th September.
- P. napi* L. New squares—NC00, 26 and 45; NG85; NH06, 25, 26, 66, 76 and 87.
- Erebia aethiops* Esp. Two on 7th August at Lochcarron (NG83).
- Maniola jurtina* L. Two on 29th June and one on 12th July at Sandwood Bay (NC26).
- Coenonympha pamphilus* L. Singles at Achiltibuie (NC00) on 8th June and Gruinard (NG99) on 11th June.
- Vanessa atalanta* L. One of three observed in 1970 in a new square, NH45, at Achilty power station on 22nd September.
- Aglais urticae* L. New squares—NC26 and 46; NG83 and 84; NH35, 49, 66, 76 and 87.
- Argynnis aglaia* L. Three at Munloch (NH65) on 8th July.
- Clossiana selene* Schiff. Two in Strathconon (NH25) on 9th June.
- Polyommatus icarus* Rott. One at Fanagmore (NC14) on 18th June—also one on Handa in the same square.

- Lasiocampa quercus* L. Larvae found in four new squares—NB90; NC00; NG85 and NH66.
- Macrothylacia rubi* L. Larva found on Tanera Beg, Summer Isles (NB90) and on the Ardmore peninsula (NC25).
- Saturnia pavonia* L. A ♂ conveniently flew into our minicoach at Assynt (NC22) on 10th May enabling me to show this species to a party of naturalists. A larva found by Loch Stack (NC24) on 28th July.
- Spilosoma lutea* Hufn. One at Muir of Ord on 8th June.
- Arctia caja* L. New squares for larvae—NC24 and 25 and NH76.
- Amathes c-nigrum* L. One at Muir of Ord on 5th May.
- Ceramica pisi* L. A larva near Torrison House (NG85) on 24th September.
- Hadena contigua* Schiff. One found under doormat at Muir of Ord on 22nd June.
- Leucania conigera* Schiff. One at Muir of Ord on 1st August.
- Xylena vetusta* Hübn. One at electric light, Muir of Ord, on 3rd November.
- Phytometra viridaria* Clerck. One near Torrison House (NG85) on 7th June.
- Xanthorhoe montana* Schiff. One at Fanagmore (NC14) on 18th June—also on Handa in the same square.
- Euphyia bilineata* L. One at Rispond (NC46) on 19th June.
- Ellopija fasciaria* L. Singles at Muir of Ord on 7th and 21st July.
- Ematurga atomaria* L. New squares—NC90; NC15, 25 and 36.
- Pyrausta cespitalis* Schiff. One caught on Eilean Ard in Loch Laxford (NC15) on 18th June.
- Agriphila culmellus* L. Three at Munloch (NH65) on 8th July.
- Anthophila fabriciana* L. One at Achilty power station (NH45) on 22nd September.

HANDA, SUTHERLAND

I visited the island on nine occasions in 1970 but no Lepidoptera were seen on 22nd May, 1st June, 15th and 27th July and 10th August. The eleven species observed included five that I had not seen before on the island (these are marked with an asterick).

- Pieris brassicae* L. Two on 17th June.
- P. napi* L. Common on 17th June and one on 24th August.
- Maniola jurtina* L. About twelve on 3rd July.
- Coenonympha tullia* Müll. Three on 3rd July.
- Aglais urticae* L. Two on 24th August.
- Polymmatius icarus* Rott.* A ♂ on 3rd July.
- Lasiocampa quercus* L.* Two larvae on 10th September.
- Lyophotia varia* Vill.* One flying by day on 3rd July.
- Xanthorhoe montanata* Schiff.* A worn specimen on 3rd July.
- Lygris testata* L.* Three on 24th August.
- Olethreutes schulziana* F. About ten on 17th June.

Kyle & Glen, Muir of Ord, Ross-shire.

Notes on Some of the British Nepticulidae

By Lieut. Col. A. M. EMMET, M.B.E., T.D., M.A., F.R.E.S.

(Continued from p. 142)

So we come to the larvae. The larva of *ignobilella*, by consent of all authorities, is yellow, but there is lack of agreement about the colour of the larva of *hybnerella*. Stainton said it was yellow; Fologne (1862) said it was yellow, but figured it as dull green; Wood said it was green, but we now know that he was describing *crataegella*. More recent British authors have said it was green, but they were following Wood's false scent; Hering said nothing; Carolsford-Krausé (1961) said it was yellow and took Wood severely to task for doubting Stainton's word; lastly Borkowski (1969), the most recent authority says it is green when seen in the mine (Larva hellgrünlich, wobei der Einfluss des durch das Blatt fallenden Lichtes zu beachten ist). For my part, I have bred *hybnerella* from apparently yellow larvae and have checked the determination of the imago by dissection of the genitalia. I have also bred (as I believe) *ignobilella* from larvae which I have not been able to distinguish from *hybnerella*.

This brings us to the imagines. The wing-pattern of the two species seems to be so alike as to be indistinguishable. The colour of the head is the conventional means of determining the two, the text-books saying that *ignobilella* has a red head and *hybnerella* a black one. Wood, as we have seen above, said that the female *ignobilella* had a black head. Later writers have been rather coy about this. Some, like Waters, have accepted Wood's statement; others, like Meyrick, have ignored it: none, to my knowledge, has refuted it. I submitted five red-headed neps bred from hawthorn-feeding larvae (not *regiella* H.-S.) to Dr Bradley at the British Museum, and after examining the abdomen and frenulum of each under a microscope, he pronounced four to be females beyond doubt, and the fifth to be almost certainly of that sex—the reverse of Dr Wood's experience. My moths were reared from a batch which had also produced black-headed, genitalia-attested male *hybnerella*. The series of *ignobilella* in the British Museum consists predominantly of red-headed moths; all those determined by Lord Walsingham are of this form. There is also, however, a smattering of black-headed specimens contributed by foreign collectors. What we need to know, therefore, is whether *ignobilella* always has a red head and *hybnerella* a black one, or whether the colour of the head is mixed in one or both of these species, and, if so, whether the variation depends on sex.

Part of the problem is that (as far as I know) the female genitalia have not yet been examined and figured. For this reason I saw no point in dissecting my red-headed female moths, for we still would not have known to which species

they belonged. If any collector takes a pair of either species *in cop.* (many neps perform this act on tree trunks), it would be valuable to dissect the genitalia of the pair, so that we may associate the female genitalia with the correct male.

Much more work has been done on these species on the continent than in this country, but abroad *ignobilella* appears to be rare. Borkowski states that he has not yet bred the imago, and Dr Klimesch has asked me to send him cocoons as the species is not yet represented in his collection. Its commonness in Britain is based on the assumption that all red-heads are *ignobilella*.

The male genitalia of the two species are distinct, and they can be separated at once by the shape of the *jugum*. This difference led Beirne (1945) to place *hybnerella* in the genus *Stigmella* and *ignobilella* in *Nepticula*. But Stainton recognised the two species as different before the genitalia had been examined. Did he rely solely on the colour of the head, or had he some criterion of differentiation which we have now lost? Carolsford-Krausé (1961) writes of this group, "the only sure way to tell such species apart is by examination of the genitalia" and Dr Klimesch (*in litt.*) expresses the same opinion in almost the same words.

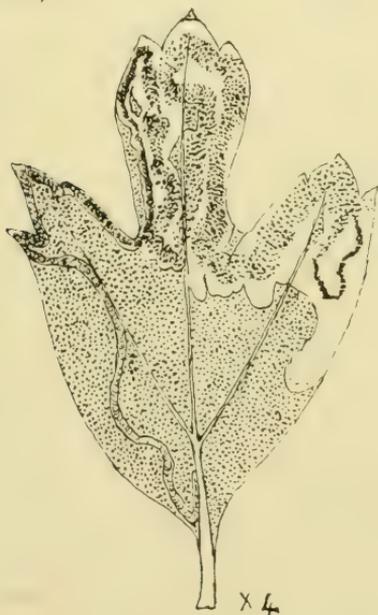
So there we must leave this problem still unsolved, and proceed to the last mistakes which have landed us in such difficulties.

This surrounds the larva of *Stigmella oxyacanthella* St. (species D). While the imagines of the previous species are as alike as three peas (apart from specimens which have red-heads), there is no mistaking *oxyacanthella* which is unicolorous purplish fuscous without a fascia on the forewing. It is the larva and mine which have been confused. The trouble started early, for Stainton (1855) figures the mine and larva of *crataegella* and ascribes them to *oxyacanthella*. In his herbarium there is a folder of hawthorn-leaves labelled "*N. oxyacanthella*, 6/8/54"; all the mines, in my opinion, are those of *crataegella*.

Once more, we have Wood to thank for sorting out the trouble. He writes (1894, p. 2): "Some doubt has been thrown on the existence of *gratiosella* as a good species, mainly from the circumstance that it has been given the larva of an allied species, whilst its own larva seems to have done duty for a presumed summer brood of *oxyacanthella*. It was noticing the very pale head of this summer-feeding larva that first made me question its identity with the dark-headed larva which occurs late in the autumn, and which I knew beyond dispute to be the larva of *oxyacanthella*. Suspicion once aroused, other differences that had been overlooked or misunderstood before became apparent, until the conviction could no longer be resisted that two very similar larvae and equally similar mines had been mixed together as one. Subsequently, the breeding of the perfect insect completely settled the point, and proved that the green larva with the colourless head,



Stigmella crataegella Klimesch.
 Bournemouth Hampshire.
 S. C. Scarsdale Brown leg. et det.
 13/15.viii.1970.



S.N.A.J.
 16.ii.1971

feeding on hawthorn leaves in July, belonged to *gratiosella*". I must remind readers that where Wood has written *gratiosella*, they should now substitute *crataegella*. This passage seems to me to clear the matter up completely, but until I had read it, I certainly used to confuse the two species of larvae, and I do not imagine that I was alone in doing so. Our text books still attribute a summer generation of larvae to *oxyacanthella*, and that, perhaps, is the root of the trouble; but I shall return to that point later.

One species remains, and then I shall have done with this part of my story. *Nepticula pygmaeella* Haw. (species E) is only on the fringe of this comedy of errors. Like *oxyacanthella*, it has an imago which is distinct. The larva, too, can hardly be mistaken. It is after the larva has gone that the trouble begins. For the vacated mine is so like that of *crataegella*, and *crataegella*'s mine is so like that of *oxyacanthella*, that errors of identification are almost inevitable, and records based on vacated mines must be treated with caution.

We now come to the dichotomous table of the mines of the hawthorn-feeding Nepticulidae. Here we must feed in the three species which hitherto I have not mentioned, *Stigmella paradoxa* Frey (*nitidella* Hein.), *S. regiella* H.-S. and *Decthiria atricollis* Stt. The table will, I hope, make the determination of tenanted mines a matter of ease and certainty, except in the case of that obstinate pair, *ignobilella* and *hybnerella*.

1. Mine starting as a gallery which generally develops into a blotch 2
- Mine not starting with a gallery. Blotch on lobe of leaf with a dark central mass of frass. Larva greenish white, head dark brown *paradoxa*
2. Gallery widening into a blotch 3
- Gallery not widening into a blotch, but long and erratic, with frass arranged in arcs of often separated grains. Larva bright green, head blackish or dark grey ... *oxyacanthella*
3. Linear feeding continued throughout. Blotch formed by gallery looping back and fusing with its earlier course ... 4
- Linear feeding not continued throughout. The gallery ends abruptly, the blotch being formed by radial feeding 5
4. Egg on underside, either on the frill of the leaf-stalk, when the gallery follows the lower edge of the leaf, finally turning back on itself to form a small blotch; or on midrib when the gallery and blotch are usually small and compact, staying close to the point of origin. Frass in arcs. Larva green, head whitish brown *crataegella*
- Egg on upperside. Mine similar to *crataegella*. Larva yellow *pygmaeella*
5. Early gallery not strictly following margin of leaf and containing a fine unbroken line of black frass, leaving clear margins 6
- Early gallery following leaf margin, with frass not dis-

- posed in fine central line 7
6. Frass line at the start of the mine broader, filling more than half the track. Subsequent blotch at the edge of the leaf. Larva yellow *ignobilella*
- Frass line at the start of the mine narrower, filling only one third of the track. Blotch often in the centre of the leaf. Larva greenish yellow *hybnerella*
7. Frass in gallery along leaf margin black, deposited in blobs or separated grains. Blotch large with irregular frass. Larva whitish green with darker dorsal vessel. Head and ventral spots on thoracic segments dark brown (larva mines venter uppermost) *atricollis*
- Frass in gallery along leaf margin red. Frass in blotch black in a loose central line. Larva yellow, head light brown *regiella*

Other common lepidopterous leaf-miners on hawthorn include *Bucculatrix crataegi* Zell., which makes, in its first instar, a very short gallery close to the midrib; *Lyonetia clerckella* L., which makes a long sinuous gallery with a thin central line of frass; and *Leucoptera scitella* Zell., which makes a large blotch with the frass arranged in spirals in the centre of the blotch.

I shall now treat each of these species of *Nepticula* in turn, taking them in the order in which they occur in the table, which is as convenient as any other arrangement.

Stigmella paradoxa Frey (*nitidella* Hein.) (see Emmet 1970). *S. paradoxa* had a good year in 1970. In 1969, when I first found it, I was almost too late for the larvae, but from the few cocoons I secured, a single imago emerged on the 24th of April. Those who are unfamiliar with these tiny moths have little conception of the speed with which they run: by comparison, *tragopoginis* is a laggard. I must have spent nearly half an hour that evening in an unavailing attempt to catch the *paradoxa* in a glass tube, and decided that Frey so named it because it always does the unexpected; though at the same time I saw the aptness of Heinemann's appellation, for its shining wings gleamed and flashed as it weaved and bobbed in its efforts to escape. The next morning I tried again and at last succeeded in trapping it.

I paid a brief visit to Wicken Fen on the 10th of May and searched the trunks of the hawthorns on which I had found the mines in the previous summer. I saw, as I thought, only one *paradoxa*, but on tubing it, I found I had two—a pair in cop. One of these died in the ammonia with its wings folded like a butterfly over its head, and I set it rather badly as a result; the other is a very good specimen. However, I decided that the bred specimen, as historically the most interesting, was the one to give to the British Museum, although it had suffered, but not too badly, in the chase I have described.

I have little time for entomology in June and July, but I felt that at all costs I must visit the Fen to collect *paradoxa*. So I made a flying visit on the 28th of June, just thirteen days

earlier than the date on which I had discovered the species in 1969. There were mines in profusion, but it was at once apparent that I was too late. With no time to be selective, I picked about a hundred mines. On my return home I found that barely a dozen of these were still tenanted, and most of these larvae were obviously parasitized. In the end I obtained only four cocoons for my labours. It would seem, therefore, that mid-June is the time to look for the larvae. My four cocoons all produced parasites, of three different species.

The following is a brief account of the biology of *paradoxa*:

Ovum—dark and shiny; laid on the underside of the leaf about one millimetre from the tip of a lobe.

Larva—glossy greenish white, with the head dark brown. When not feeding it tends to rest in the central blob of frass and then is hard to see.

Cocoon—reddish purple. I have not yet examined the pupa.

Imago—expanse, 5-6 millimetres. Head, light orange. Eye-caps cream. Antennae, shining bronze-brown. Collar, as head, but scales paler at their tips. Thorax, bronzy brown. Forewing, unicolorous glossy bronze-brown except for a hint of purple at the extreme apex. Hindwings, light grey.

Of the other British Nepticulidae that I am acquainted with, *paradoxa* seems most nearly to resemble *S. viscerella* Stt., but the head is brighter orange, not being mixed with fuscous, the eye-caps are paler and the wings are much more glossy.

I made some unfortunate errors in the account I gave of the distribution of *paradoxa* in my article of 1970, owing to my mistaking for it the old, discoloured mines of *Leucoptera scitella* L. When *scitella*'s mines are situated on the lobe of a leaf and age has obliterated detail, they look very much like those of *paradoxa*. The position of the egg will, however, resolve doubts, for *scitella*'s egg is laid well away from the leaf-margin whilst *paradoxa*'s is right at the tip of the lobe. Cambridgeshire records for *paradoxa* from Wicken Fen and Cherry Hinton are correct, and to these I can now add Chippenham Fen. The record from the Burren, Co. Clare, is likewise valid. My records from Essex and Kent were, however, mistakes and they must be cancelled.

In my previous article I suggested that *paradoxa* had long been present in Britain, but had remained undetected until a population explosion led to its discovery. This view is supported by an interesting find which I made in Stainton's herbarium. It contains a single hawthorn leaf bearing a mine of *paradoxa* but labelled "*N. pulverosella*". The error in identification need occasion no surprise or reproach. Apple and hawthorn are closely related foodplants and we have one species of *Nepticula*, *Dechtiria atricollis* Stt. which feeds on them both. *Pulverosella* makes a blotch at the edge of an apple-leaf, and when Stainton found an unknown species

making a somewhat similar blotch at the same time of year at the edge of a hawthorn-leaf, he jumped to a reasonable though faulty conclusion. There are no data for Stainton's leaf. It was probably collected in the 1850's quite possibly before Frey named *paradoxa* in 1857. Stainton's herbarium contains a few mined leaves expressly stated to be of foreign origin; the absence of such a statement in this instance is indicative (but not conclusively) that the mine was taken in Britain.

S. oxyacanthella Stt. The larva and mine are so admirably described in the passages I have quoted from Wood, that I have nothing to add on that score. There is, however, disagreement amongst our authors on whether *oxyacanthella* is bivoltine, as Stainton, Tutt, Meyrick and Ford maintained, or limited to a single autumn generation, as was contended by Wood and Waters, our most authoritative writers on the Nepticulidae. Both Hering (1957) and Borkowski (1969) state that it is double-brooded on the continent, and one would therefore expect it to have a similar regime in this country. On the other hand, *oxyacanthella's* mine has so often been confused with that of *crataegella* that our summer records for the larvae are suspect. Stainton, as we have seen, confused the two species, so his testimony is worthless, and our other authors may well have followed his lead. For the moment I prefer to reserve judgement, but if I had to commit myself, I would back Wood and Waters.

S. crataegella Klim. Here again, after quoting Wood in full, I need give no further description of the mine and larva. I wish I could say something of value regarding the appearance of the imago, but I have not yet bred or taken this species myself, and I regard all black-headed hawthorn-feeding Nepticulidae in our collections with the gravest suspicion. The most authentic series of *crataegella* are, I suppose, Dr Wood's bred series of "*gratiosella*" in his collection in the British Museum.

It seems that *crataegella* is a difficult species to rear. Waters knew the larva well, under the name of *gratiosella*, but it was one of the few *Nepticulas* with which he was consistently unsuccessful. Wood was more skilful, and he tells us later on in the article from which I have quoted that the pupa is subterranean. The secret must be to provide it with earth of the right consistency and humidity. I had quite a number of larvae last summer, which I then thought were *oxyacanthella*; I provided them with moss and tissue for pupation purposes, so I am unlikely to get any imagines.

Hering (1957) says that *crataegella* is univoltine, the larvae appearing in mid-summer. This is consistent with the observations of Wood and Waters. What other writers have to say about *gratiosella* is of no validity, for we cannot tell whether they are referring to *crataegella* or *hybnerella*.

It seems that *crataegella* is a rare species on the continent, being confined to a few localities in central Europe. On the

other hand, it appears to be common in Britain, though its distribution needs to be worked out. Wood had it from Herefordshire, Waters from Oxfordshire, Berkshire and Buckinghamshire, Mr Brown from the Bournemouth district, and I from Essex and Cambridgeshire, these records having been made from mines and larvae, without the moth being bred. I also have a mine found vacated in August 1969 in west Galway. Previously I had ascribed it to *oxyacanthella*, but now I feel sure it is *crataegella*; however, further confirmatory examples are desirable before this species is added to the Irish list.

Nepticula pygmaeella Haw. I have nothing of significance to add about this species. It is double-brooded with the second generation appearing to be the more plentiful.

N. ignobilella Stt. and *S. hybnerella* Hübn. I am dealing with these species together, because of the uncertainty of the distinction between them. The larvae tend to appear earlier than our text-books tell us. Meyrick and Ford give July for the first generation, but in mid-June last summer, vacated mines were already a common feature of the hawthorn hedgerows in north Essex, though I continued to find larvae for another month. These tiny moths occur in prodigious numbers. Between mid-June and mid-July I established a routine of searching the short stretch of hawthorn hedge in our garden on alternate days, and I seldom picked fewer than seventy mines a time; sometimes the number exceeded a hundred. I kept no exact figures but there were roughly three *hybnerella/ignobilella* to one *crataegella*, no other species being present; the *crataegella* mines tended to occur later than the others. So quickly do the larvae feed up at this time of year (Hering, 1951, p. 76, writes: "It has been reported that *Nepticula malella* Stt. required only 36 hours from the commencement of hatching from the egg until spinning its cocoon", though he is rather sceptical about the accuracy of the observer in this instance), and so much more conspicuous does the mine become after the larva has left, that it was a good day if more than half a dozen of the mines which I found were still tenanted, and many of these would be parasitised. In all, I reared ten months, five with red and five with black heads. The second generation also comes early and in 1970 was over in September, before the autumn feeders such as *regiella* and *atricollis* had put in an appearance.

Until *hybnerella* and *ignobilella* are distinguishable with more certainty, it is difficult to say much to the purpose about their distribution. Tutt (1899) wrote of "*gratiosella*", "So much confusion has existed between this species and *N. ignobilella* owing to the mistake about the larva in Stainton's manual, that possibly most records are unreliable". Poor man, he was doing nothing to clear up the confusion, for, through his following Wood's false scent, it seems that it was he, and not Stainton, who was at fault. Records made in the

present century are even less reliable, since reports of *hybnerella* will most likely refer to *crataegella*.

Dechtiria atricollis Stt. I shall also discuss this species under the head of another of its foodplants, *Malus*. I know a locality in Kent where ornamental crab-apples and a hawthorn hedge are in juxtaposition, and a vigorous colony of *atricollis* extends to them both. There is a close similarity in the formation of the mine in each tree, but whereas in apple the mine often extends at length along the leaf margin, in the smaller hawthorn-leaf it turns back on itself and is more compact.

Although the authorities, other than Meyrick (1928) say that *atricollis* is bivoltine, I have never found larvae except in the autumn, when they are abundant in many localities. Early October is the best time to look for them. This is a hard species to breed, and I have not yet been successful. Tutt (1899, p. 171) says that it hibernates as a larva and leaves its hibernaculum to spin its cocoon in the spring. He adds: "Many failures to breed species having this habit may be due to the fact that the vessels in which their mines are kept are not tightly closed in the spring, and that the larvae wander away to pupate, rather than to the normal explanation that the larvae or pupae have dried up". At the time of writing (April) I have a living larva that overwintered in its mine.

Stigmella regiella H.-S. The reddish colour of the frass in the gallery phase, and the course of the gallery along the margin of the leaf, are constant characteristics which make the determination of this mine easy. The species is bivoltine, with the commoner autumn generation continuing throughout October and sometimes into early November.

The End of a Decade

By T. W. HARMAN

1970 saw the end of my first decade as a serious lepidopterist. Besides making some observations about the lepidoptera seen in 1970, I should like to make a few general comments on the entomological scene and the field of conservation as I see it.

First, the year 1970 from the point of view of lepidoptera. The season began in earnest on 18th March when Mr B. Elliott and myself visited a Hampshire locality to search for galls of *Aegeria flaviventris* Staud. on the stems of willow bushes. We collected about fifty promising-looking stems and the result was four moths later in the season. In this locality we saw a Water Rail at very close range, the first live bird of this species either of us had seen. The following day we visited a Chiltern locality to obtain stems of Wayfaring Tree containing the early stages of *Aegeria andrenaeformis* Lasp. This proved very hard work and many of the signs seemed to be old. It would appear this insect must be declining, as another spot which yielded

several specimens a few years ago was almost devoid of signs. I wonder if other lepidopterists have had the same experience? Later that day we visited Mr R. Fairclough in Surrey and spent a pleasant afternoon and evening with him. The plan was to try for *Jodia croceago* Schiff. later in the evening near Abinger. However, the weather turned out cold and blustery and the shallows were not in bloom, so all collecting was abandoned. After several attempts this elusive insect has always failed to show up.

The 18th April was a lovely spring day and I took my family to the lower slopes of Beeley Moor where there are some fine birch plantations. *Archiearis parthenias* L. was quite common, but very hard to catch among the high trees and steep slopes. Among a number taken was only one female and this was found sitting among leaves on a sunny bank. We returned the following day, but saw very few insects. We were greeted on the second occasion by the songs of many Willow Warblers which had been absent on the previous day. They had obviously taken part in a massive overnight migration.

Mr B. Elliott and I joined the Brit. Ent. and Nat. Hist. Soc. field trip to Dovedale, Derbyshire, on 16th May. The chief object of the visit was to search for signs of *Yponomeuta stannella* Thunb. in the lower parts of its foodplant, Orpine. This is the only known British locality for this moth and with some eminent lepidopterists in the party, we set off with high hopes. The foodplant proved to be very difficult to find and the few specimens of the plant we did see were rather weak in growth and living amongst tall grass. None seemed sturdy enough to provide food for anything and no signs of the moth were seen. However, other micros were found and the party enjoyed a further profitable day in other Derbyshire localities on 17th May, during which I was unable to be present.

Whilst at my parents' farm in the Chilterns on 23rd May, I visited one of my favourite chalk downland localities nearby and, in lovely sunshine, saw four specimens of *Hemearis lucina* L. This is the first occasion I have seen this species on the dip slope of these hills, but probably because I have overlooked it previously. A week later Mr B. Elliott and I found ova quite commonly on the underside of Cowslip leaves. One leaf held seventeen ova in two batches. On the same day we had the great fortune to find the third British colony of the Military Orchid, my father finding the first specimen by accident, with a second some forty yards away from the first.

Mr T. J. G. Homer and myself made the long trip to West Wales on 26th May to see the site and search for larvae of *Coenophila subrosea* Steph. After hearing varying reports about its extreme localisation and reading others condemning collectors for descending on the area after its discovery, we thought it would be interesting to see the situation for ourselves. The bog is certainly a rather tricky place for night searching, Mr Homer, at one point, sinking to the tops of his long wellington boots. We found the first larva just at dusk

and then had quite a blank period and began to lose heart. Like most larvae-hunting it is a question of "getting your eye in" and, as time went on we found more and more. They seemed to prefer the wetter areas and the more branched specimens of Bog Myrtle. There have been fires periodically on the bog and the new growth of Bog Myrtle on such areas seems to produce a rather upright plant. The *subrosea* larvae were nearly all full-grown and were very easy to see by torchlight. It may be local, but we did not cease finding them despite getting quite a long way into the bog. From our experience, I think fire is a much greater hazard to the species than collectors and despite reports of large numbers of larvae and moths being taken, it seems to have had little effect on its status. Not far from this locality I took a short series of *Lampropteryx oregiata* Metc. flying at dusk along a hedgerow bordering marshy ground. None had been seen during the daytime yet they were numerous as soon as the daylight faded. Also found in the same general area were two specimens of the Giant Lacewing, *Osmylus fulvicephalus*. In 'Insect Natural History' by A. D. Imms, there is a distribution map of this species, but West Wales is not shown as a locality.

Beeley Moor, Derbyshire, received some attention during June and on the 7th I took my three eldest children on a walk, following a stream down its fairly deep-steep-sided valley. We fried eggs and beans over a Primus stove by the side of the stream and made the whole thing an authentic pioneer day by cleaning our plates with grass divots! In this valley I saw my first specimen of *Epirrhoe tristata* L. Intensive searching failed to produce more, but it was seen in several Derbyshire localities later. In the same locality with m.v. light on 9th June, we took one *Harpyia bicuspis* Borkh. This species must be quite widespread in Derbyshire and probably occurs in most valley where birch and alder grow. It never seems to occur in great numbers and we have never seen more than two or three on one night.

Mr B. Elliott and I made one of our long weekend trips on 12th June, on this occasion to Dungeness. On the way we called to look at a locality for *Idaea lineata* Scop. near Ashford. It proved a saddening experience. Rabbits abounded and in this restricted area had made their presence obvious by eating much of the grass in which the moth likes to hide. Added to this was the result of a fire which had burnt about half the area. It appeared to have been deliberately started by a farmer in order to burn bushes, but had spread much further than was necessary. Needless to say, we saw very few moths and under conditions such as these its continued existence here must be limited unless immediate steps are taken to save the habitat. Clear nights rather spoiled results at Dungeness and in Orlestone Woods over the weekend, but we were not idle by day. We nicknamed it the 'weekend of the hairy larvae' because Dungeness swarmed with several hairy species, *Euproctis chrysorrhoea* L. occurring literally in millions. They had

stripped nearly all green foliage in some places and even seemed to relish Horse Radish!

Back in Derbyshire on 20th June, we decided to try m.v. light at the top end of Lathkill Dale. It is probably true to say that few of the dales have been worked with m.v. light and many more are inaccessible by car. We humped two generators on rucksacks the half mile to the dale bottom and were rewarded among forty species with several specimens of *Anaplectoides prasina* Schiff. It is a lovely dark form here. Two females were obtained which laid ova, but no larvae were reared. The Elliott-Harman team spent the last weekend in June in the Suffolk Breck. We were joined by Mr H. Chipperfield and we all camped near a pine wood not far from Tuddenham. The whole area is fairly new to us, but it is quite obviously only a shadow of its former self, being much affected by agriculture and forestry. Where tree-planting is recent the ground flora is good and we camped adjacent to such a spot. M.v. lights were used at night and on 26th June we recorded 87 species. Among them were six species of Hawkmoths and these made quite an impression on the spectators we had attracted by midnight, who included the landowner, his wife, and several pyjama-clad children, the agent, gamekeeper and two policemen. One specimen of *Evergestis extimalis* Scop. was also seen at light. By day we searched for likely spots for *Anepia irregularis* Hufn. The foodplant seems to be less common than formerly and we found no sign of the moth or its larvae in the place where the foodplant was locally quite common. Perhaps this species still survives in Norfolk, but I think it is quite likely that it is now extinct in Suffolk. Let us hope someone has evidence to the contrary!

We also searched for *Lithostege griseata* Schiff. A few were seen in our roadside locality where the foodplant was abundant. With the spraying of crops and roadside verges Flixweed must be one of the first plant victims and it must be less common over recent years. Whilst walking the roadside verges we noticed the American influence in the area, with dozens of empty beer cans and bottles laying among the herbage, where they had been thrown from passing limousines. Are the Americans more guilty of depositing litter than British people or do we behave similarly when in overseas countries?

Mr Chipperfield took us to the classic locality for *Rheumaptera cervinalis* Scop. and *Pareulyte berberata* Schiff, near Bury St Edmunds. Once again it was a sad experience. A notice on a telegraph pole proclaimed the road as a site for development to form a bypass for the town. So passes another locality, known by generations of collectors and lost to the march of so-called progress. In fact, it now appears that the whole of this Suffolk town will be buried in all but name for the same reason. We also visited two localities near Needham Market to search for freshly emerged specimens of *Sesia apiformis* Clerck. Although a little early for this species we thought the

trip worth a try. The Black Poplars were riddled with exit holes of various ages, and in neighbouring trees we found two very fresh empty pupae cases sticking out of the trunks close to the ground. Unfortunately the moths had already beaten a retreat! So ended a pleasant, but somewhat disappointing weekend. We had even been to see Farmer Leech's asparagus field, the old haunt of *Emmelia trabealis* Scop. and met Farmer Leech himself. What a scene this historic place now presented! A flock of sheep on a flat stretch of grass which was no longer and considerably less green than most suburban lawns.

My father was persuaded to have his first real holiday with us this summer and I went down to collect him on 11th July. It happened to be a lovely day on 12th and it was most encouraging to see so many butterflies on the wing. On blackberry blossom in a secluded corner of one field I counted nine specimens of *Strymonidia w-album* Knoch. on one small bush. That night one specimen of *Trisateles emortualis* Schiff. came to each of two m.v. lights. Both were kept for ova, without luck. It would seem to be very difficult to get this species to lay. It might be worthwhile putting females in very large cages in situ in a wood with large branches of oak with dead leaves on them placed inside the cages. After a few days in Derbyshire I went back to the farm and on a very good night on 17th July I took a specimen of *Oria musculosa* Hübn. with 94 other species.

The next day Messrs B. Elliott, T. J. G. Homer and myself travelled to Wiltshire for a long weekend. The weather had been so good at this time that many of the butterflies were past their best. By accident we met Mr R. Stockley there on 19th and spent an entertaining and informative afternoon with him. We had seen *Apatura iris* L. and a male had been lured down to a piece of polythene tied to the ridge pole of the blue tent in which we were camped. However, Mr Stockley excelled himself by suggesting we tried to find ova! This seemed a pretty hopeless task, but with his superb knowledge of this species and its habits in this locality he duly did as promised, only one, but that was enough to impress us considerably. The larva is now safely sleeved on a small sallow and seems quite happy in the thick atmosphere of Chesterfield! Mr Stockley also described the habits of the female when egg-laying and during the next day we observed several performing exactly as he had forecast, a wonderful sight to see this magnificent species flying low over sallows. Let us hope the Forestry Commission in this and similar areas take heed of entomologists before altering the ecology of these critical habitats.

At the end of July my family and I decided to reverse a rather whistle-stop camping tour of Scotland which we made with some friends in 1966. This time we decided to make no plans time-wise. We duly departed on 26th July. Lunch was taken near High Force in Teesdale and here we found a specimen of *Colostygia olivata* Schiff. sitting on a tree trunk. We pressed on all day and camped in the garden of a disused

cottage near Longtown, just on the Scottish border, for the first night. The only insect of interest seen there were a few larvae of *Cucullia chamomillae* Schiff. The next day we did another 200 miles to our first major camp site close to the western shore of Loch Sween in Argyll. The site was reached by a shocking approach track across a peat bog covered with Bog Myrtle. However, the car managed to haul itself and the trailer through the mud and water and we spent a delightful week out of touch with civilisation. On this expedition we met the farmer on whose land we were camped and, after explaining our desire to get away from the maddening crowd, he was very friendly towards us and even allowed us to fish in his private trout loch. This whole area is surely a 'must' for any naturalist. I could write many paragraphs about our activities there, but must restrict myself to a few highlights.

Mothwise I did not see much which could be called unusual, but *Alcis jubata* Thunb. and *Venusia cambrica* Curt. were quite common. One regret was that my diary records *Selenia bilunaria* Esp. on the 28th July and 1st August. Not wanting this species I did not take a specimen. Later I was informed that nobody would believe these records as a second brood has not been recorded for Scotland. It is a long trip for *bilunaria* and that mistake will cost many gallons of petrol, but it will have to be done!

On advice from the farmer we visited Loch Mhurrich, a branch of Loch Sween, to see the Mullet in the shallow bays. This must be quite a natural phenomenon because the shallows were literally moving with fish. Again, this is a most lovely place, with acres of Meadowsweet and Purple Loosestrife and virtually untouched by the usual holidaymakers. Whilst there I tapped out a specimen of *Thera cognata* Thunb. from dwarf juniper, a species new to me. The 29th July was a rather tragic day with eighteen hours of continuous rain. It also happened to be my daughter's fifth birthday. A party was held inside the tent and we had managed to get a small cake on which were two ordinary household candles. Some jelly, set in the local stream, raised our spirits to suit the occasion. Belongings had become rather damp by the evening and we were all for retreating south if the weather was similar on the following day. It was not much better but looked more hopeful by evening. Then followed two glorious days during which we sunbathed, fished and swam.

A decision about moving had to be taken and we made the long, but scenic, journey to Findhorn, Moray, on 2nd August. Camp sites suitable for entomologists are becoming more difficult here, but in our usual pioneer style we drove through the sea of frame tents, past the permanent wash houses and on to the extreme limit of navigation. Here we pitched camp in the lee of some excellent sand dunes which were covered with heather and broom. We were extremely lucky to strike the beginning of a heatwave. The m.v. trap attached to the generator was run in amongst some dunes about three hundred

yards from the camp and away from habitation. Results were excellent and although the number of species seldom exceeded fifty, they consisted of those I seldom see. *Agrostis vestigialis* Hufn. was easily the commonest moth and occurred in hundreds. *Euxoa cursoria* Hufn. in many forms was a close second. *Actebia praecox* L. and *Gnophos obfuscata* Schiff. were also common. Over the week other species of interest were seen—*Arenostola elymi* Treits., *Ammogrostis lucernea* L., *Euschesis orbona* Hufn., several, *Apamea furva* Schiff., *A. assimilis* Doubl. and *Stilbia anomala* Haw. From Findhorn we made a couple of trips to explore the north coast of Moray and Banff. It is a rocky coast and closely resembles North Cornwall, even down to the fishing villages. We enjoyed finding old tracks to the beaches by using the one inch Ordnance Survey maps, and in this region one can have whole bays to oneself.

At the end of a pleasant week we regretfully packed up and decided to move to an untried site at Rattray on the east Aberdeen coast. My second cousin, who I had not seen since childhood, is chief coastguard at Fraserburgh, so we thought it a good idea to look him up whilst in the region. The Rattray sand dunes are vast in area, both in length and height. They are also very lonely, the only houses in the area being those of the lighthouse keepers. It was from these good people that we got our water supplies. We thoroughly enjoyed the place and in the sun the scene reminded us of Western Australia, where my brother lives. Although the area looks superb, the flora lacked variety. Consequently, the moths were very disappointing, *S. anomala* Haw. being about the most interesting insect seen. We spent a marvellous day with my cousin, visiting the Fraserburgh lighthouse and the coastguard station. Later we were entertained in true Scottish style by his wife, who insisted that nothing on the tea-table would be put back into the larder, so we did our best to oblige!

I had arranged to stay with Mr Pelham-Clinton on the way home and on 14th August we had to bid farewell to the lonely places and departed for Edinburgh. We were given excellent hospitality and we hope he has had sufficient time to recover from the effects of hordes of campers descending on him. His collection and records are a model for any entomologist. With his tremendous knowledge, of which he is always willing to impart to others, it made the evening in his study most interesting and it was the small hours before I crawled into the tent on the lawn. The next day we left Scotland with many happy memories. When we looked back over the three weeks we could honestly say we had not had a cross word from anyone, in fact, it was just the reverse, everyone kind and helpful, whether farmer or shopkeeper. A native bank manager cashed a cheque without checking my references which should dispel a number of rumours about the inhabitants of this lovely country!

After a two-day stop at home to clean up and reorganise,

we travelled south on 18th August, another two-day stop in Bucks. and then on to Worth, Kent. Weatherwise it was a poor visit because, although the days were sunny and pleasant, the nights, for the most part, were clear and cool. Consequently I spent more time fishing than mothing, the best fish being a four pound tench from a local drainage dyke. The only moth of real note was my first ever *Herse convolvuli* L. at Worth on 30th August.

Work became the order of the day in early September and our last major field trip was to Clumber Park, Notts., on the 19th. Here we recorded several *Diarsila dahlia* Hübn., some worn *Enargia paleacea* Esp., a single *Aporophyla lunula* Stroem and one female *Dryobotodes eremita* F. Apart from a local autumnal field trip, this more or less ended the season. The annual pilgrimage to the Annual Exhibition of the Brit. Ent. and Nat. History Society at the Natural History Museum, S. Kensington, took place on 7th November. Amongst a box of unidentified lepidoptera which I showed to Mr Pelham-Clinton at this meeting, he identified the first British specimen of *Stenoptilia saxifragae* Fletch. This was taken at m.v. light in my garden here on 24th July 1969. The only explanation of this record is that my next-door neighbour, who happens to be Irish, was on holiday in Dublin in 1968 and brought back some rock plants with her. It will be interesting to see whether the moth has established itself in this unlikely locality.

As well as ending my first decade of collecting, 1970 was also European Conservation Year. Much has been written and talked about this event. I think it has been useful in that the importance of preserving the quality of environment has been brought to the notice of the public. However, nowadays I tend to judge people and organisations by their actions rather than their words. If we look carefully at the present state of our countryside compared with twenty years ago and then try to forecast what will happen over the next decade, the picture, as I see it, looks rather gloomy. With a population already at least fifteen million greater than we can comfortably cope with and likely to increase even further, there is little hope for maintaining wide-open spaces. In conjunction with this increase in numbers of people, is their increased mobility by various means, which can only lead to increased pressure on our already limited areas for recreation. The march of industrialisation, concrete, bricks and mortar, is gradually reducing habitats, thus reducing insect population. There have been a number of articles published this year aimed at curbing the activities of collectors, particularly those using m.v. traps for sampling populations. One such article was published in the June 1970, edition of 'Animals'. My reply to it appeared in the September edition, but it did not evoke further correspondence. In my opinion, if more attention were paid to preserving existing habitats, there would be little need to curb even the most ruthless collectors, of whom there must be very few anyway!

What I find most gloomy about the subject of the environ-

ment is that it appears secondary to our main aim in the Western World, that of economic progress at all costs. Our whole way of life is geared to an increase in the standard of living. Although not a trained philosopher, I think the quality of life is more important than its material comforts and this greed for ever-increasing ease of life must either stop voluntarily or it will be forced to a halt by some rather unpleasant circumstances. This, of course, means nothing short of a social revolution, which would not happen overnight, if at all. Education in its widest sense is possibly our only hope for survival, and educational revolutions tend to take a generation or two in which to take effect. This may well be too late at this already late stage. I am not a natural pessimist and hope something will happen to prove me wrong. If so, it will have to happen in the next decade if my children are to enjoy a small fraction of the contact with the natural world in which I have been fortunate enough to be able to participate.

26 Highfield Road, Chesterfield, Derbyshire.

A note on the distribution of the Rhopalocera on the Island of Sao Jorge—the Azores

By C. A. MARSDEN and P. L. WRIGHT

(Department of Pharmacology, Bergen University, Bergen, Norway)

Introduction

The Azorean archipelago, situated in mid Atlantic between Portugal and North America, consists of nine islands geographically arranged into three groups. The south easterly group comprises Santa Maria and São Miguel. The central group consists of Terceira, Graciosa, São Jorge, Pico and Faial. The north westerly group includes Flores and Corvo. The present

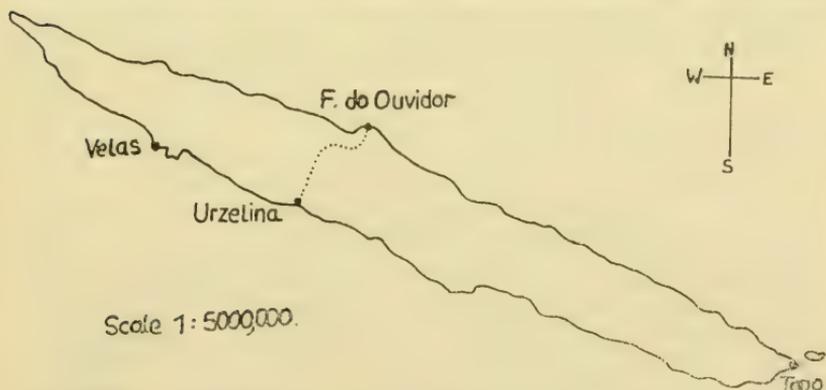


FIGURE 1.—The island of Sao Jorge showing the route taken during the survey (.....).

study was made during the Chelsea College (London University) expedition to the island of São Jorge from July to September 1965.

São Jorge lies between long: 28' West and Lat: 38' North. The climate of the island is extreme oceanic with moderate rainfall throughout the year, high relative humidity and a small temperature range (Tutin 1953). The island of São Jorge is 4 km wide at its maximum point and 27 km long and has a backbone of quiescent volcanic cones reaching a maximum altitude of 900 metres (Fig. 1).

There is a distinct sequence of vegetation on the island passing from sea level to the summit. The sequence passes from open woodland to closed woodland, to scrub, to a combination of scrub and pasture and finally to open damp pasture. Each zone is characterized by certain plant species (Fig. 2). A similar vegetation zonation is found on the neighbouring island of Pico (Marler & Boatman 1952).

Drouet (1861) compiled the first list of Azorean Lepidoptera and this list was improved by Godman (1870). In 1903 Ogilvie-Grant collected Azorean Lepidoptera (Warren 1905). In more recent years Rebel (1940) and Carthy (1957) have published lists of Lepidoptera collected on the Azores.

Only four species of Rhopalocera were found on São Jorge during our stay in 1965.

Rhopalocera

PIERIDAE

Colias croceus Geoffroy

Previous records: Godman (1870), Rebel (1940), Carthy (1957).

Pieris brassicae azorensis Rebel.

Previous records: Godman (1870), Warren (1905), Rebel (1940), Carthy (1957).

LYCAENIDAE

Lampides (Polymmantus) boeticus L.

Previous records: Rebel (1940), Carthy (1957).

SATYRIDAE

Hipparchia azorina Strecker.

Previous records: Rebel (1940), Carthy (1957).

An endemic species. Regarded by some authors as a subspecies of *H. aristaeus*.

It soon became apparent that these species exhibited a well defined distribution in respect to altitude. The altitudes at which Carthy had collected his specimens on Pico suggested a similar situation on that island (Carthy 1957). It was decided to make a more detailed examination of the apparent zonation of these four species taking into account altitude, climate and vegetation.

Methods

The survey was carried out on 1st September 1965 in sunny weather with a slight breeze blowing. The apparatus consisted of an altimeter, stop watch and four hand tally counters.

A hike (Fig. 1) was made from Fajo do Ouvidor, on the north coast, via Norte Grande (300 metres) and Santo Antonio (460 metres) across the central ridge of extinct volcanic cones (790 m) to Urzelina on the south coast. At every 60 metre contour a count was made of the number of each of the four species observed in a period of three minutes. The species were counted simultaneously using the tally counters. The counts were all made during periods of direct sunlight. At each counting station a note was made of the exposure to wind, general flora zone and the relative abundance of the more common flora. The latter were arbitrarily graded from 0 (absent) to 5 (very abundant). The types recorded in this manner were: *Mentha* sp., *Zea mais*, *Brassica* sp., *Erica azorica*, *Graminae* sp., *Carex flava* and *Polytrichum commune*.

During the period of our stay on the island we climbed from Urzelina up to the central ridge of volcanic craters on 30 separate occasions. The main reason for these trips was the collection of coleoptera (Marsden 1969) from the crater of a volcano that had erupted in May 1808. On these climbs we also collected Rhopalocera and recorded the altitude at which the captures were made.

Meteorological recordings were made at 210 metres and 790 metres.

Results and Discussions

1. *Climatic.* The extent of the cloud coverage at 210m and 790m is given in Table 1. The central ridge of volcanic peaks was often clear in the early morning but by late afternoon was completely enveloped by dense mist. No humidity recordings are available as the cobalt thiocyanate papers, that had been stored in glycerine, were found to be ruined on their return to England. The mean annual relative humidity at Horta, on the neighbouring island of Faial, is 81.5% (Tutin 1953). The maximum and minimum air temperatures recorded at 210 and 790m are shown in Table 2.

TABLE 1.—The extent of cloud coverage recorded at 210m and 790 m on Sao Jorge between July and September 1965.

	Total Cloud Coverage	Partial Cloud Coverage	Clear Days
210m	6	10	14
790m	10	12	8

TABLE 2.—The air temperature recorded at 210 m and 790 m on 30 days between July and September 1965 on Sao Jorge

	Total Cloud Coverage	Partial Cloud Coverage	Clear Days
210 m			
Max. Temp. °C	24	28	35
Min. Temp. °C	81	17	13
790 m			
Max. Temp. °C	18	23	24
Min. Temp. °C	12	11	7

2. *Vegetation.* The main plant zones recorded on the south and north faces of the island are shown in Fig. 2. The relative abundance of certain species recorded at every 60m contour are shown in Table 3. The mint plant is the only plant that was recorded at almost every 60m contour. Certain vetches were also very common being abundant in the low pasture land. The region from sea level to 420m on the north side of São Jorge is much steeper than the corresponding area on the south. This is reflected in the very small cultivated and *Erica* pasture zones found on the north side.

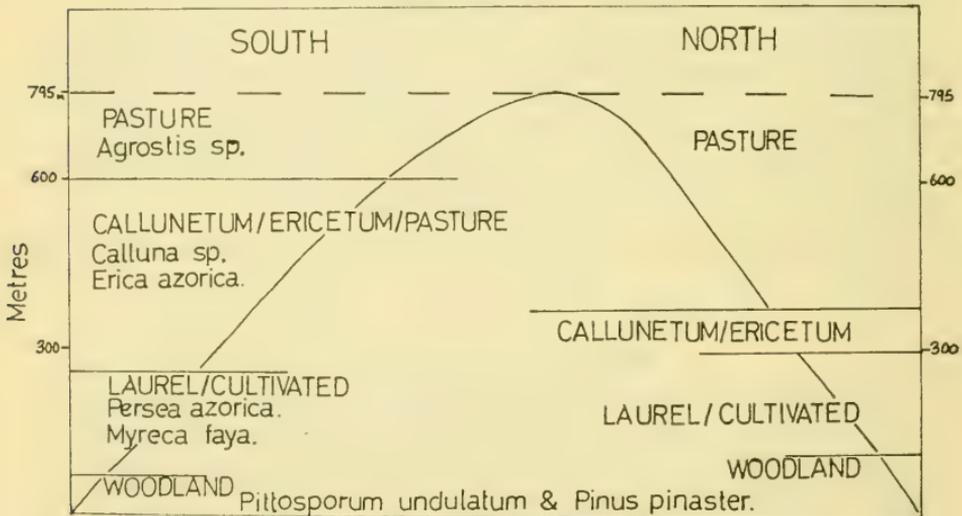


FIGURE 2.—Diagram to show the main vegetation zones on the north and south sides of the island of Sao Jorge between the village of Urzelina on the south and Fajo do Ouvidor on the north.

TABLE 3.—The type of plant zone and the abundance of certain plant species at each 60 metre contour between Urzelina on the south coast and Fajo do Ouvidor on the north coast.

Altitude (metres)	Zone	A	B	C	D	E	F	G
60	Woodland	—	2	2	—	—	—	—
120	Cultivated	—	5	3	—	—	—	—
180	Cultivated	—	5	2	—	—	—	—
240	Cultivated	1	4	2	—	—	—	—
300	Woodland	3	—	—	—	1	—	—
360	Wood/Pasture	5	—	—	1	4	—	—
SOUTH 420	Erica/Pasture	5	—	—	1	4	—	—
480	Erica/Pasture	5	—	—	2	5	3	—

	540	Erica/Pasture	2	—	—	3	5	3	—
	600	Erica/Pasture	4	—	—	1	5	3	—
	660	Pasture	3	—	—	—	5	—	3
	720	Pasture	3	—	—	4	4	—	2
	790	Pasture	2	—	—	—	5	—	3
	720	Pasture	4	—	—	—	5	3	3
	660	Pasture	2	—	—	—	5	3	—
	600	Pasture	2	—	—	—	5	3	—
	540	Pasture	3	—	—	—	5	—	—
	480	Pasture	4	—	—	—	4	—	—
NORTH	420	Erica/Pasture	3	—	—	2	5	—	—
	360	Pasture	3	—	—	2	5	—	—
	300	Cultivated	2	4	1	—	3	—	—
	240	Cultivated	2	4	1	—	2	—	—
	180	Woodland	4	—	—	—	—	—	—
	120	Woodland	2	—	—	—	—	—	—
	60	Woodland	3	1	—	—	—	—	—

A = *Mentha* sp., B = *Zea mais*, C = *Brassica* sp., D = *Erica azorica*, E = *Graminae* sp., F = *Carex flava*, G = *Polytrichum commune*. The abundance of the plants is arbitrarily graded between — (absent) and 5 (very abundant).

3. *Rhopalocera*. *P. brassicae azorensis* was not observed above 540m and was most common in cultivated areas (Fig. 3). More individuals were recorded on the heavily cultivated south side than on the steeper north side. Many of the small fields of cabbage plants were totally destroyed by the activities of the vast numbers of the larva of *P. brassicae azorensis*.

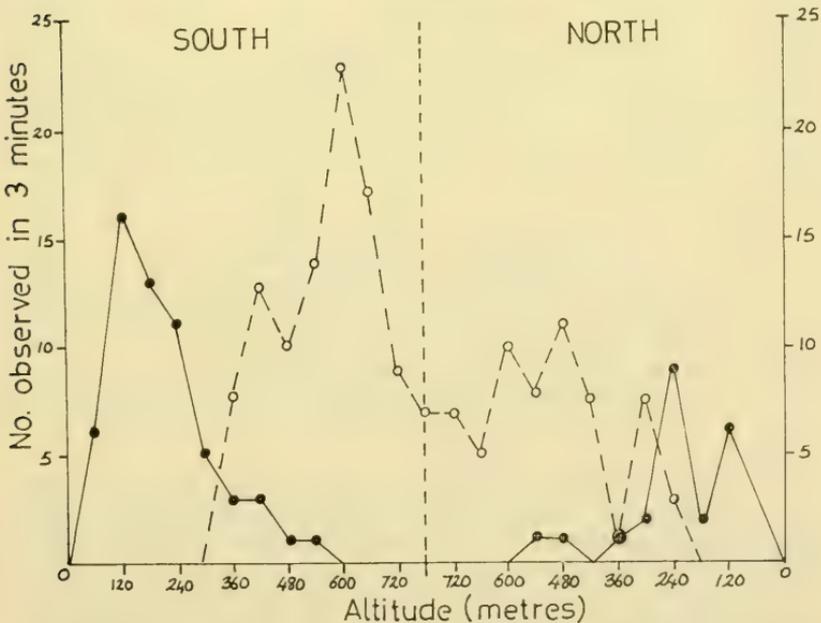


FIGURE 3.—Relationships between the numbers of *P. brassicae azorensis* (● — — — ●) and *C. croceus* (O — — — O) counted and altitude.

Colias croceus was not found below 240m on the north side and 360m on the south and the numbers reached a peak in the lower drier pasture land (Fig. 3). The lower pasture zone extends between 360m and 660m on the south and 360m and 720m on the north. The zone is generally below the heavy cloud coverage and is consequently of a drier nature than the upper pasture. The vegetation mainly consists of coarse grasses, clumps of *Erica azorica* and *Calluna vulgaris* with numerous small flowering plants including vetches that are common food plants of *C. croceus*. *C. croceus* is generally found in heath and open places up to about 1,800m.

Hipparchia azorina showed the most limited distribution of the four species being confined to the upper damp pasture zone (Fig. 4). This is above 480m on the north and 540m on the

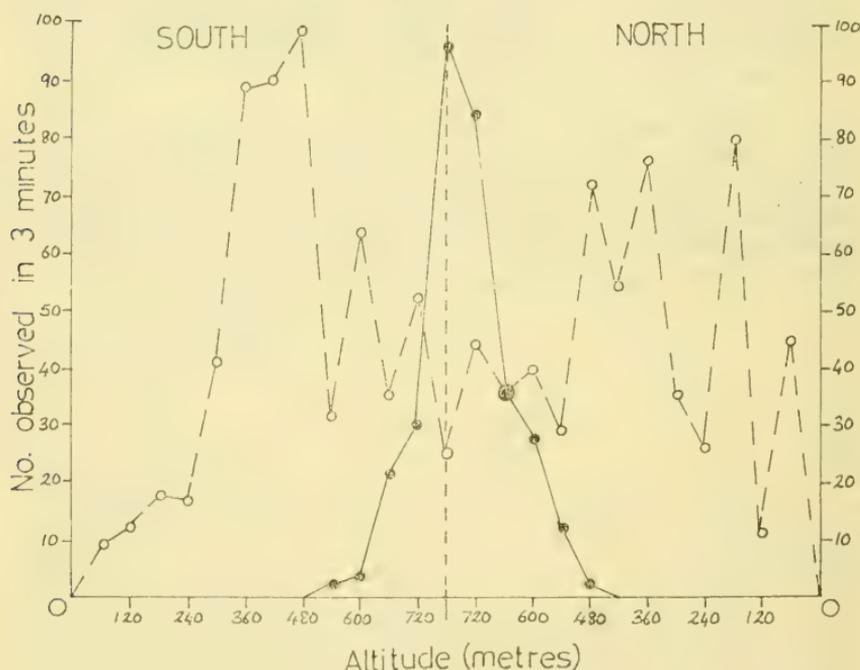


FIGURE 4.—Relationships between the number of *L. boeticus* (O — — — O) and *Hipparchia azorina* (● — — — ●) counted and altitude.

south. In this area the butterfly is very abundant and at times the air is literally thick with butterflies, sluggish in flight and very easily captured. The limiting factor in the vertical distribution of *H. azorina* appears to be the diet of the larva. A larva, probably that of *H. azorina*, was found in great numbers amongst the grass roots at the higher altitudes. It is possible that *H. azorina* as well as *P. brassicae azorensis* may be of some economic importance on the island. There is evidence that some agent is doing considerable damage to the upper pasture

zone. It is this zone that supports the large herds of Friesians found on São Jorge. The larva of *H. azorina* may contribute to this damage.

Lampides boeticus was the most widely distributed of the four species and its distribution does not appear to be related to altitude (Fig. 4). In the cultivated and woodland areas the species was less common. There does, however, appear, to be a significant correlation between the occurrence of mint plants and the number of *L. boeticus* counted (Fig. 5). This probably

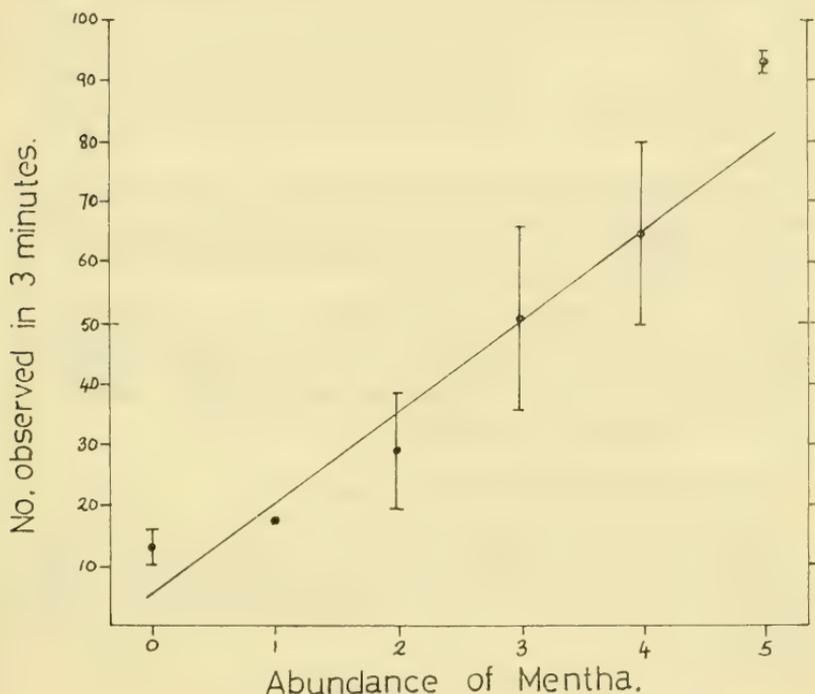


FIGURE 5.—The relationship between the number of *L. boeticus* counted and the abundance of *Mentha* sp. The *Mentha* is graded between 0 (absent) and 5 (very abundant).

- p 0.05 between abundance of *Mentha* 3 and 4
 p 0.01 between abundance of *Mentha* 4 and 5
 p 0.001 between abundance of *Mentha* 2 and 4

reflects the common habitat of this species which is flowery banks and other rough places up to 1,800m.

The route taken on this survey was chosen for convenience as it afforded an accessible route from the north coast over the central peaks to the south coast. The recordings made on the other 30 climbs from the village of Urzelina to the central ridge of peaks confirmed that the distribution of the four species is typical of São Jorge. On visits to the neighbouring islands of Pico and Faial the four species were collected in the same

vegetation zones. Carthy (1957) found the four species on Pico and the altitudes at which the specimens were collected correspond with the floral zones on Pico (Marler and Boatman 1952) in which the species were generally recorded on São Jorge. It is thus the plant zonation that probably determines the distribution of the four species on these islands while the plant zonation is affected by climate and consequently altitude.

The method of investigation was devised in the field using available equipment. The possibilities for errors and inconsistencies are obvious. The fact that the recordings were made at different times of day, varying from early morning to late afternoon, was unavoidable. In an attempt to standardize the results all the counts were made during periods of direct sunlight. At higher altitudes this often involved waiting at observation points for a considerable time before a count could be made.

It is probable that the number of each species counted at each 60m contour is subject to error as individuals may have been counted more than once. The relative numbers, however, probably reflect the true situation.

The results demonstrate the few number of butterfly species present on São Jorge but the abundance in number of those species that are present particularly under suitable ecological conditions. It was the abundance in numbers that made the present very simple survey feasible.

Acknowledgements

We thank M. Smookler for help with the meteorological observations and the identification of the flora. We also thank the staff of the Lepidopteran section of the British Museum (N.H.) for confirmation of the identification of the four Rhopalocera.

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65p net

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Collecting Lepidoptera in Britain during 1970

By C. G. M. DE WORMS, M.A., Ph.D., F.R.E.S.

The new year opened with a very cold snap which was quickly followed in the second week of January by an extremely mild period which lasted almost to the end of the month. It brought forth most of the early geometers, in particular *Theria rupicapraria* Schiff., *Phigalia pendaria* F., and *Erannis leucophaearia* Schiff. Mr R. F. Bretherton and I found a good many sallow stems inhabited by *Aegeria flaviventris* Stand. on Horsell Common on February 4 and several more there in company with Mr and Mrs J. A. C. Greenwood on the 8th. But some real winter supervened shortly afterwards with a blizzard on the 12th. In fact, there was hardly a mild day for the rest of the month. March opened with a very bleak spell with further heavy snowfalls on the 4th. It was not till the 15th that *Achlya flavicornis* L. appeared at Horsell with the first Brimstone on the 20th, quite a late date for its emergence from hibernation. I travelled to Kent on this day and on March 22 I found *Archiearis parthenias* L. flying in numbers round the birch tops in the Hamstreet woods.

The sallows were only just starting to bloom when Mr J. L. Messenger accompanied me on March 25 to Hope Cove near Salcombe to spend the Easter holiday period. But a very chilly week-end awaited us, no collecting being undertaken, though we went over to Mr Geoffrey Cole at Slapton, but drew a blank. We motored home the last day of March somewhat empty-handed. The first ten days of April were equally unpropitious with a bitter east wind which was still prevailing when I travelled to Bristol on the 10th for a conference of the British Ornithologists Union. On the 13th I went on to stay with Mr Ronald Demuth at Oakridge at the southern end of the Cotswolds. By this time the weather had relented. We were met with sun and warmth when we motored to Wyre Forest on the 14th in the hope of seeing *Endromis versicolor* L., but we saw no sign of it and were no doubt too early in this late season. *A. parthenias* L. were flying in plenty and not difficult to net as they settled on the sallow bloom which also attracted several *Inachis io* L. and *Polygonia c-album* L. A good many noctuids visited my host's trap that night, including *Cerastis rubricosa* Schiff., *Xylocampa areola* Esp., *Eupsilia transversa* L., *Earophila badiata* Schiff., and *Biston strataria* Hufn. I then went on to stay with my relative Gen. Beddington, near Blandford, seeing the first *Pieris rapae* L. in his garden on April 18. The latter part of the month was for the most part mild, but one *Odontosia carmelita* Esp. only appeared at Horsell the last day of April.

May was ushered in with real summer temperature of nearly 70°F. On the 2nd I paid my first visit of the season to the New Forest, staying with Rear Admiral D. Torlesse at Sway, and it proved a very propitious night for our m.v. lights

run on the boundary of Rhinefields Enclosure, where we saw as many as 25 species of the "macros". Among the early arrivals were male *Cleora cinctaria* Schiff. to be followed by *Orthosia miniosa* Schiff., but a most welcome visitor was a female *Lithophane socia* Hufn. which obliged eventually with a lot of ova laid on netting placed over a small box, as also did another of this species which Col. Mackworth Praed kindly let me have from his trap at Burley. From both these insects, we bred out some fine specimens in the autumn, feeding the larvae mainly on privet. Other species of note on this productive night were a number of *Polyploca ridens* F., a single *O. carmelita* Esp., also *Drymonia ruficornis* Hufn., *Panolis piniperda* Schiff., *Colocasia coryli* L., *Menophra abruptaria* Thunb., *Trichopteryx carpinata* Borkh. and finally a *Bapta distinctata* H. & S. (*pictaria* Curtis), a very late date for this local geometer which I had not seen before in this part of the Forest. The following day topped the seventies, bringing out many Whites, chiefly *Pieris rapae* L. and *P. brassicae* L. together with a lot of *Gonopteryx rhamni* L. and several *Polygonia c-album* L. The heatwave persisted on my return to Surrey, where I ran my light on the night of May 5 in the vicinity of Gracious Pond on the edge of Chobham Common. Again a number of interesting species were seen up till midnight. One of the earliest to appear was a female of *Saturnia pavonia* L. from which a large batch of ova was obtained and most of them attained the pupal state. Other insects seen included *Drepana lacertinaria* L., *Notodonta ziczac* L., *D. ruficornis* Hufn., *Lophopteryx camelina* L., *C. coryli* L., *Polyploca ridens* F., *Eupithecia nanata* Hübn., *Selenia tetralunaria* Hufn. and *Aethelura punctulata* Schiff. The next evening of the 6th Mr R. Bretherton and I visited Ranmore Common after dark where we were pleased to see several *Boarmia consonaria* Hübn., also *Lycia hirtaria* Clerck, *P. ridens* F., *Orthosia munda* Schiff., and *Pachynemina hippocastanaria* Hübn. The warm spell continued till the 9th when in my sister's garden at Virginia Water among visitors to my light were *O. carmelita* Esp., *Pheosia gnoma* L., *camelina* L., half a dozen *C. coryli* L., a fine *Mimas tiliae* L., and many *Eupithecia abbreviata* Steph. On May 12 I set out for a three-week stay in Central Italy and, returning on June 2, I was welcomed once more by a remarkable heatwave, which was to last for the next three weeks and provide some almost record temperatures reaching just 100°F in the shade in the Lake District on June 11.

On June 5 in the Chiddingfold area when I was with Mr J. Messenger, *Leptidea sinapis* L. was flying in some numbers. This butterfly seems to be coming back to its former haunts which is very encouraging. *Clossiana euphrosyne* L. and *C. selene* Schiff., were also on the wing with a good many *Anthocharis cardamines* L., late *Gonepteryx rhamni* L. and *Pyrgus malvae* L., while *Minoa murinata* Scop., was to be flushed from the wood spurge, its foodplant. The following night some forty

species came to my m.v. light run in my sister's garden at Virginia Water. Among these were several *Drepana binaria* Hufn., *Nola confusalis* H.-S., *Ectropis extersaria* Hübn., also *Bena prasinana* L., *Drymonia trimacula* Esp., *Notodonta dromedarius* L., *Pterostoma palpina* Clerck, *Bapta bimaculata* E., *Eupithecia tantillaria* Boisd., and *Cosymbia punctaria* L., but among the last arrivals was a most unexpected visitor *Hadena conspersa* Schiff., which was well separated from its normal terrain on downland. The thermometer exceeded 80°F on June 7 which provided one of the best nights when Mr R. Bretherton accompanied me to a heathy area near Winterfold. Insects came flocking in as we lit up at 10 p.m. and continued till 1 a.m. by which time we had recorded 80 species of macros. Early arrivals were *Hepialus vellea* Hübn. and *Arctia villica* L. followed by quite a dozen *Apatele alni* L., including some dark examples. *Bomolocha fontis* Thunb. was a numerous insect from the bilberry. Both sexes were on the wing with several *Erastria venustula* Hübn., *Cepphis advenaria* Hübn. and both the Elephant Hawks which were the only Sphingids. The Notodonts comprised *Drymonia trimacula*, *Stauropus fagi* L., *Lophopteryx camolina* L. and *P. palpina*. Among noctuids were *Tethea* or Schiff., *T. fluctuosa* Hübn., *Apatele leporina* L., *Hadena contigua* Schiff., *Plusia pulchrina* Haworth, and the geometers included *Cosymbia linearia* Hübn., *E. lariciata* Freyer, *Lamproteryx suffumata* Schiff., *Boarmia punctinalis* Scop., and *Bupalus piniaria* L.

There were daily temperatures in the 80's all the subsequent week. On June 10 Mr Messenger and I revisited the Dunsfold woods. Both of the Pearl-bordered Fritillaries were flying with late Brimstones and Small Whites. That night—another prolific one—saw me near Bisley when 60 species came to light up till midnight. *Mimas tiliae* and a huge female Fox moth were early comers. Half of the species noted were Geometers, among which were *Mysticoptera sexalisata* Retz., *Euphyia unangulata* Haworth, *Euchoeca nebulata* Scop., *Hydriomena coerulata* F., *Lycometra ocellata* L., *Perconia strigillaria* Hübn. Females of *Bupalus piniaria* L. and a very dark female *Dyscia fagaria* Thunb., *Laotoë populi* L. and *Hyloicus pinastri* L. were the only hawkmoths and the last to arrive. Two days later, I was once more in Kent collecting in the Hamstreet area where another female Fox Moth (*M. rubi* L.) ushered in the evening with a female *Dasychira pudibunda* L. Shortly afterwards a couple of *Diphthera alpium* Osbeck arrived with a rush of *Deilophila elpenor* L. The last of 34 species seen was *Stauropus fagi* L. It was again very warm on the 13th when I visited Dungeness where many Common Blues were flying. The swallow bushes were all devoured by the Brown-tail (*Euproctis chrysorrhæa* L.). A further night in the Orlestone woods at Hamstreet produced two more *D. alpium* with an outsize female Privet Hawk (*Sphinx ligustri* L.), also *Tethaea* or Schiff., *Thyatira batis* L., *Notodonta ziczac* L., *Aplecta nebulosa* Hufn., *Cosym-*

bia porata L., *Semiothisa nolata* L., and *Sterrhia subsericeata* Haworth. The hot spell was over when I returned to Surrey on June 15. But when I ran my m.v. light on 19th at Virginia Water warm conditions had returned, where I noted 50 species up to 12.30 a.m. A newcomer to this locality was *Erastria venustula* Hübn. Also seen was *Boarmia roboraria* Schiff. in a dark form with *Comibaena pustulata* Hufn., *Tethea ocularis* L., and *Apamea epomidion* Haworth. Another night, near Bisley, on June 20, after a day of 79°F, brought just over fifty species, including *Apoda avellana* L., *H. pinastri*, *S. fagi*, *Geometra papilionaria* L., *Cidaria fulvata* Forst., *Eupithecia arceuthata* Freyer, *M. sexualisata*, *B. roboraria* and *Ellopiia fasciaria* L.

On June 22 under very warm conditions Mr Messenger and I set out en route for Eire which we last visited together in 1965. That night we made Tintern our headquarters with quite successful collecting in the woods overlooking the river Wye. We were favoured with four male *Drepana harpagula* Esp. which I last took there in 1964. *Abraxas sylvata* Scop. and *Cleora repandata* L. were common. Among 45 other species were *S. fagi*, *Tethea fluctuosa* Schiff., *Craniophora ligustri* Schiff., *Eilema sororcula* Hufn., *Laspeyria flexula* Schiff., *Discoloxia blomeri* Curtis, *Hydrelia testaceata* Don., several fresh *Eupithecia egenaria* H.-S., *Eupithecia fraxinata* Crewe, *Horisme tersata* Schiff., and two *Anaplectoides prasina* Schiv. The next morning unfortunately the heatwave had given way to very dull and rainy conditions when we set out from Tintern in the afternoon for Swansea, where we embarked late that evening on the car ferry Innisfallon after having surveyed some of the Gower Peninsula in the vicinity of the Mumbles. But the sea was far from kind and we had a very choppy crossing to Cork, which we reached at 7.30 a.m. with plenty of rain and wind to welcome us in Ireland. Halting at Mallow for a late breakfast, we motored on via Limerick and Ennis arriving at Lisdoonvarna about lunchtime on June 24. As in 1965 our haven was the very comfortable Imperial Hotel. That afternoon we explored our old haunts in the Burren, visiting the rough hilly country just west of Ballyvaughan where we were pleased to find *Leptosia sinapis* L. still on the wing, though mostly past its best. On the way back we called on Mr Pelham Clinton and Mr J. Bradley, who were staying at the fairly new Gregan Castle Hotel, situated at the bottom of the Corkscrew Hill on the road to Lisdoonvarna. Together with Mr and Mrs Denzil Fennell they had arrived a few days before us and were fortunate enough to come in for the last two days of the hot spell with very good collecting results, especially among the smaller lepidoptera.

The next morning, the 25th, we set our static trap up at the Ballynalacken Hotel, thanks to the kindness of Mr and Mrs O'Callaghan, and we then proceeded to the flat ground bordering the coast road. Here we flushed a good many of the large form of *Setina irrorella* L. together with several

Zygaena purpuralis Brünn, *Epirrhoë tristata* L., also some very bright and large *Polyommatus icarus* Rott. and worn *Cupido minimus* Fuessl. The afternoon we penetrated inland to the district round Corofin which is studded with small lakes. Here we found the Transparent Burnet quite numerous, while the bog myrtle was well patronised by larvae of *Orthosia gracilis* Schiff. in tents of all sizes. Also on wing was that most attractive little Pyrale *Pyrausta sanguinalis* L. As the evening turned fairly mild and still, we ran our portable m.v. light in a hollow near the coast below Ballinalacken, a spot which had served us well five years previously. Up till 1 a.m. no less than 60 species of macros were noted. Of the early arrivals there was a short run of *Deilephila porcellus* L. which was followed by a number of *S. irrorella* males and quite a procession of the delightful little geometer *Perizoma blandiata* Schiff. A couple of fine *Plusia bractea* Schiff. were fairly late-comers together with *P. festucae* L. Other species worth recording included some very dark *Caradrina blanda* Schiff. *Diarsia brunnea* Schiff., pale *Aplecta nebulosa* Hufn., *Hemitea aestivaria* Hübn., *Cidaria fulvata* Forst., *Eupithecia distinctaria* H.-S., *E. subumbrata* Schiff., *E. absinthiata* Clerck, *Cleora lichenaria* Hufn. and a great variety of *Cleora repandata* L. June 26 was so wet that we did not go out till the afternoon when we visited Ballyvaughan where Wood Whites and Burnets were once more on the wing with many *Aphantopus hyperanthus* L. We saw *P. sanguinalis* L. again, very difficult to follow on the rocky hillside which also harboured several nests of *Eriogaster lanestris* L. mostly with nearly full-fed larvae. We attempted night operations on the coast but a gale got up and our only visitors were some *Hepialus humuli* L. of both sexes. We went over again to the lake area near Corofin on the afternoon of the 27th where a few late *Euphydryas aurinia* Rott. were still flying with many *Maniola jurtina* L. and some further very bright *P. icarus* Rott. For the remainder of our stay we concentrated on the very wooded ground lying a few miles inland known as Cooncloose near Kilfenora. On the 28th we found both *Z. purpuralis* Brünn. and *Z. filipendulae* L. well on the wing in this attractive locality. *E. lanestris* larvae were also here in strength. On June 29 this area yielded the first *Argynnis aglaia* L. with the males much brighter than those normally seen in England or Scotland. Ringlets, Meadow Browns and Speckled Woods were in plenty and we also flushed an occasional *Epirrhoë tristata* L. The last day of June produced a deluge so that no collecting was possible till after dark, when we once more ran our light in a sheltered spot down the hill from Ballinalacken Castle. We again saw most of the species we had noted our first night, including *P. bractea* Schiff. and *S. irrorella* L. as well as *Peridroma porphyrea* Schiff., *Thyatira batis* L. and *Plusia pulchra* Hübn.

The second half of the year started finer but very blustery when we motored to the coast at Doolin and picked a lot of

Silene maritima which was inhabited by a lot of *Hadena capsophila* Dup. and a few *Eupithecia venosata* F. but we could not detect any *Hadena caesia* Schiff. Later on July 1 we revisited Clooncoose where one of the open glades was alive with *A. aglaia*, a few *L. sinapis* with many Ringlets and Meadow Browns. Our final day in the Burren was spent at Ballyvaughan, where we collected some full-fed *E. lanestris*. We had our last night by the coast once more and saw nearly thirty species up to 12.30 p.m., the only newcomer being *Apamea sublustris* Esp. We also collected a lot of heads of the Wood Valerian which turned out to be full of larvae of *Epithecia valerianata* Hübn. which soon all pupated. We had run our trap at the Ballinalacken Hotel on seven nights, but apart from the first two nights the results were very disappointing. The nights of June 25th and 26th both only produced forty moths among which were *Deilephila porcellus* L., *D. elpenor* L., *Laotoë populi* L., *Hadena nana* Hufn., *Plusia pulchrina* Hübn. and *Hepialus velleda* Hübn.

On July 3 in rather cloudy but mild weather we set out for Killarney, having abandoned a tentative visit to Galway and Mayo owing to the very unfavourable conditions. We reached that famous resort in the afternoon and made the Muckross Hotel our haven. I had last stayed there in 1956 with the late Eldon Ellison, but compared with that occasion we found the hotel and, in fact, the whole area deserted of tourists. Fortunately, we were given facilities to run our static trap at the back of the hotel to very good advantage, while we were also lucky in getting permission to collect after dark in the Kenmare Demesne which we first sampled on the night of our arrival, seeing 65 species up till 1 a.m. We placed our light just off the route usually followed by the jaunting carts where there was a big growth of holly and yew which had proved so prolific in 1956. At dusk we came upon quite a flight of the tiny geometer *Perizoma blandiata* Schiff., many of which also patronised our sheet later on. Among other early arrivals was a single *Eustrotia bankiana* F. (*argentula* Hübn.) to be followed by quite an influx of *Bomolocha fontis* Thunb. Another welcome visitor was *Perizoma taeniata* Steph. with one at the big m.v. light and a further example at the Heath trap set well among the yews. Other species of note on this very productive occasion were several *Tethea fluctuosa* Hübn., a couple of the large *Stauropus fagi* L., a huge female *L. populi* L., also *Notodonta dromedarius* L., *Atolmis rubricollis* L., *Leucania pudorina* Schiff., *Abraxas sylvata* Scop., *Eupithecia subumbrata* Schiff., *E. plumbeolata* Haworth, *E. pulchellata* Steph., *Ligdia adustata* Schiff., *Cleora lichenaria* Hufn. and a large assortment of *C. repandata*. July 4 turned out a much better day though we only penetrated after lunch as far as Ladies' View without seeing anything special on the wing. A second evening in the same spot in the demesne provided another good harvest, though not quite as rich as on the previous night. *P. blandiata* was again

numerous at dusk and we saw one more *P. taeniata* as well as several somewhat dark *Scopula immutata* L., with *Thyatra batis* L., *Ectropis consonaria* Hübn., *Nudaria mundana* L. and *Geometra papilionaria* L. The morning of the 5th we motored over to Glenbeigh for lunch at the Towers Hotel, where we had stayed in 1962, then back via Glencar and Lough Caragh. That night saw us once more in the demesne, this time on the neck of land carrying the road that divides the two large lakes, but it was not nearly such a good night or productive locality, as only just over thirty species were noted, among which further *B. fontis*, *T. fluctuosa* and *E. consonaria*, as well as a large female *S. fagi*. *Polia nebulosa* Hufn., in a very pale form. *Perizoma alchemillata* and the usual concourse of *C. repandata* L. Our last morning, of July 6, was spent in the demesne among the yews which we tapped assiduously in the hope of flushing the little *P. taeniata*, a *modus operandi* which had been so successful in 1956 and was not in vain on this occasion, as we saw quite a number dashing off mostly out of reach, but only three found their way into our nets. The verges of the woods and long grass were abounding with *Maniola jurtina* L. and *Aphantopus hyperanthus* L. That afternoon we revisited the high ground above Ladies' View, where we found *E. bankiana* F. still fairly numerous together with *Jaspidia pygarga* Hufn. (*fasciana* L.) and *S. immutata*. En route we had examined the old birches lining the main road and found several empty pupa cases of *Aegeria scoliaeformis* Borkh. protruding from the larval burrows. Our final night in the demesne, again in the yew and holly region, turned out quite prolific. Among 38 species seen, by far the most outstanding was a couple of *Deileptenia ribeata* Clerck (*abietaria* Schiff.) apparently according to Mr Baynes (1964), a great rarity in Ireland, which had never been observed in the Killarney district and only previously known from Cos. Wicklow, Leix and Kildare with its last Irish record in 1944. We had a further singleton *P. taeniata* at our light, also a *Plusia bractea*, many *C. lichenaria*, with several *B. fontis*, *L. adustata* and a couple of *T. fluctuosa*.

As already mentioned, we ran our static trap the four nights at Muckross Hotel with quite phenomenal results. The first night saw in it just over 500 individuals, comprising 77 species of the macros and a total for the short period of nearly 1500 moths of just on 100 species. Possibly the most noteworthy visitors were three *Eilema deplana* Esp. which had only been recorded from Killarney and was last seen there in 1944 according to the 1964 list. Both the Elephant Hawks (*D. elpenor* and *D. porcellus*) were fairly prevalent. Among the Notodonts were several *S. fagi*, also *Notodonta ziczac* L., *Pheosia tremula* Clerck, *P. gnoma* F. and a female *Harpyia furcula* Clerck. *Arctia caja* L. was quite numerous, as also were both the Ermines (*Spilosoma menthastri* L. and *S. lutea* L.). Among the noctuids the numbers of *Agrotis exclamationis* L. and *Apamea monoglypha* Hufn. outstripped all others.

Among the more notable of this Family was a single late *Apatele alni* L., *Peridroma porphyrea* Schiff., *Hadena contigua* Schiff., *Eumichtis adusta* Esp., *Graphiphora augur* F., *Apamea epomidion* Haworth., *Leucania straminea* Treits., *Anaplectoides prasina* Schiff., *Polia nebulosa* Hufn., *Pyrrhia umbra* Hufn., *Unca trigemina* Werneberg, *Plusia bractea* and *B. fontis*. The geometers were represented by *Abraxas sylvata* Scop., *Lygris populata* L., *Cleora lichenaria* Hufn., *P. blandiata* Schiff., *Bapta temerata* Schiff., *Eupithecia plumbeolata* Schiff., *E. subumbrata* Schiff., *Chlorochystis coronata* Hübn., *Ellopia fasciaria* L., and a late *Gonodontis bidentata* Clerck.

We set out from Killarney early on July 7, a glorious day with the thermometer in the 70's and, travelling via Mallow, Lismore and Dungarvan we reached Tramore in the afternoon and revisited Ballydwane Cove near Bunmahon, which had proved so productive in 1965 and again in 1968, when Mr Messenger was on his own. This very sheltered spot did not disappoint us either on this occasion. Of forty species seen up till 1 a.m. the more interesting were a fresh example of *Hadena caesia* Schiff. and several *H. capsophila* Dup., also a couple each of *Agrotis trux* Hübn. and *Ammogratis lucernea* L. besides *Philudaria potatoaria* L., *Malacosoma neustria* L., *Plusia bractea* Schiff., *Pseudoperpna pruinata* Hufn., *S. immutata* L., *Gnophos obscurata* Schiff., and *Chiasmia clathrata* L.

On July 8 we left the Grand Hotel at Tramore and after a stop for lunch at Waterford we made for Rosslare, where we put up at the newly built Great Southern Inn, but it was far too wet and windy to try the sandhills after dark. The following day, the 9th, we crossed over to Fishguard, arriving about 3 p.m., and proceeded via Carmarthen to the Gower Peninsula, staying the night at Langland Bay in the very well-appointed Osborne Hotel. After dark, we ran our light in a very sheltered car park situated in a valley between wooded cliffs at Caswell Bay. I had marked it down on a visit in 1967 as a most propitious-looking locality which provided us with 45 species up till 12.30 a.m. *Abraxas sylvata* Scop. was especially numerous, as also was *C. repandata* L. The two Golden Y's (*Plusia iota* L. and *P. pulchrina* Hübn.) appeared with *Lophopteryx camelina* L., *Miltochrista miniata* Forst., *A. prasina* Schiff. and the geometers *Cidaria fulvata* Forst., *Lygris pyraliata* Schiff., *Anaitis plagiata* L., *Ligdia adustata* Schiff., and *Eupithecia haworthiata* Doubl., also a large female *Hepialus humuli* L. was nearly the last visitor. The following morning, July 10, in very wet conditions we headed into Swansea and on across the Severn Bridge to Chippenham and Castle Combe for lunch, eventually reaching Surrey after what had proved to be a very enjoyable and, on the whole, successful trip with two weeks in Eire.

On my return my first outing was on July 12 to Alice Holt Forest with a temperature of over 80°F. In spite of arriving at an early hour *Apatura iris* L. was already flying

at the top of the higher trees, though an occasional one swooped low, especially the females which were already on the wing. *Thecla quercus* L. was plentiful, and there were a few *Limenitis camilla* L. That afternoon *Plebeius argus* L. was in great plenty on Chobham Common. The 13th saw me once more at Lucas Green near Bisley, where my light attracted 55 species including *Hyloicus pinastri* L., *Drepana binaria* Hufn., *Eilema complana* L., *Apamea scolopacina* Esp., *Lygephila pastinum* Treit., *Laspeyria flexula* Schiff., *Parastichtis suspecta* Hübn., *Sterrrha sylvestraria* Hübn., *Xanthorhoë quadrifasciaria* Clerck., *X. unangulata* Haworth, and *Bupalus piniaria* L. I revisited Alice Holt on the 16th, with the Rev. Anthony Harbottle and his eldest son. Again, in spite of less sunny conditions, the Purple Emperors obliged us with quite a good display round the treetops even in the afternoon. After another very warm day on the 17th, some fifty species came to light in my sister's garden at Virginia Water among which were several *Leucania pudorina* Schiff., *Cosmia pyralina* Schiff., *Apatele megacephala* Schiff., *A. leporina* L., *Nycteola revayana* Scop., *P. suspecta*, *X. quadrifasciaria* Clerck and *Ellopiia fasciaria* L.

On July 18, a further very fine day, I set out for East Suffolk, which I last visited in 1966. Travelling via Colchester and Ipswich I reached Southwold in the early evening, putting up at the Randolph Hotel nearby at Reydon which had been my haven on several previous occasions. That night saw me and Mr H. E. Chipperfield on the edge of the fresh marsh at Walberswick where a wartime pillbox still stands. It was mild and muggy and insects came flocking to the light at once. In fact it turned possibly the best night for numbers I have had in this region with no less than 95 species up till 1 a.m. One of the most unusual combinations was having a Goat Moth (*Cossus cossus* L.), and the Leopard (*Zeuzera pyrina* L.) on the sheet together. Besides a female *L. populi* L., the only Hawkmoth, *P. potatoaria* L. arrived in plenty soon after dusk with several *Comacla senex* Hübn., and *Phragmatobia fuliginosa* L. Among the many noctuids were a number of *L. straminea* Treits., and *Arenostola phragmitidis* Hübn. together with *Apatele leporina* L., *Hadena suasa* Schiff., *Cucullia asteris* Schiff., *Graphiphora augur* F., *Pyrrhia umbra* Hufn., *Plusia iota* L., and *Zanclognatha cribrumalis* Hübn. The geometers provided many *Eupithecia succenturiata* L., *Chlorclystis coronata* Hübn., *Philereme vetulata* Schiff., a rarity in Suffolk, *Euphyia unangulata* Haworth, *Chesias rufata* F., *Cidaria fulvata* Forst., *Scopula imitaria* Hübn., *Eupithecia linariata* Schiff. and *E. haworthiata* Doubl. A notable absentee was *Nonagria neurica* Hübn., which only appeared a week later. A very dull and wet day greeted me on the 19th when I went to Thorpe-ness in the afternoon, but when later that day it was my night venue with Mr George Baker, insects flocked to our light. The operations opened with a remarkable influx of *Lygephila pastinum* Treits to be followed by many *P. potatoaria* L. and

some fifty other species until just after midnight. These included several *Comacla senex*, *M. neustria* L., *Euproctis chryssorrhæa* also *Coenobia rufa* Haworth, *Leucania straminea* L., *L. pudorina* Schiff., *X. unangulata*, *Z. cribrumalis*, *Pyrrhia umbra* Hufn., *Procus literosa* Haworth, *Cidaria fulvata* and *E. succenturiata* L. The morning of July 20, a very warm one, we spent searching local poplar trunks for *Sesia apiiformis* Clerck, of which there were many emerged pupa cases, but almost on the last tree we looked at was a newly hatched female. That evening very little came to light on a marsh on the outskirts of Southwold. During my three nights in this area Mr Baker very kindly let me run my static trap in his garden at Reydon. It attracted just on 600 moths comprising some 80 species. Among the visitors were several very big *Sphinx ligustri* L. as well as *L. populi* L., *P. potatoria*, *Euxoa tritici* L., *Hadena lepida* Esp., *H. bicolorata* Hufn. (*serena* Schiff.), a couple of *H. compta* Schiff., *H. suasa* Schiff., *Apamea ophiogramma* Esp., *Polia nebulosa* Hufn., *C. rufa*, *Thalpophila matura* Hufn., *L. flexula* Schiff., *Cucullia umbratica* L., *Plusia iota* L., *Philereme undulata* L., *Crocallis elinguaris* L., *Itame wauaria* L., and *Bupalus piniaria*. On July 21 I made my way back to Surrey via the Breck area, where I searched a number of patches of *Silene otites* in vain for larvae of *Anepia irregularis* Hufn. A large lucerne field in full bloom harboured very few Whites. On the 23rd, Mr Michael Tweedie paid me a visit and we went over to Alice Holt in the afternoon and once more several *A. iris* were still flying. Also a lot of *Theclis quercus* L. In the Petworth area on the 24th many Ringlets and Meadow Browns were on the wing.

On 26th July I flew to Nice on the Riviera and thence motored into Spain returning on 11th August with General Sir George Johnson. The following evening Mr George Woollatt ran his large m.v. light in his garden near Chobham. Just 40 species of the macros were noted. There had been a big summer emergence of *Harpyia furcula* Clerck and half a dozen of these Kittens arrived on the sheet like small bullets, together with several Ruby Tigers also *Pterostoma palpina* Clerck, *Notodonta dromedarius* L., *Coenobia rufa* Haworth, *Cosmia affinis* L., *Eupithecia linariata* Schiff., *Deuteronomos fuscantaria* Stephens, and *Hepialus sylvina* L. Some very warm weather was prevalent in the middle of August when I paid a further visit to the New Forest on the 18th, staying again with Admiral Torlesse. In spite of a downpour that evening quite a concourse appeared at our lights in Rhinefields especially of *Lymantria monacha* L. and *Eilema deplana* Esp. Among the few Geometers were *Cosymbia linearis* Hübn. and *Semiothisa alternaria* Schiff. which also appeared in my host's trap at Sway. Many insects also graced Mr A. Russwurm's trap in Brockenhurst and once again there were several Sallow Kittens. The weather conditions were very unfavourable on the 19th when I went to see Mr Gilbert Nixon who has just come to live near Rhinefield House. Many pupae of *Polygonia*

c-album L. were hanging on a batch of nettles and also parts of his greenhouse, and it was most encouraging to learn that he had recently seen several ab *valezina* of *Argynnis paphia* L. together on a bramble clump in his garden. August 21 saw me once more in Kent on a late summer visit with headquarters at Appledore, where I ran my static trap to very good advantage. The evening of the 22nd Mr Michael Tweedie accompanied me to collect at Dungeness where we had as usual a number of Grass Eggars of both sexes to light with several Ruby Tigers and *Epirrhoë galiata* Schiff. Very little of note was on the wing in the Folkestone district on the 23rd, but at night I saw a number of insects at light by the Military Canal at Appledore including Elephant Hawks and Drinkers, also *Eilema griseola* Hübn. Running the static trap the three nights produced over seven hundred moths including some 450 on the 23rd. There were a good many *Arctia caja* L. with several *Nonagria sparganii* Esp. also *Arenostola pygmina* Haworth, *Amathes sexstrigata* Haworth, *Amphipyra berbera* Rungs and *A. pyramidea* L., *Caradrina ambigua* Schiff., *Plusia festucae* L., *Catocala nupta* L. and *D fuscantaria*. I travelled back to Surrey on a very fine and sultry day stopping en route on the downs near Gomshall where I met Mr Russell Bretherton and we were pleased to find a number of *Hesperia comma* L. still flying, as it had had a very good comeback in several of its old haunts. There were quite a number of *Lysandra coridon* Poda on the wing with *Polyommatus icarus* Rott. and *Aricia agestis* Schiff. I was at Shoreham in Sussex on the 26th. Chalk-hill Blues were still in fair plenty with a number of fresh ones and also a very promising emergence of *Lysandra bellargus* Rott. More warm weather ended the month when I went, on the 29th, to the Hague to attend the International Ornithological Congress which lasted the subsequent week till 6th September.

The first fortnight of September was far from propitious with very cool and windy period when little profitable collecting was carried out nor was anything special on the wing when I stayed with my relations near Blandford on the 12th. However, a very marked change began during the second half of this month and welcomed Mr Bretherton and myself when we motored to our favoured part of South Devon at Hope Cove on 18th September, a very warm day. In fact it turned out one of the most glorious weekend periods I can remember at this time of the year with daily temperatures in the 70's. The following morning we walked down Soar Mill Cove in the direction of Salcombe, where many *Aglais urticae* L. were flying on valerian with a large number of Whites, mostly *Pieris napi* L. and *Pararge aegeria* L. The afternoon we visited the sandhills at Bantham where we found a bower of ivy smothered with Red Admirals and accompanied by a couple of Painted Ladies. A further superb day greeted us on the 20th with the thermometer at just 80°F when we walked over the downs near Bolt Tail where many fresh *Pieris napi* and *P. aegeria* were to be seen, but searching under rock spurrey along a wall failed to

yield any larvae or pupae of *Hadena barrettii* Doubl. and it was surprising that no full-fed larvae of the Fox Moth were sunning themselves on the cliffs. That evening we went over to Slapton to visit Mr Geoffrey Cole who set up two Heath traps in his garden besides his static mercury vapour one which later that night attracted a couple of *Eupithecia phoeniceata* and in the morning he found a huge *Convolvulus* Hawk at rest on one of his windows nearby. Our final day in this delightful region was also spent with Mr Cole at Slapton along the undercliff which was alive with *Pyrameis atalanta* L., *P. cardui* L., *A. urticae* L., the three common Whites and even *P. icarus* Rott. and *Heodes phlaeas* L., but there was no sign of Clouded Yellows. Our static trap run as before outside the Cottage Hotel at Hope Cove attracted just 400 insects in the four nights. Among the more interesting visitors were several *Peridroma porphyrea* Schiff. (*saucia* Hübn.), *Leucania l-album* L., *Gortyna flavago* Schiff., *Eumichtis lichenea* Hübn. and *Scopula promutata* Guen, also single examples of *Rhizedra lutosa* Hübn., *Amathes glareosa* Esp., *Antitype xanthomista* Hübn. and *A. flavicincta* Schiff. as well as quite a visitation of *Plusia gamma* L. on the last two nights. This usually very prevalent insect had been hitherto very scarce. We had searched local ivy bloom after dark, but it was virtually deserted. We set out from Devon early on 22nd September on yet another grand day and made our way via Bridport, Dorchester and Ringwood to the New Forest where tried in vain for larvae of *Cosymbia orbicularia* Hübn. on sallow in a spot where it used to be fairly common. Later that day we continued our journey back to Surrey after a very enjoyable sojourn in the south-west.

The last week of the month was still favoured with summer weather with just over 80° F registered on the 28th, but conditions deteriorated at the start of October. However, they improved when I joined Mr and Mrs J. A. C. Greenwood at Swanage on the 9th for what was virtually the last long-distance venture of the season. That night produced a couple of *Lithophane leautieri* Boisd. to Heath lights placed under some large macrocarpa trees, while the static trap, set also in this vicinity, attracted several more of this species which seems to be increasing its range rapidly in the south of England. *Leucania l-album* L. was once more well to the fore with *G. flavago* and *E. lichenea*, also *Aporophyla nigra* Haworth and *Omphaloscelis lunosa* Haworth. Our second night did not produce any more *L. leautieri*. After I had returned to Surrey on 11th October the warm spell again set in and a number of insects came to light at Virginia Water the next night, including *Tiliacea aurago* Schiff. and *T. citrigo* L. The rest of October was on the whole very mild and sunny, but providing a distinct paucity of autumn insects. November too was congenial with very few frosts. Our final operations of the season saw me and Mr R. Bretherton on the down at Ranmore Common on 20th November when we had a few *Poecilocampa*

populi L. to light with some *Erannis aurantiaria* Hübn. and the two Winter moths (*Operophtera boreata* Hübn. and *O. brumata* L.) but no *Ptilophora plumigera* Schiff. were forthcoming, though large numbers of this insect were seen in the Chilterns in mid-November.

Thus ended a very mixed year which started with a very late spring but eventually had a very warm and prolonged summer with a spate of butterflies at the height of the season. The Hairstreaks above all had a very prolific year, especially the Black and White-lettered (*Strymonidia pruni* L. and *S. w-album* Knoch.) which were both more abundant than they had been for a great many years. But on the negative side was the remarkable absence of most of the commoner migrant species, notably Painted Ladies and the Clouded Yellow which was virtually unrecorded in 1970. Even the Silver-Y was quite a rarity and hardly any of the normal noctuid migrants appeared.

Three Oaks Shore's Road. 5.iv.71

Problems around *Vanessa atalanta* Linnaeus

By B. J. LEMPKE

Although after the publication of Williams' classical book (1930) a considerable number of data have been collected about our migrating Lepidoptera, many problems still remain to be solved. There is hardly any species the complete history of which is exactly known. A good example of this is offered by *Vanessa atalanta*. Its life history during the summer months was already described more than two centuries ago. But for the rest hardly any progress has been made.

First there is the question of overwintering. Is the Red Admiral capable of doing so in our latitude? If so to what extent, and have specimens observed here in winter any chance of breeding in spring? From proofs we know that there is very little chance for the butterfly to survive the period from November to May here. I shall only quote a few authors who tried to make it do so rather recently. Jacobs (1957) writes that the butterfly never really enters into diapause, it only rests. Even in strong frost it is immediately active when it is touched, and opens its wings. Specimens which do not react in that way, when they are carefully touched, are dead. All specimens, also those which hibernated in a frost-free cellar, died in the course of January and February. The author concludes that the species cannot survive the five winter months in northern Germany without taking food. It has no diapause, and is only capable of passing a rather long period of bad weather in a state of rest. The least sun beam activates it at once, even at a rather low temperature, and it is capable of flying away.

Burmam (1964) had the same experience at Innsbruck. 40 specimens placed in a dark cellar all died from mid January; none was alive at the beginning of February. But specimens of *Gonepteryx rhamni* and *Aglais urticae* remained alive under

the same circumstances.

Roer (1961), who made a thorough study of the butterfly, in September-October 1955 placed 450 specimens in a cold-storage chamber at a temperature of 3°C. Half of them were fed every fortnight after they had been brought into a warmer room. The other half was not fed and died after a few weeks. Those of the first group lived longer, but only two of them survived the winter and lived till May. If we take into account that all these trials were made under very favourable circumstances (no frost, no snow), it is clear that the chance of overwintering under natural circumstances is very small for the butterfly here. The former keeper of the insectarium of the Amsterdam Zoo repeatedly tried to bring them through in the winter, but he had never any success, although other species, like *Aglais urticae*, presented no difficulties. Newman writes (1911) that he only succeeded to overwinter *Vanessa atalanta* by keeping the butterflies in a frost-free room and by feeding them regularly.

Especially Jacob's conclusions are fully in accordance with the experience of Elliot at the Côte d'Azur, of which he gave an excellent summary in 1953. He observed that the butterfly flies the whole winter in small numbers, feeding on cultivated and wild flowers, hiding in the usually short periods of bad weather, but reappearing when the thermometer rises above 9°C. in the shade. Tutt (1897), quotes Chapman who passed the months of January and February 1897 at Cannes, and wrote that the same specimens very probably flew the whole winter in the same places, overwintering, not hatching or laying eggs, nor hiding except on dark and cold days. Mrs Muspratt (1950) noticed the same habits at St Jean-de-Luz (between Biarritz and the Spanish frontier).

From 1940 we have a continuous series of data in the Netherlands. In this period of 31 years *V. atalanta* was observed five times in December (one flying in 1942, one in a garrett in 1948, three in a hothouse in 1953 and 1954). Two were met with in January (1949 and 1962, both indoors). Eight were observed in February (partly indoors, partly flying) and no less than 69 in March, most of them flying. (On January 1926 one was seen flying over the snow at a temperature of 5°C!).

It is not easy to compare these figures with the British ones. Captain Dannreuther composed the reports from 1931-1950. He did not always state the figures for the first three months of the year separately. In French's reports (1951-1965) we do find them, but this is only a period of 15 years. The totals are: January 9 (eight of which in 1960), February 16, March 50. Plus an unknown number in 1953, mentioned in *Entomologists' Rec. J. Var.*, 65: 142, 1953. From this it is at any rate clear that the British figures are higher than the Dutch ones. But practically all observations were made in the southern counties of England, which have a more favourable climate than the Netherlands. There is no distinct

correlation between the two groups of figures.

A number of the February and March specimens were seen in or shortly after a period of fine weather with a temperature several degrees above normal. It is therefore quite possible that they had arrived with a subtropical air current. It might be interesting to compare the English early observations also with the weather conditions. I should not be surprised if here too part of them would more or less coincide with periods of temperatures above normal.

There is of course as a rule no proof whatever that specimens found indoors had been there from the end of the preceding autumn. They may have entered when a door or window was open to seek shelter from less favourable weather just as the butterflies do in southern Europe. Furthermore the winter observations (including those of March) seem to be a group in themselves. They are nearly always separated by a period of two or more weeks from the April ones when the normal series of observations begins. The British reports also often show a rather long period between the two groups. So far there is no proof that the February or March specimens will live long enough to reproduce at the end of April or the beginning of May.

I think we may conclude at present that some of the autumn specimens try to overwinter here and there may be a small possibility of success, the same as with *Autographa gamma*, caterpillars of which are found sometimes in the Netherlands surviving the winter even in periods of frost and snow.

Remigration. Of all migrants *Vanessa atalanta* has shown most return flights in the Netherlands. There are only few years without any observation of them. They are of course most numerous in years of abundance (1950, 1959, 1961, 1964, 1966). But even in the poor year 1970 there was one observation. Most cases were seen in the second half of August, but especially in September and the beginning of October. It is principally the autumn brood that remigrates, not the summer one. Specimens belonging to the latter generation and recognizable by some feature, were sometimes observed for several weeks on or near the same spot.

It is unknown where all these southwards flying specimens go to. Roer (1961) tried to throw some light on this problem by marking more than 1700 specimens in August-October 1957-1960 and releasing them in the neighbourhood of Bonn. The results were very poor. Only three specimens were caught back at some distance (5, 16 and 16 km), all SSW of the place where they had been liberated, but 10, 13 and 2½ days afterwards. Several specimens remained in the vicinity and were regularly seen on a field of single dahlias. Roer concluded that the southward flights are of little importance for the species. But it is not necessary that our remigrants reach the shores of the Mediterranean. As Johnson (1969) points out in his magnificent book it suffices if only part of them reach a territory where they can survive. And it is quite certain that

specimens from central France or still more southward reach such places. The same holds good for specimens crossing the Alps.

But Dr Roer did more. If, he said, *Vanessa atalanta* reaches us in spring from the south, there must be localities where it is so common that they can furnish the migrants. He therefore visited in the spring and autumn of 1956-1959 many places on the southern and northern shores of the Mediterranean, but failed to find such localities. There were of course Red Admirals, but never in great numbers, and nowhere could an inclination for northern flights be detected in the spring. All this led him to the conclusion that *atalanta* is not a migrant at all, but that our summer and autumn generations are the descendants of the winter survivors.

I do not think that this conclusion is correct. The normal Dutch spring generation develops as follows. It is as a rule observed from the second half of April till the end of June (and flying stragglers often still in July), it is rare in April (one or a few per day with gaps between), in May a little better and gradually with less gaps, but the peak (as a rule only a small one!) is sometimes reached about 10th June, not seldom however only in the second half of the month. But this is not in accordance with the conduct of a true hibernator! *Aglais urticae* e.g. is most seen on fine days in April and gradually disappears in the course of May. Elliot writes (1953) that he never saw *atalanta* from June till September, but every October a number came from somewhere and remained in the garden (at Cavalaire-sur-Mer, Var). This points to the possibility that the species emigrates there.

Autumn migrations of *Vanessa atalanta* across the Pyrenees from France to Spain are well-known, but so far we have no information about spring migrations in the opposite direction. Mrs Muspratt (1946) camped in the Hautes-Pyrénées from 27th June-15th July 1946, but she only mentions *Colias crocea* and *Autographa gamma*. This period is however much too late for the observation of spring migrations of *Vanessa atalanta*, if there are any in this part of the Pyrenees. Marten (1956) gives a list of species he saw migrating in Spain. Among them is the Red Admiral, but there are no particulars.

According to the literature there are many places in South-Europe and North-Africa where the butterfly is uncommon. But locally this is not always so. Fletcher (1904-1905) writes that it is "common throughout the year" in Malta. Roell (1953) found it common in the Sierra Alfacar near Granada in June 1952, Smith (1953) in October 1951 at Bellver on Majorca. Johnson (1944) found *atalanta* very common near Sulmona in Central Italy, only in January it failed completely. And probably other communications may be found in literature.

Moreover the species must migrate in spring in such small numbers that it is as a rule hardly possible to see anything of it. I know of only one observation in the Netherlands. On 24th June 1956, 16 specimens were seen on the island of

Terschelling (north of Friesland) flying in a north-eastern direction. Interesting are also two specimens caught on the lightship Noord Hinder (about 70 km west of Flushing) on 15th June 1957 and 15th June 1958. (Gibbs—in Williams *et al.*, 1942—mentions the species from eight out of ten English lightships, a number which it only shares with *Pieris brassicae*, *P. rapae* and *Autographa gamma*, all well-known migrants). No doubt the summer generation may also be reinforced by immigration from the south, as is proved by an observation of about 3000 specimens passing in nearly two hours near Zaandam (north-west of Amsterdam) on 26th August 1950 and flying in a northern direction.

The yearly totals strongly fluctuate both in the British Isles and in the Netherlands. But the differences between the two countries are very striking. The British totals are often much lower than those of the Netherlands as may be seen when we compare the figures for the period 1960-1965.

	1960	1961	1962	1963	1964	1965
British totals	3,700	940	610	323	6,500	580
Netherlands totals	9,500	18,700	7,000	2,800	135,000	2,300

This is the more striking as the number of British cooperators is much larger than that of the Netherlands and as the climate of the British south coast is decidedly milder than the Dutch one.

Elliot is of opinion that *V. atalanta* can only safely overwinter in localities where also the olive tree can grow. One of the first things we must try to find out is if this is really true. It is a pity that so little is known of the habits of the species in Spain. Manley and Allcard (1970) in their otherwise fine book only dedicate four lines to the species plus two for the caterpillar. There is not the slightest indication about the degree in which the butterfly was met with.

Every spring the immigration must take place in a broad front ranging from West to East Europe and yet hardly anything is known about the origin of all these specimens. I can only indicate the gaps in our knowledge. But I hope that they will gradually disappear through the cooperation of the lepidopterists interested in such problems.

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The Moths of Wimbledon: Further Captures 1962-1970

By J. V. DACIE, M.D.

In 1962 I recorded in the *Entomologist's Record* (**74**, 109) a list of 300 species of moths (macrolepidoptera) taken in Wimbledon in the 6 years 1956-61. The majority were caught in a mercury vapour trap run in my garden while a few species were taken on Wimbledon Common which is about $\frac{1}{2}$ mile away. Between the two is a residential area in which most of the houses have large gardens. The present communication lists 52 additional species taken between 1962-70 and brings the total of personally taken species to 332.

The nomenclature and order of arrangement in the following list are those of Heslop (1964).

SPHINGIDAE: 1 species

Hyloicus pinastri L., 1 only, 12.7.70.

NOTODONTIDAE: 1 species

Notodonta ziczac L., 1 only, 22.5.65.

THYATIRIDAE: 1 species

Polyploca ridens F., 1 only, 7.5.62.

LYMANTRIIDAE: 1 species

Euproctis similis Fuessl., 1 only, 9.8.70.

ARCTIIDAE: 1 species

Cybosia mesomella L., 1 only, 30.6.68.

ZYGAENIDAE: 1 species

Zygaena filipendulae L., Wimbledon Common, 16.7.63.

NOCTUIDAE: 11 species

Euschesis interjecta Hübn., 1 only, 9.8.70.

Panolis flammea Schiff., several, 1965-66, 1968.

Leucania pudorina Schiff., several, 1963-64, 1967.

Apamea sublustris Esp., 1 only, 28.6.64.

Cosmia diffinis L., several, 1966-67, 1970.

Agrochola lota Clerck, several, 1962-63.

Agrochola macilenta Hübn., several, 1970.

Citria lutea Stroem, 1 only, 21.9.63.

Ectypa glyphica L., Wimbledon Common, 1962.

Plusia pulchrina Haw., several, 1963-70.

Rivula sericealis Scop., several, 1968-69.

GEOMETRIDAE: 15 species

Sterrhia emarginata L., 1 only, 16.7.67.

Rhodometra sacraria L., 1 only, 11.9.66.

Xanthorhoe ferrugata Clerck, several, 1964-68.

Xanthorhoe designata Hufn., 1 only, 13.5.64.

Perizoma flavofasciata Thunb., 1 only, 10.6.65.

Philereme transversata Hufn., 1 only, 16.7.64.

Chesias legatella Schiff., 1 only, 13.10.70.

Anaitis plagiata L., several, 1969-70.

Hydrelia flammeolaria Hufn., 2 only, 1969-70.

Eupithecia millefoliata Rössl., 2 only, 16.7.61, 24.7.67.

Eupithecia castigata Hübn., several, 1963, 1965-66.

Eupithecia fraxinata Crewe, 1 only, 14.6.65.

Ectropis biundularia Borkh., 1 only, 6.9.70.

Ectropis crepuscularia Schiff., 1 only, 29.4.70.

Ematurga atomaria L., several, Wimbledon Common, 11.6.62.

Of the above 32 "new" species 19 were recorded as being found in Wimbledon or Wimbledon Common by de Worms (1954-57) in his *Moths of London and its Surroundings*, Parts I-V and in the Supplements to these lists published in 1959 and 1960; 12 of the records, however, refer to insects listed in the 1898 *List of London Lepidoptera* compiled by the City of London Entomological Society.

Another interesting list of Wimbledon Moths has been

made available to me through the courtesy of Mr L. J. M. Wakely. This list comprises the species caught by his father Sir Leonard Wakely between 1910 and 1959. Out of 212 species, 17 have not been taken by me. It may be added perhaps that in de Worms's list there are a further 49 species not yet caught or observed by me in the Wimbledon area. Again, however, 25 of these species have not been recorded subsequent to 1898 and a further 9 species not since 1905. Adding these figures together the total number of species, past and present, recorded from Wimbledon practically reaches 400. 332 in my lists, 17 additional species taken by Sir Leonard Wakely, and 49 further species listed by de Worms, 34 of which are old (pre-1905) records. How many of the insects not noticed since near the end of the last century persist in the area is a matter of speculation. Many, unfortunately, seem likely to have disappeared for good.

In my earlier report (1962) I estimated that the number of species still to be found in the Wimbledon area was unlikely to exceed 350. The last 9 years' experience tends to support this contention. That well over one-third of the total species of macrolepidoptera in the British List (Heslop 1964) have been noted in the Wimbledon area in the last 15 years is, nevertheless, quite remarkable, bearing in mind the progressive urbanization of the district and the closeness of Wimbledon to the centre of London. Fortunately, Wimbledon Common, and adjacent Putney Heath and Richmond Park, still, no doubt, act as valuable reservoirs from which species can spread into the gardens in the neighbouring built up areas.

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A Model for Temporal Sub-speciation

By R. L. H. DENNIS

This note is in appreciation of Mr G. Thomson's recent article on the same subject (antea: 87). I felt it might be useful to construct a model for temporal sub-speciation on current genetic theory, and it seems, on the face of it, that this is both possible and feasible. I hope then, that this note will provide a basis for any research into the subject, as well as explaining certain aspects of the whole phenomenon.

The main features of Mr Thomson's article were—firstly, the tendency towards a reduction in numbers in the univoltine brood in late August and early September, and the emergence of a second brood as a bivoltine inclination post that date; and secondly, the four major series of features (morphological) connected with the second brood which distinguish them from the usual series; these can be absorbed in the model.

The initial feature is the long flight period of *Maniola jurtina* (L.) (Satyridae), which is as he states occasionally from late June into the middle of October on the Isle of Wight. The model and the whole hypothesis demand a break in this sequence; an isolation barrier to divide a sympatric species into allochronic sections giving rise to sub-speciation. This can arise in the form of selective pressures operating in the middle of the flight period, which in the case of the Isle of Wight population would be slightly asymmetrical on the temporal scale (late August/early September). The whole process, however, can result initially as a genetic extension of a gaussian occurrence, assuming that the frequency of emergence in the flight period approaches this pattern. Certain specimens may occasion to emerge late via a random genetic endowment, and may, by mating continue the trend, but this would depend on a number of factors which need not concern us here. However, for the two broods to separate, as it were, a selection barrier preventing the continuum is essential. For speciation, an extension of the theory, a complete barrier to gene flow must develop, or be built up in the genome of either brood.

The model proposed here depends, or makes the initial assumption that the emergence time is governed by a series of loci and alleles, whether closely linked or not. In fact, though one would suspect more in reality, as many as two alleles for two loci may be utilized for our purposes here, since with increasing either of these, the simple model given becomes overcrowded cartographically.

With 2 alleles and 2 loci, nine genotypes are available. If this was to be extended to 3 loci, then 27 genotypes would be available and with 4, 81 genotypes, and this without altering the number of alleles, so it is evident, that with increasing the number of alleles and/or loci, a hoard of genetic variability is made available.

The genotype numbers are easily calculated from:—

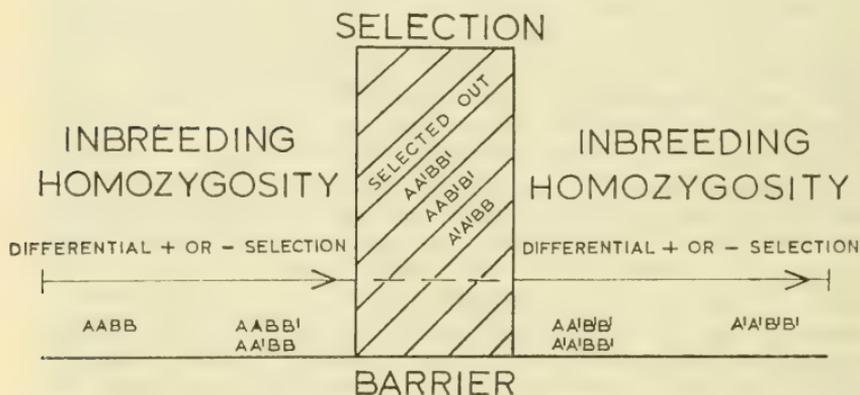
$$\text{Genotypes } N = n(n+1) \quad n = \text{alleles}$$

$$\frac{2}{2}$$

and with L loci, NL genotypes.

So, in our model, if we take 2 loci A and B with two alleles A/A¹ B/B¹ (without dominance effect, as with this small number of alleles and loci it would alter the results considerably) and allot to A and B early emergence, and to A¹ and B¹ late emergence, the system can be built up whereby there is selection against the intermediate genotypes, as indicated in the diagram, Fig. 1.

MODEL FOR TEMPORAL SUB SPECIATION



Selection, then, operates against A¹A¹B¹B, AA¹BB¹, AAB¹B¹, and A¹A¹BB in the model. The important function of the isolation (selection) barrier is that by separating two groups, it leads to inbreeding in the two allochronic populations, which in turn leads to homozygosity. Any intermediate values that these two broods produce will be eliminated, whilst if the late series produce 3 early facets, or in the early series 3 late facets, then these will add to the gene pool of the other, and avoid the barrier. In other words, gene flow does occur but operates to 'purify' the two broods. Of course in this simple 2 allelic/2 loci system, the end series contain so few a number of variables, that they cannot produce three facets that determine the other brood.

i.e., AA¹B¹B¹ × A¹A¹BB¹ can only give AA¹BB¹, AA¹B¹B¹, A¹A¹BB¹, and A¹A¹B¹B¹; the first of which ends up in the selection barrier and the final 3 in the late emergence category, from which they originated.

It will also be readily apparent that the two populations

now to a certain extent isolated may also be under different selective pressures themselves; quite different from the original selective barrier hypothesized. Two things might be happening in conjunction or separately. Either the features that are associated with the late emergence (such as smaller size, fulvous more extensive, UN considerably darker and more striate, and a smaller apical spot in the ♀) are part of the genetic endowment that distinguish the two groups temporally—I mean that the genes are pleiotropic in effect and that the genes for late emergence also affect other (morphological) differences—; or there is a second selective demand on the genome of the temporal populations that affects the frequency of certain genes also pleiotrophic for morphological characteristics. Finally both of these pressures may be operating in unison. It is interesting to reflect that both *Eumenis semele thyone* Thompson and *Plebejus argus caernensis* Thompson emerge earlier than their respective species colonies elsewhere in Great Britain, and are also significantly smaller. The important feature of the barrier is that the single brood no longer adjusts itself to the demands of the environment of the whole flight period, but is now separated into bivoltine units each deme separately adapting itself to the same spatial but temporally differential conditions.

A situation may also occur, unlike the negative pressures postulated on the bivoltine series above, but where the end ranges of the emergence sequence are favoured,—I mean in respect of the flight period without the selection barrier. However, even if this was so, it would still require some deleterious selection in the mid part of the range to allow the segregation of the two broods.

Of course this simple model leaves many questions unanswered. Among them, how many alleles and loci are operative, and what are the selection pressures? It is easy to see that with few loci, the effects of dominance, close linkage *et cetera* will have a profound effect on the model, and so with 2 loci, such a model would face severe difficulties. But with the geometric increase of genotypes, which can be calculated from the simple method I gave earlier, then with 4 loci/2 alleles, the amount of genetic variability would give the considerable range of divergence for the model to operate, even in the face of Mendelian offsetting or enhancing effects.

As for the selection pressures, these must be analyzed in the field. This population on the Isle of Wight differs by some factor(s) from other populations there. Perhaps the interesting point is not just the fresh late emerging specimens inclining to a second brood, but also the reduction in numbers that 'may or may not occur' at the end of August and early September. If this does indeed reflect on heavier selection in this period, through the multiple, as it were, we can follow the situation in the diagram. It will be interesting to see, as Mr Thomson points out, the numerical data associated with these

changes over a few years. It seems that with the close similarity in morphological changes associated with the late brood that a reasonably uniform mechanism is the cause of the phenomenon. It would be valuable to collect environmental data from these and surrounding colonies, from the macro scale of lithology, climatic data and notes on available food-plants *et cetera* in case these indicate effective forces; to detailed work on the differences through the flight period in the insects themselves.

It must be obvious by now, that there is a further possibility. The selection may not be in the mid part of the flight period at all, but may operate as selective selection on certain genotypes in the larval stage say; and the genotypes removed may be pleiotropic for the selective factor and mid flight emergence; i.e. the mid flight period emergence types (controlled by certain genotypes) may also be susceptible to selection pressures of a different nature much earlier in their existence, effecting the same genotypes. So it is wise to remember that in the diagram it is the *effect* of the selection barrier in the mid part of the flight period, though the selection itself may be operating at some other time of the year on a different stage of metamorphosis. On this note, the subject may for the moment be closed.

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A Review of the Butterflies of the Bristol Area

by A. D. R. Brown

(continued from p. 108)

Argynnis paphia Linn. (Silver Washed Fritillary)

Although the Silver Washed Fritillary is on the decline generally in the rest of the country, the signs are most encouraging in West Gloucestershire. Its potential in the Forest of Dean is tremendous, and we know of several good sightings from the areas around Monmouth. The situation is the same along the wooded areas of the Cotswold Hills, and we are just beginning to discover new haunts where it had previously been overlooked. In the Nature Reserve at Wetmoor, it is seen in most years but is not common.

Individual specimens have been seen from time to time at several places in North Somerset, but its future prospects do not look so good. It is probable that many of these isolated specimens have originated from the deciduous woodlands near Tickenham, but the M5 motorway development scheme has recently devastated this region. Once again, Goblin Combe is another well known locality for this species, but its numbers vary from one year to the next.

Argynnis aglaia Linn. (Dark Green Fritillary)

This species is more widely distributed than the previous one owing to the larger areas of its habitat. In places such as Dursley and Wotton-under-Edge in the Cotswolds, it is seen most years, but its numbers appear to vary. We know of many more localities in North Somerset, especially in the Mendip Hills where it is particularly fond of the rough marshy pastures around the deserted lead mines. Occasionally, extreme melanic specimens have been captured here, but none have been taken in recent years. Goblin Combe provides another ideal habitat for the Dark Green Fritillary, and this butterfly is seen here in strength every year. During 1970 some superb dark females were observed, not unlike sub-species *scotica* from northern Scotland. Reports are frequently received of observations from the coastal stretches near Brean, as well as from the hills behind Clevedon. We rarely find records or discoveries of new localities, since most of our material is repetitive from one season to the next. As far as can be made out the status of this species is somewhat static at this time in the West of England.

Argynnis cydippe Linn. (High Brown Fritillary)

The only locality known at present in either of the two vice-counties is Goblin Combe in North Somerset. It is extremely likely that the High Brown Fritillary occurs in the Forest of Dean and various other places, but a good deal of work in this line has yet to be done. It is highly probable that many of our records of the Dark Green Fritillary (*Argynnis aglaia* Linn.) have been mistaken for this species, as this confusion commonly arises. In Goblin Combe itself, it is quite scarce and never more than three specimens have been recorded on any one occasion. This butterfly certainly needs all the protection it can get, and the problem is by no means a local one.

Vanessa atalanta Linn. (Red Admiral)

Many reports are received each year usually of individual specimens, but 1964 and 1969 stand out conspicuously, owing to the immense numbers of these butterflies which were observed during the late summer and autumns of those years. Clumps of Michaelmas Daisies and other plants were literally covered with them, and they stayed with us right up into the middle of November. It is worth noting that sightings of specimens seen on the wing during the early summer are seldom sent in, and so the apparent abundance now and again in the autumn brood may be due to the fine hot summer months of those years.

Vanessa cardui Linn. (Painted Lady)

Being also a regular migrant, the Painted Lady followed the example of the previous species and was especially abundant during the latter parts of 1964 and 1969. However, in

contrast we received many more reports of spring sightings, especially groups of butterflies moving northwards during May. These observations were concentrated from the North Somerset coast and along the Severn Estuary to Crook Peak, inland from Weston-super-Mare. On the whole, this species does not stay on the wing as long as the Red Admiral (*Vanessa atalanta* Linn.), since we have no reports from mid-November.

Aglais urticae Linn. (Small Tortoiseshell)

The Small Tortoiseshell butterfly, although common in most years, reaches a peak now and again during which time specimens have been counted in their hundreds. 1964 was one such year when it was probable that a third generation took place; in mid-September no fewer than 150 individuals were noted at Blagdon Lake in North Somerset, where they were visiting Water Mint flowers on the shore.

In 1968 a similar occurrence took place, and the butterflies 'swarmed' everywhere during the second generation. Earlier in the year larvae were to be found in profusion, and several good aberrations were bred from collected wild stock. Specimens remained on the wing throughout the autumn, and the last one was recorded from Charfield in Gloucestershire on 24th November.

Undoubtedly these peak emergences are due to the extra long fine hot summers experienced in those years.

Nymphalis io Linn. (Peacock)

This species too appears to be capable of sudden peaks, although judging from our records this phenomenon is far less frequent. It was observed fairly commonly throughout the 1960's, but was likewise affected by the hot summer of 1968. However, it was nothing like as plentiful as the Small Tortoiseshell (*Aglais urticae* Linn.) and the maximum number counted on any particular day was about fifty.

Nymphalis antiopa Linn. (Camberwell Beauty)

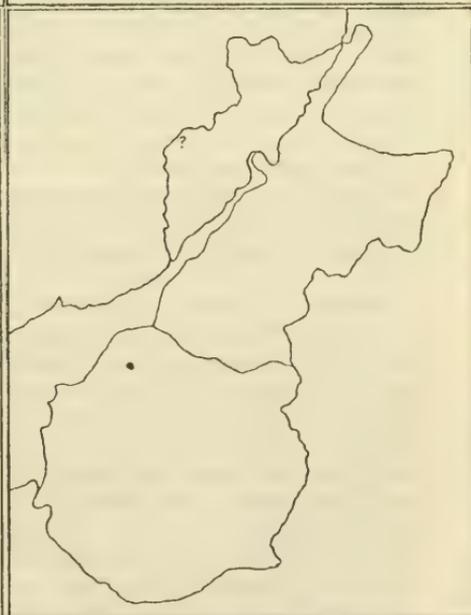
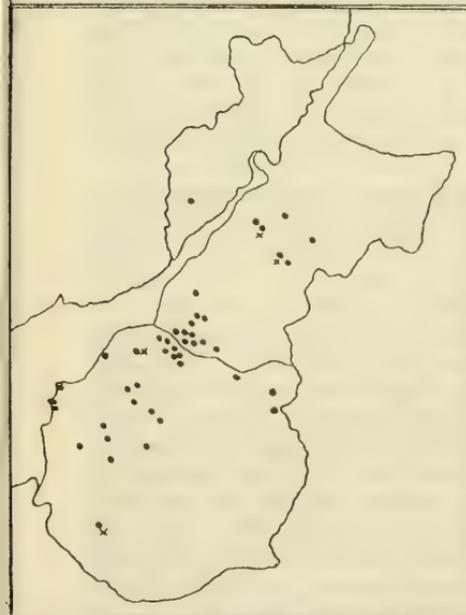
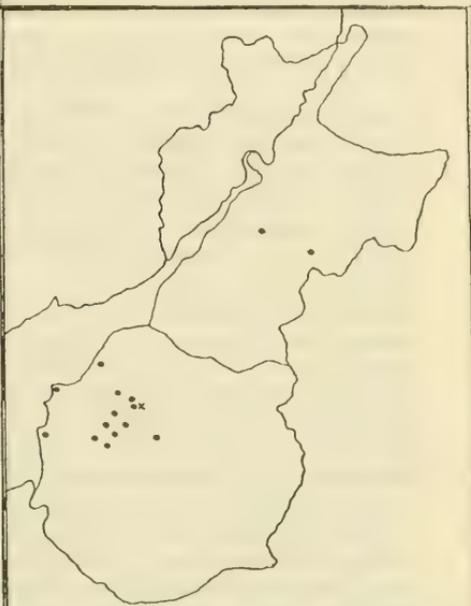
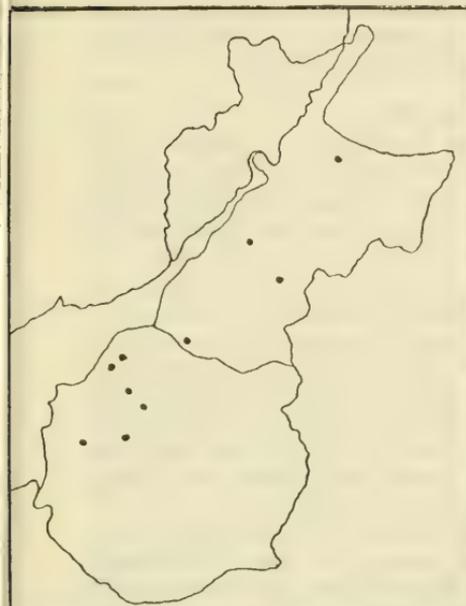
In 1966 we were fortunate enough to receive a report of this rare migrant from Scandinavia, when we heard that a single specimen had been found in a mercury vapour moth trap at Winscombe in North Somerset. This incident took place on 25th September, and it is of interest to note that there was a dense fog in the air that night, the visibility being down to fifty yards.

Polygonia c-album Linn. (Comma)

The status of the Comma remains practically constant at present, but fortunately, as in other parts of Britain, its distribution is increasing. This species is never common, and on average only one or two specimens are seen at a time. Occasionally, however, considerable numbers are met with, such as at Wetmoor in Gloucestershire on 17th April 1968, and again in Goblin Combe on 29th July of this year. In the Bristol area,

Argynnis paphia L.
(Silver Washed Fritillary)

· *Argynnis aglaia* L.
(Dark Green Fritillary)
x *Argynnis cydippe* L.
(High Brown Fritillary)



· *Polygonia c-album* L.
(Comma)
x *Limenitis camilla* L.
(White Admiral)

Apatura iris L.
(Purple Emperor)

the first specimens usually appear on the wing in early April following hibernation, and these then deposit their ova giving rise to the first generation in July. It is the butterflies from this first generation possessing the pale undersides that are known as ab. *hutchinsoni*. From August onwards the second generation is on the wing, and these may be around until late in October when they finally go into hibernation.

Limenitis camilla Linn. (White Admiral)

The White Admiral occurs in two places in each vice-county, but its survival is severely threatened. At Michael Wood in Gloucestershire it is still quite common, although the greater part of the original deciduous forest has been eradicated, as mentioned earlier. However, if steps are taken to protect the remaining habitat, there may still be a chance of keeping the species up to its previous strength. The conifer plantations here owned by the Forestry Commission, look quite mature now and could be felled at any time. This would mean clearing the undergrowth and brambles before widening the forest tracks, and this action would immediately exterminate the butterfly from this locality. About eight miles away at Wetmoor, the White Admiral is fortunately protected from such dangers, but it is by no means so plentiful.

The M5 motorway development scheme is also taking place in North Somerset, and a large portion of the Tickenham ridge near Clevedon, where the White Admiral is known to occur, has been blasted out by explosives, thus severing the hill completely in half. The damage that this has caused to the local flora and fauna has not yet been estimated, or whether this species has suffered. Down on the Somerset moors around Shapwick, an isolated specimen was observed a number of years ago, but no further records have been received since that time.

There are certainly many unexplored areas around the Bristol district where this butterfly might occur, and in particular the Forest of Dean.

Apatura iris Linn. (Purple Emperor)

Up until 1969 we had no reports whatsoever concerning this magnificent species, until the late Mr I. R. P. Heslop informed us that he had re-discovered it at one of its old haunts in North Somerset after a gap of fifty-one years. Due to the isolation of this habitat it is presumed that the Purple Emperor has survived there all this time, but has obviously been previously overlooked. The author visited the locality again this year, but no butterflies were seen. The area in question is quite inaccessible in places, where large oaks and other deciduous trees grow on the sides of a steep valley. Vertical cliffs protrude from the valley sides and these are adjacent to some deserted quarries, mostly overgrown. For some distance around the thick oak forest spreads out until the boundaries of the Forestry Commission's plantations take

over. From this it can be seen that the Purple Emperor could be flourishing anywhere within this region, and it is just a question of finding the master oak (or oaks).

There appear to be very few dangers to its future existence, the only real threat being the gradual encroachment of the Forestry Commission.

Up in Gloucestershire, the Purple Emperor used to be found at Symond's Yat near Monmouth, but has not been observed there in recent years. It is most likely, however, that it occurs elsewhere in the Forest of Dean at the present time. The author also has in mind one or two places east of the River Severn, but no systematic observations have yet been made.

(to be continued)

The Highlands: April 1971

By R. G. CHATELAIN and B. F. SKINNER

We arrived at Struan at 6.30 on the morning of Easter Monday, 12th April, and within an hour had gathered a fresh series of *Lycia lapponaria scotica* Harr. of both sexes. The posts also yielded females of *Agriopis marginaria* Fab., *Achlya flavicornis scotica* Tutt. *Colostygia multistrigaria* Haw., a cocoon of *Cerura vinula* L. and, as a bonus, four fresh specimens of *Cleora cinctaria bowesi* Rich. This seemed a surprisingly early date as the bug would hardly have been out in its southern localities. Scotland was enjoying unusually warm weather and at Aviemore the usual selection of skiing outfits was enlivened by a few hardy souls in bathing suits and hot pants. In the afternoon on Granish, males of *Endromis versicolora* L. were flying with *Archiearis parthenias* L. and an early *Semiothisa carbonaria* Clerk.

That night we decided to let the static traps work for *Brachionyca nubeculosa* Esp. and to concentrate on the Scottish form of *Orthosia populeti* Fab. Accordingly, the portable lamps were set up in an aspen grove near Inshriach and we left to work the shallows south of Aviemore. These produced a fair number of moths, including *Orthosia incerta* Hufn. and *O. gothica* L. in great variety and several of the silvery-grey form of *Cerastis rubricosa* Schiff. The geometers were represented by *Tricopteryx carpinata* Borkh., some of them heavily banded, and plenty of *C. multistrigaria*, all past their best. On returning to the lamps, we were disappointed to find only one *O. populeti*, although five males *B. nubeculosa* were a pleasant sight. Next morning, the static traps situated to the north and south of Aviemore contained two more *nubeculosa* and many *Lycia hirtaria* Clerk., their ground colour ranging from white to deep yellow.

On 13th April, we returned to Struan for a further eight *C. cinctaria*, all within a restricted area. That night was cold, the thermometer at ground level registering -3°C and the only moths in the traps were a few *C. rubricosa*. Sallowing at

Rannoch was somewhat more profitable and produced one of the very few *O. cruda* we saw, as well as several *Xylena vetusta* Hübn. Next morning, the Aviemore traps yielded one each of *O. populeti* and *Panolis flammea* Schiff., a few *Ectropis bistorta* Goeze, *A. flavicornis* and the usual *Orthosias*, etc.

Much of our time by day was spent in pinpointing promising willow bushes but on a return visit to Granish we again saw *E. versicolora* and found a cocoon of *Phragmatobia fuliginosa borealis* Staud. on the heather. That night, we tried willows to the north of the village and were pleased to note about twenty *O. populeti*, some of them worn, one *P. flammea*, five female *Chloroclysta miata* L., several *Lampropteryx suffumata* Schiff. and one *Anticlea badiata* Schiff. The lamps at Inshriach attracted four more *populeti*, three *nubeculosa* and the usual visitors. The static traps fared badly and apart from a male *E. versicolora* contained little of interest.

Thursday, 15th April, was our last day and after loading the car, a mammoth task, we departed for Struan where only one *C. cinctaria* was found and most of the *lapponaria* had vanished. Willowing that night at Rannoch yielded both sexes of *vetusta* and several *L. suffumata* including a female ab. *piceata* Steph. which was kept for eggs. A second *piceata*, this time a male, was taken from willows at Tummel Bridge in company with seven *O. gracilis* of the attractive local form. Although the lamps had been left nearby, apart from a male *Odontotia carmelita* Esp. and one *P. flammea*, they produced little of note.

We ceased operations at 1.30 a.m. and were home for lunch.

Notes and Observations

EUPROCTIS CHRYSORRHOEA HÜBN. (LEP. LYMANTRIIDAE)
LARVAE IN N.W. KENT.—A considerable but localised colony of these caterpillars was found at Dartford on 18th May 1971. More than a dozen apple and hawthorn trees and numerous small bushes, some completely defoliated by the half-grown larvae, were festooned with their nests. The infestation appears to be confined to both sides of a stretch of road on the chalk high ground East of the Darent valley. Visits to the Dartford and Stone marshes have failed to reveal colonies there, but a hawthorn alongside the same road in the vicinity of Darenth Wood contained two nests.

For the present century there are only two casual records of the moth for N.W. Kent, and none for the larva. This extension of range which will doubtless be temporary even in the absence of local council intervention, is interesting, for although *E. chrysorrhoea* is notorious for sudden increases in larval population and temporary territorial expansion in S.E. England, from as far back as 1800 there seems to be no record of colonies being observed further West than Gravesend on the Southern side of the Thames estuary.

It may be worth recording that in June 1970 at Dungeness the larvae were in extraordinary abundance and devastated the vegetation, mainly composed of shallows, blackthorn, hawthorn and bramble, over a wide area. What was the state of the species in its other haunts in the country, I wonder?—B. K. WEST, 36 Briar Road, Bexley, Kent.

A SOUTH AMERICAN BUTTERFLY IN DORSET: While preparing a member of Weymouth West Scout Troop for his Natural History badge, I heard that his grammar school friend, Robert Smith, had taken an unusual butterfly in a rough, sloping meadow bordering the Fleet, on 23rd August 1970.

I was able to borrow the specimen, which was a little damaged, but fairly well set in the same style as Smith's other set specimens. As I could not identify the insect, I took it to Mr Douglas E. Dodwell at Yeovil, who identified the butterfly as *Hypanartia lethe* Fabr.

I am informed by Mr T. G. Howarth of the British Museum (Natural History) that this species is widely distributed in Central and South America from Mexico to the Argentine, where the larvae have been recorded feeding on *Celtis spinosa* Spreng. and other *Celtis* species (Ulmaceae), also upon *Boehmeria caudata* Swarz.

He also tells me that they have in the museum a specimen presented by Mr R. L. E. Ford which was taken alive in Covent Garden market on 17th October, 1935.

How this second specimen of *lethe* reached South Dorset will probably remain a mystery. I know of no one in this area who imports larvae or pupae of this species, so it is unlikely to be an escapee.

I am greatly indebted to Mr Howarth and Mr Dodwell for the help they have given.—V. W. PHILPOTT, F.R.E.S., 122 Wyke Road, Weymouth, Dorset.

THE POSSIBLE OCCURRENCE OF ARGYNNIS CYDIPPE L. (LEP.) IN KINTYRE.—Whilst on holiday with my family in Scotland, we stopped on 18th August 1969 for lunch between Crinan and Tayvallich, very near the northernmost point of Loch Sween, and only about 50 yards from the Loch itself. I noted on the wing *Pararge aegeria* L., *Erebia aethiops* Esp., *Aglais urticae* L., *Vanessa atalanta* L., *Lycaena phlaeas* L. and one very battered fritillary. The last named was flying in a damp, marshy field, resting occasionally on thistle heads, and although not taken, was assumed to be *Argynnis cydippe* L.

However, reference to the provincial Atlas of Insects of the British Isles—Butterflies, reveals no record of *cydippe* in Scotland, a fact of which I was unaware at the time, and this would suggest that the insect was, in fact, *A. aglaia* L., even though this species also is not recorded for Kintyre. Nevertheless, I still feel certain that I saw *cydippe*, but clearly the record needs confirmation or otherwise, and anyone in the area this summer could make a useful contribution to the Atlas by

searching the locality.—A. J. SHOWLER, 12 Wedgwood Drive, Hughenden Valley, High Wycombe, Bucks. 24.v.1971.

It is regretted that unavoidable delays have rendered this note too late for this year, but readers should note it for attention next season. Ed.

COSMOITES FREYERELLA HÜBN. (NIGRELLA HÜBN. NEC FAB.) (LEP. ELACHISTIDAE).—During the early months of 1969, I was rearing a batch of grass-feeding Noctuid larvae, on a diet consisting largely of *Poa*. Some time in April a very small cocoon appeared on the nylon stocking which was being used as a covering for the rearing container. The cocoon was rather broad and flat and consisted of a fairly substantial sheet of silk, which was nevertheless sufficiently transparent to allow the light rust-brown pupa to be easily seen through it.

Although I searched amongst the uneaten food I was unable to find a mined grass-leaf which could have been the former feeding place, and I assumed that one of the Noctuids had devoured it. The moth emerged in May 1969, leaving the pupa skin in the cocoon (not protruding from it).

During September 1969 I found a similar cocoon on the underside of a dock (*Rumex*) leaf, which produced a moth a few days later. Further cocoons appeared amongst other grass-feeding batches of larvae in the early months of both 1970 and 1971, from which a few moths appeared. The cocoons were always constructed at the top of the rearing container, either on a piece of nylon stocking, or on a firm metal lid, the same kind of cocoon being constructed on both the hard and the soft materials.

Elachista species are generally reputed to pupate without a cocoon, the pupa being supported merely by a silken pad at the tail together with a silken girdle (like the Pierids) and one wonders whether any other members of the genus *Cosmoites* are cocoon-makers.

My thanks are due to Lieut. Col. A. M. Emmet for having identified the moths, and for assisting with the nomenclature.—J. L. GREGORY, 17 Grove Road, St. Austell, Cornwall. 11.v.1971.

CORRIGENDUM.—In my article on collecting on the Riviera and in Spain (*antea*: 34) for some unaccountable reason some errors have crept into the list of Lepidoptera recorded.

Line 5 from top should read "*Clossiana dia* L. a few flying at Coussols.", while in line 12 from the top, in place of *Erebia pluto* a second time it should read "*Erebia gorge* Hübn. In smaller numbers near Col de la Bonette."—C. G. M. de WORMS, Three Oaks, Woking. 16.v.1971.



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Museum of Entomological Materials of Historic Interest.—I have formed a small museum of entomological materials of historic interest, including items of early collecting equipment, photographs and curiosities. Among the objects that I particularly desire to locate are examples of the *Clap Net*, *Umbrella Net* (cord and pulley operated), old *Oil and Acetylene Collecting Lamps* (not bicycle or pressure lamps), and old photos of collectors and entomological apparatus. If anyone has any such items they think might be of interest, I should be glad if they would kindly communicate with me.—J. M. Chalmers-Hunt, 1 Hardcourts Close, West Wickham, Kent.

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K. G. W. Evans, Chairman, Entomology Section, 31 Havelock Road, Croydon, CR0 6QQ.

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THE ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

Edited by S. N. A. JACOBS, F.R.E.S.

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The Systematics of the Charaxidae (Lepidoptera: Nymphaloidea)

By A. H. B. RYDON, F.R.E.S.

(c/o Williams & Glyns Bank Ltd., Kirkland House, Whitehall,
London, S.W.1)

The family Charaxidae was erected in 1886 by William Doherty for five species of Indian butterfly, namely *Charaxes fabius* (Fabricius), *Ch. kahruha* Moore (= *lunawara* Doherty), *Ch. polyxena hemana* Butler, *Polyura* (not *Eulepis*) *athamas* (Drury) and *P. eudamippus* (Doubleday). The family is listed as Name No. 284 in the *Official List of Family-Group Names in Zoology* (Second Instalment, 1966), but whether or not it should be maintained as a separate family-group of the Rhopalocera is a matter of opinion. Some modern authors (e.g. Aurivillius, 1911; Stichel and Bryk, 1939) have treated the Charaxidae as a subfamily (i.e. "Charaxidinae") of the Nymphalidae (*sensu* Doubleday and Westwood, 1846-52); while others, such as Fruhstorfer and Röber (1916) and Fox *et al.* (1965, *Butterflies of Liberia*), have instead demoted the family to a tribe (i.e., "Charaxidi" or "Charaxini") of the subfamily Nymphalinae (*sensu* Butler, 1869; Kirby, 1871). However, since the Charaxidae differ markedly from the other Nymphaloid families, not only in the early stages and the morphology of the adults but also in their habits in the field (*qq.v.*), I propose to treat them here as a separate family on a par with the Satyridae, Danaidae, Acraeidae, Ithomiidae, and so on, placing them with the latter families in the superfamily Nymphaloidea (which comprises all those butterflies with a suspended pupa, and with only four ambulatory legs in the adults, the forelegs being reduced in both sexes and not used for walking). Alternatively, the Charaxidae can equally well be treated as a separate family of the superfamily Papilionoidea (*s.l.*), in the same way that Klots has done with some of the Nymphaloid families in his *Field Guide to the Butterflies*, 1951.

Doherty, incidentally, was not the first systematist to have separated the Charaxidae from the other Nymphaloid families. Linnaeus (1758, *Systema Naturae*, 10th ed.) for example, instead of placing the two members of the Charaxidae known to him at the time, i.e., *Papilio pyrrhus* (No. 24) and *P. demophon* (No. 36), in his phalanx "Nymphales" to which they rightly belonged, placed them, because of their size and shape, in his "Achivi" (Achaeans) which were a subdivision of his phalanx "Equites" (Knights) to which the Swallowtail butterflies also belonged. Stoll (1782), however, in his essay on the systematics of the butterflies, separated from the latter's "Equites" most of the members of the Charaxidae that he and Cramer had figured and described in their *Papillons Exotiques*, and placed them in his own family "Argonautes" because, as

Note.—Figs. 7-14 will appear next month.

he said, the latter had four ambulatory legs, as opposed to the six that the "Equites" or Swallowtails had; and because, unlike the "Equites", the Argonauts had the abdomen covered below by the hindwings, and veins 2 and 4 of the hindwings typically extended into tails. Jones (1791), who went by the wing-venation chiefly, expressed the opinion that the Argonauts correctly belonged to the Linnean phalanx "Nymphales", with which opinion Fabricius (1793, *Ent. Syst.*, vol. 3) seemed to agree, since he also placed the Argonauts in his own family "Nymphales", together with certain other Nymphalids, Apaturids, and Satyrids, but with *Papilio jasius* L. at the head of it. Latreille (1805, Buffon's *Hist. Nat.*, vol. 14) did much the same as Fabricius, placing *P. jasius* (which he referred to as "*Nymphalis*" *jasius*) at the head of his own "genus" "*Nymphales*" too, the latter taxon not being a genus in the modern sense of the word but rather a superfamily, since he said, on page 82, "Ce genre est divisé en trois grande familles, qui sont les Nymphales proprement dites, les nacrés, les satyres". Shortly afterwards, Fabricius (1807, Illiger's *Mag. Insektenk.*, vol. 6) created a number of new taxa ("Gattungen") for the butterflies, among them being his "genus" *Paphia* (an invalid name, by the way, because it had been used already by Lamarck for a genus of molluscs) which also represented a group of higher rank than a mere genus, since it was subdivided into four sections, two of which contained a number of the Charaxidae, and two some of the larger Limenitids and Nymphalids. Recognising this fact, Ochsenheimer (1816, *Schmett. Europa*, vol. 4) removed *Papilio jasius* from *Paphia*, and placed it instead in his own genus *Charaxes*, thus making *P. jasius* the type-species of the latter by monotypy. Owing, however, to the prior association of *P. jasius* with Latreille's genus *Nymphalis*, it was some time before the name *Charaxes* was generally adopted, such authors as Westwood (1850-2) and Kirby (1871) continuing to refer to *Charaxes* as "*Nymphalis*".

Swainson (1827), the author of the two Nymphaloid families Nymphalidae and Heliconiidae, gave *Paphia* (i.e., *Charaxes* and its allies) as an example of the strong build and powerful flight of certain members of his Nymphalidae, comparing it with the delicate construction and weak flight of the Heliconiidae, and suggested that it should be made a subfamily (i.e. "*Paphiana*") of the Nymphalidae. (But since the latter family has, in recent years, been elevated to superfamily status (i.e. the Nymphaloidea) by some modern systematists, one is now also justified in raising the Charaxidae to family rank, because they are the modern equivalent of the "Paphiana"). Boisduval (1832, 1840), on the basis of the larvae, subdivided his "Penduli" (i.e., those butterflies with a suspended pupa) into Danaides, Nymphalides, Satyrides, Apaturides, Morphides and Libytheides. In his "Apaturides" he placed *Apatura* and *Charaxes*, the larvae of which are smooth, without dorsal scoli, and armed with horns on the head, being unlike the prickly larvae of the typical Nymphalidae. Doubleday and Westwood

(1846-52) maintained most of Boisduval's families, but not his "Apaturides" which they lumped, together with numerous unrelated genera, in their family Nymphalidae based on "*Nymphalis*" *jasius* and other *Charaxes*. Since when, the Charaxidae and the Apaturidae have invariably been treated as part and parcel of the Nymphalidae by most authors up to the present day, although these three families actually have very little in common. Now that Hemming (1933, *Entomologist*, vol. 66, p. 225) has fixed *Papilio polychloros* L. as the type-species of *Nymphalis* Kluk (1802) which has priority over *Nymphalis* Latreille, the Nymphalidae no longer primarily represent the Charaxidae but rather the Vanessidae of Butler (1869). If the Nymphalidae are made to include the Charaxidae, the Apaturidae, and other Nymphaloid families, it becomes impossible to define, except in the broadest of terms. Of the latter, Barcant (1970, *Butterflies of Trinidad and Tobago*, p. 53) says, "Adequate description of the family as a whole is impossible. It is highly diversified and badly in need of reclassification. It seems to me, for instance, that nothing could possibly justify a common family classification between the tiny flower-seeking Dynamines and the powerful, fruit-sucking Preponas, irrespective of what their body and wing structures may be like. Their habits and habitats are too diverse"

The need for splitting up or subdividing the Nymphalidae or the Nymphalinae of the above authors into smaller and more manageable taxa had, however, been recognised for many years by various authors. For example, Denis and Schieffermüller (1775), in accordance with their dictum, "Ein Aug auf den Schmetterling, das andere auf die Raupe" (one eye to the butterfly, the other to the caterpillar), divided the Nymphaloid butterflies of the Vienna region by the larvae into six families, namely: "Papiliones Nymphales Gemmati" (Satyridae); "P. Versicolores" (Apaturidae); "P. Maculato-fasciati" (Limenitididae); "P. Angulati" (Vanessidae); "P. Nobiles" (Argynnidae); and "P. Variegati" (Melitaeidae). No doubt they would have created a family for the Charaxidae, too, if *Charaxes jasius* had occurred in their faunal region! Herrich-Schäffer (1864), this time mainly on the basis of the wing-venation, divided the Nymphaloid genera into Heliconina, Danaina, Brassolina, Biina, Hetaerina, Satyrina (two groups), Elymniina, Ragadina, Eurytelina and Nymphalina. The latter family he subdivided into a number of groups, placing most of the Charaxid genera known to him in his "*Protogonius-Agrias*" group. Butler (1869, *Cat. Diurn. Lep.*) subdivided the Nymphalinae of Bates (1864, *J. Ent.*) into ten groups, namely: Nymphalides (which contained some of the Neotropical Charaxidae); Apaturae (containing *Apatura*, *Charaxes*, and various other Charaxid and Nymphalid genera); Limenitides; Catagrammae; Timetides; Vanessides; Epicaliae; Adoliades; Diadema (in which, oddly enough, he placed the two Charaxid genera *Agrias* and *Godartia*!); and the Argynnides. Doherty

(1886, p. 107) expressed his dissatisfaction with the Nymphalinae of systematists such as Kirby (1871), saying that this family-group presented a confused mass of many genera, the relationships of which *inter se* were extremely vague and uncertain. He suggested that the eggs should be studied with a view to a better understanding of the true relationships of the genera, since the wing-venation, though well and easily defining a particular genus, only very imperfectly expressed the relationship in which it stood to other genera. On the basis of the eggs, Doherty split the Nymphalinae into three families, the Apaturidae, Charaxidae, and the Nymphalidae. His "Apaturidae", however, were based on "*Apatura*" (*Hypolimnias*) *bolina* (which is a Vanessid or Nymphalid, not an Apaturid), and his "Nymphalidae" on "*Nymphalis*" (*Limenitis*) *populi*; hence his "Apaturidae" represented the Nymphalidae in the modern sense, and his "Nymphalidae" the present-day Limenitididae (or Limenitidinae). Doherty was of the opinion that *Charaxes* (which had smooth globular eggs, with obscure ribs and cross lines at the apex only) seemed to connect the Nymphalidae (with their longitudinally ribbed, conical eggs) to the Limenitididae (with their spiky faceted, dome-shaped or rounded eggs).

Clark (1947), however, said the larvae appeared to offer the most dependable basic characters for the primary subdivision of the Nymphaloidea, dividing them into three main groups: (1) those that are spineless and usually fusiform (the Satyridae, Brassolidae, Morphidae and Apaturidae); (2) those that are spiny and cylindrical (the Marpesiidae, Nymphalidae, Ergolidae, Argynnidae and Acraeidae); and (3) those that are cylindrical but provided with "pairs of long fleshy filaments" (comprising the Danaidae). On the basis of the larvae he made the Charaxidae a subfamily of the Apaturidae; but the eggs of *Charaxes*, as already stated above, are globular and smooth with a fluted depression on top, while those of *Apatura* are somewhat conical and longitudinally ribbed (see Frohawk, 1924, *Nat. Hist. Brit. Butts.* pl. 29, fig. 1); so that, on the basis of the eggs at least, the Charaxidae do not belong with the Apaturidae. On the other hand, Ehrlich (1957, 1958), on a comparative study of all "major areas of the integumental anatomy" of the adults of some 300 species of butterflies, made the Charaxidae a subfamily of the Nymphalidae (*s.l.*), giving it equal rank with the Ithomiinae, Danaeinae, Satyrinae, Nymphalinae, and others. But since many modern authors still maintain family status for most of Ehrlich's subfamilies, it is reasonable to maintain similar rank for the Charaxidae, also. Aurivillius (1911), when he erected his subfamily "Charaxidinae" for the African members of the group, made no attempt to subdivide it into tribes; nor did Ehrlich (1958), who simply said that no tribal division of the Charaxinae was suggested at the time. The main purpose of this paper, therefore, is to try and fill this gap in the systematics of the butterflies, since, to my knowledge, no other author to date

has done so.

Schatz and Röber (1892), on the bases of the early stages and the morphology of the adults, added the following genera to the Charaxidae, originally comprising the two genera *Charaxes* and *Polyura* Billberg: *Euxanthe* Hübner and *Palla* Hübner (both of which are Ethiopian genera), as well as the Oriental genus *Prothoe* Hübner which Semper (1886-92, *Die Schmetterlinge der Philippinischen Inseln*, pp 76-78) had earlier placed in his "Pseudo-Nymphalis" group, adjacent to the "Charaxes" group, of the Nymphalinae (*sensu* Kirby). In addition, Schatz and Röber placed the following Neotropical genera among the Charaxidae: *Siderone* Hübner, *Zaretis* Hübner, *Coenophlebia* Felder and Felder, *Polygrapha* Staudinger, *Prepona* Boisduval, and *Agrias* Doubleday. All the above-named genera they placed in their "Nymphalis" group of the Nymphalidae (*sensu* Doubleday and Westwood). They separated the *Anaea* group of Neotropical Charaxids from their "Nymphalis" group on the basis of the wing-venation, as well as on the larvae which, in the *Anaea* group, are covered with papillae and tubercles, and often have short simple or branched horns on the head. In the latter group they placed *Anaea* Hübner (= *Pyrrhanaea* Schatz), *Hypna* Hübner, and *Consul* Hübner (= *Protogonius* Hübner), all of which Herrich-Schäffer (1864) had grouped together with *Siderone*, *Charaxes*, *Prepona* and *Agrias* in the "Protogonius-Agrias" group of his family "Nymphalina." Reuter (1896), from a detailed study of the palps of the butterflies, also separated the *Anaea* group from the "Nymphalis" group of the Charaxidae, placing the latter in his tribe "Nymphalidi", and the former in his tribe "Anaeydi" (here referred to as the subfamily *Anaeinae*). However, Fruhstorfer and Röber (1916) recombined these two groups and placed them in their tribe "Charaxidi" Fruhstorfer (1916) added *Anaeomorpha* Rothschild to the list of the New World Charaxidae, and erected the genus *Archaeoprepona* for those species of *Prepona* with black hair-tufts in the hindwings of the males. Fruhstorfer (1913-14) also added *Agatasa* Moore to the list of the Old World Charaxidae, treating it as a subgenus of *Prothoe*. Stichel and Bryk (1939, *Lepidopterorum Catalogus*, parts 91 and 93) maintained Aurivillius's subfamily "Charaxidinae" for all the genera of the Charaxidae, adding to the list the African genus *Hypomelaena* Aurivillius, and the dubious genus *Phyllophasis* Blanchard (= *Sideronidia* Bryk) which is based on *Papilio galanthis* Cramer, known only from the figures in Cramer's *Papillons Exotiques*, 1775. More recently, Comstock (1961), in his monograph on the genus *Anaea*, has lumped together on phylogenetic grounds nearly all the genera comprising the New World Charaxidae (including *Siderone* and *Zaretis*, but not the *Prepona-Agrias* group of species) and has demoted them to subgenera of his "Anaea", and has also resurrected *Memphis* Hübner as a subgenus for a large group of the latter. Be that as it may, *Siderone* and *Zaretis*, should in my opinion,

be separated from the latter's "*Anaea*" group both on the morphology of the adults, and on the larvae which are quite distinctive (*q.v.*). For these reasons they were separated from the *Anaeinae* by Schatz and Röber (1892), and Fruhstorfer and Röber (1916). In this paper I propose to maintain *Siderone* and *Zaretis*, together with *Coenophlebia*, as a separate sub-family of the *Charaxidae*, intermediate between the *Prepona-Agrias* group of species on the one hand, and the *Anaeinae* on the other.

The *Charaxidae* are an outstanding group of medium to large-sized butterflies many of which are scarce in the field, and some are among the most beautiful of all the *Lepidoptera* (e.g. *Agrias claudina sardanapalus* Bates and *Agatasa calydonia* (Hewitson), to mention but two species among others). Most members of this family are robust, fast-flying insects, with a large and deep thorax and a short abdomen. They do not feed at flowers, but will readily come to exuding sap, fermenting fruit, damp and muddy places, and ordure—tastes that they share to some extent with the *Apaturids*. *Charaxes* and (according to Moore, 1899) *Agatasa* have the odd habit (like some *Lycaenids*) of jerking the hindwings up and down in contrary motion when feeding, presumably to distract potential predators from the more vulnerable parts of the body. According to various authors, all the members of the *Charaxidae* have the habit of returning frequently to their feeding places, or if not feeding, to their favourite perches (somewhat in the manner of the *Apaturids*) where the males like to bask in the sun and wait for passing females, defending their territory with great pugnacity against all intruders, particularly other males of the same species. (In Africa I have seen *Charaxes* pursuing birds much larger than themselves on the wing!) The females are more retiring than the males, but will sometimes be seen flying about their foodplants or sunning themselves on a leaf after ovipositing. They are attracted to natural exudates and fermenting fruit like the males, but not to excrement to which the males are especially partial. The females will not tolerate being mobbed by the males while feeding, but will drive them away by striking at them with their powerful wings. The *Charaxidae* have a circum-tropical distribution, being mainly inhabitants of warm rain-forests; but some are found in drier, more open country, while others prefer cooler, montane conditions. Several species occur in the temperate regions, i.e. *Charaxes jasio* in the Mediterranean Subregion, and *Charaxes pelias* Cramer and a few others in the Cape Province of South Africa; while some species of the *Anaeinae* are found north and south of the New World Tropics.

Morphologically, the imagos of the *Charaxidae* differ from those of the other *Nymphaloid* families in having veins 7 and 8 of the forewing generally much longer than their common stalk, with vein 8 curving downwards at its termination. (In *Charaxes* vein 8 ends at the outer margin below the apex of the

wing, but in the *Anaeinae* and some other genera it tends to end at the apex, or in the costa of the forewing basad of the apex). In the Ethiopian *Euxanthe* and *Hypomelaena*, and in the Neotropical *Anaeinae*, there is also a tendency for some of the subcostal veins to anastomose with the costal vein, and in some species the first subcostal vein (vein 11) is vestigial or absent. The antennae of the Charaxidae are gradually thickened to a club, the terminal four or five segments being longer ventrally than dorsally, thus giving the antennae the appearance of being rolled up at the tip. The palps are also distinctive, being, in the main, uniformly wide and strong, and in some genera (e.g. *Charaxes*, *Polyura*, *Siderone*, *Zaretis*) they are somewhat S-shaped and porrect. The relatively long middle segment of the palps (which, for example, is four times the length of the basal segment in *Charaxes*) is densely squamose, being covered with flat scales on its latero-ventral surface, and has a prominent dorsal tuft of long narrow hair-like scales at its distal end. The terminal segment is short, conical, and densely scaled. Reuter (1896), on the basis of the palps, subdivided the Nymphalinae (*sensu* Kirby) into fifteen tribes of which two, i.e. his "Nymphalidi" and "Anaeidi", comprised the present-day Charaxidae. He pointed out that there are differences between the *Anaeinae* and the main body of the Charaxidae in the shape and structure of the sensory patch (Reuter's "Basalfleck") which is located at the base of the inner side of the basal segment of the palps. In the *Anaeinae* the basal patch is variable in shape, being pulled out in its full length and obtusely rounded off or cut off at right angles in *Anaea*, *Hypna* and *Consul*, but is scutiform, or quadrate in shape in typical *Memphis* and *Polygrapha*. In *Charaxes*, *Prepona* and *Siderone*, however, the basal patch extends more distad from the base of the palp, and is somewhat elongate and conical in appearance. In *Prothoe* and *Agatasa* (which Reuter did not study) the basal patch is short, wide and oblong, being perhaps nearest in shape to *Polygrapha* than to any of the other Charaxidae. Reuter considered his "Nymphalidi" (i.e. the main body of the Charaxidae) to be more closely related to the Limenitididae than were the *Anaeinae* which were more evolved than the former. Müller (1886), from a comparative study of the early stages of the Neotropical genera, concluded that the Charaxidae were related to the Limenitididae too. The *Anaeinae*, as well as *Siderone*, *Zaretis* and *Coenophlebia* (which, as I have just said, I am treating as a separate subfamily in this paper) also differ from the other Charaxids in having, as Comstock (1961, p. 4) has pointed out, a short "ambient" vein at the base of the inner margin of the hindwing, this vein being but vestigial in the last three genera. In addition, the Charaxidae can be divided into two main groups according to whether the costa of the forewing is serrated or not. The serrated (prionopterous) group consists of *Charaxes*, *Polyura*, *Euxanthe* and *Palla*, all of which are Old World genera. None of the New World Charaxidae has a serrated

costa, nor have the Oriental *Prothoe* and *Agatasa*. Rothschild and Jordan (1898) made a detailed examination of the morphology of the prionopterous genera. One of the many points they drew attention to was the specialized type of scaling found near the base of the dorsum of the underside of the forewing, which overlaps a similar patch of scaling on the upper side of the humeral lobe of the hindwing when the insects are in flight. This specialized scaling consists of short erect or semi-erect triangular, or elongated conical, scales. In some of the Charaxidae (i.e. *Charaxes*, *Polyura*, *Euxanthe*, *Anaea*, *Polygrapha*, *Cymatogramma* and *Memphis*) these pointed triangular scales extend above vein 1 into space 1b of the forewing, as far as the fold of the wing halfway between veins 1 and 2; but in the rest of the genera (i.e. *Prepona*, *Agrias*, *Prothoe*, *Zaretis*, *Siderone*, *Coenophlebia*, *Palla*, and the two *Anaeine* genera *Consul* and *Hypna*) these specialized scales do not extend above vein 1. In this respect the first group (comprising *Charaxes* and its allies) shows a relationship with the Limenitidae, since in *Limenitis populi* (L.) the specialized triangular scales also extend above vein 1 into space 1b; while the second group (comprising the remainder of the Charaxidae) shows a relationship with the Nymphalidae (s.s.) in which, in *Nymphalis polychloros*, these scales are delimited by vein 1 and do not extend into space 1b. The above observations, therefore, support Doherty's suggestion that the Charaxidae seemed to connect the Nymphalidae with the Limenitidae.

The male genitalia of the Charaxidae are also distinctive, those of *Charaxes*, *Polyura* and *Euxanthe* differing from all the other butterfly genera in having a short broadly-bifid uncus, combined with a very long slender aedeagus, and a large shoe-horn-shaped juxta which is grooved dorsally and which forms a funnel between itself and the gnathos above it (referred to as the "penis-funnel" by Rothschild and Jordan, 1898, pp. 561-563). In the above genera the aedeagus is almost as long as the abdomen and, in cabinet specimens that have been killed by pinching the thorax, it will often be seen to be projecting from the abdomen—a sure diagnostic sign of the latter genera. In the *Anaeinae* one finds, generally, a relatively simple male genital armature, with a simple pointed uncus, and rounded or elongated valves which often have an apical hook, and a somewhat broad and relatively short, unspined aedeagus (see Comstock, 1961, for figures of the male genitalia). The male genitalia of the *Anaeinae*, and also those of *Zaretis*, *Siderone*, *Coenophlebia*, and the Oriental genera *Prothoe* and *Agatasa* (see figs. 35, 36), to a certain extent show a resemblance to some Limenitids (e.g. *Limenitis* and *Adelpha*), in which there is often a simple pointed uncus, and elongated or rounded valves, but the aedeagus of *L. populi* differs from that of the *Anaeinae* in being terminally hooked. In the *Prepona-Agrias* group (see figs. 31-34), however, one meets with a quite different arrangement in the male genitalia,

with the characteristic club-like, or spiky mace-like, subuncal projections, although in appearance the aedeagus is closer to that of the *Anaeinae* than to *Charaxes*. It comes as a surprise to find that the genital armature of *Prepona* (see fig. 33) is very similar to that of *Agrias* (fig. 34), as was noted by Fruhstorfer (1916) who separated *Archaeoprepona* (see fig. 31) from *Prepona* and *Agrias* on these differences, as well as on the colour of the hair-tufts in the hindwings in the males, which are black in *Archaeoprepona* but are yellowish or light-brown in *Prepona* and *Agrias*. The female genitalia of the above genera have not been examined by me, but according to Comstock (1961, p. 7) those of the *Anaeinae* can be used successfully in the separation of the species. The female genitalia of *Charaxes jasius* and *Palla decius* have been figured by Rothschild and Jordan ((1898, pl. 14a).

The early stages of the Charaxidae are characteristic of the family, those of some African species of *Charaxes*, *Euxanthe* and *Palla* having been described and figured in 1926 by van Someren and van Someren, and by van Someren and Rogers (1927-31); while Moore (1880-1, 1893-6) has figured the larvae and pupae of several species occurring in Ceylon and India. Shirozu and Hara (1969) have figured the egg and early stages of *Polyura eudamippus weismanni* Fritze. Müller (1886) has illustrated and described the early stages of a number of the Neotropical species—information that has been added to by d'Almeida (1922), and others. It is of interest that Stoll, as long ago as 1791, figured the larvae and pupae of *Consul fabius* (Cramer), and *Memphis leonida* (Cramer); but it should be mentioned that, owing to a *lapsus calami*, the large spiky, yellow-banded larva, purporting to be of *Papilio odilia* Stoll (see Stoll, 1791, pl. 6, fig. 3C), is that of *Papilio odius* Fabricius which is not a Charaxid, but a Nymphalid or Vanessid! The early stages of *Charaxes jasius* have been known since the end of the 18th century, and were figured by Hübner in 1811 under the name of "*Nymphalis unedonis*" (presumably named after its foodplant, *Arbutus unedo* L.!) in his *Geschichte Europäischer Schmetterlinge* (pl. 23). The early stages of *Prepona omphale guatemalensis* have been figured by Le Moulton (1932), the egg of which (see fig. 27) resembles quite closely that of *Charaxes* (see figs. 15, 16). The egg of *Siderone marthesia nemesis* Bates was stated by Müller (1866) to be almost spherical but flat on top and at the bottom, the apical plane being larger than the basal one, with the former being finely dentate round its edge. Röber (1916) quoted Fassl as saying that the eggs of *Anaea* were "globular, smoothly shelled and of a light colour"; while those of *Hypna*, according to d'Almeida (1922, p. 170), are almost spherical, measuring a little more than 1 mm. in diameter. The eggs of the African genus *Euxanthe* are somewhat similar to those of *Charaxes*, according to van Someren (1926); but the eggs of *Palla ussheri interposita* Joicey and Talbot, according to the same authors (1926, p. 251) "when first deposited are spherical, but very soon become

irregularly depressed on the top just as in eggs of certain Sphingidae”.

The larvae of *Charaxes* (see figs. 2-5, 21, 22) have two pairs of well-developed horns on the head, with two pairs of smaller, vestigial horns in between the longer ones, and a short bifurcate tail, and are closely similar in appearance to those of *Polyura* (figs. 23, 28). (It should be noted, in passing, that the first instar larva of *Charaxes* and *Polyura* possesses horns on the head, which in the case of *Ch. varanes*, according to van Someren and van Someren (1926, p. 335) “are mere tubercles when the larva has just emerged, but they are gradually extruded within the first 12 hours.” In the remaining genera of the Charaxidae, however, the first instar larva is without horns on the head, and only develops them in the second instar, as in the Apaturidae.) The larva of *Euxanthe* (figs. 6, 20) has the lower pair of horns greatly enlarged, extending outwards and upwards, with the central horns reduced in size. (As noted above, these horns are not present in the first instar, but appear in the second stage.) The caterpillars of the above genera, as far as the head-pieces go, resemble to some extent those of the Neotropical Brassolidae. The larva of *Palla* (figs. 1, 1a) is very unusual in appearance, with its single pair of large bifurcate horns on the head, and with the lateral expansion or frill (false carapace) that is chiefly developed in the region of the sixth to eighth segments, and is vaguely reminiscent of the caterpillars of certain Neotropical Charaxids such as *Prepona*, *Siderone*, and others. The caterpillar of *Archaeoprepona demophon* (L.) (see fig. 7), apart from one pair of well-developed horns on its head, has a pair of long caudal appendages. These features are found in the *Agrias-Prepona* group of species too (see figs. 25, 26), but the larva of *Archaeoprepona* is differently shaped, in that it has a false carapace extending along the dorsum from segment 4 to the anal end as in the larvae of *Zaretis* and *Siderone* (see figs. 8-10). The larva of *A. amphimachus* (Fabricius) has been figured by Müller (1886, pl. 14, fig. 6), and is shown with segments 3 and 4 hunched up and produced anteriorly (like those of *Siderone* and *Zaretis* figured here), with a false eye on either side of segment 5, thus giving it a rather fearsome, reptilian look which doubtless serves to intimidate certain predators. *Archaeoprepona* also differs from the *Agrias-Prepona* larvae in having the horns on the head widely separated (figs. 19, 24). The larva of *Zaretis itylus* (Westwood) (see fig. 8) is somewhat like that of *Siderone marthesia* (Cramer) (see fig. 9) and *S. nemesis* (Illiger) (see fig. 10). The latter two species of *Siderone* are considered to be conspecific by some authors, but it can be seen from the caterpillars that they are not. The larvae of *Zaretis* and *Siderone* resemble more closely the *Archaeoprepona-Agrias* species than the *Anaestinae*, but differ from the former in having a pair of spiky terminally-clubbed horns on the head, and no long caudal appendages. The larvae of the *Anaestinae* differ from those of the other

Charaxids in having no horns, or only short ones, on the head. For example, the larva of *Anaea andria* Scudder (figs. 29, 29a) is without horns, and is covered with small papillae and tubercles, and has two pairs of slightly larger tubercles on the vertex. The larva of *Cymatogramma verticordia* (Hübner) (fig. 12) has one pair of short horns on the head, and in appearance seems to be quite close to that of *Anaea phidile* Geyer (fig. 11). Both the latter caterpillars are markedly unlike the bristly, somewhat *Morpho*-like ones of *Memphis porphyrio* (Bates) (fig. 13) and *M. morvus* (Fabricius) (fig. 14), which fact indicates that *Anaea phidile* does not belong to the same genus as the latter two species. The larva of *Consul fabius* (Cramer) which has been figured by Stoll (1791), and Sepp (1852-5), is naked and fusiform, and is covered with papillae and small tubercles, and has a pair of short blunt horns on its head. D'Almeida (1922, pp. 170-174) has described the caterpillar of *Hypna clytemnestra* (Cramer); it is covered with tubercles too, but is unusual in having a long black subdorsal seta on either side of segments 3, 5, 7, 9 and 11 respectively, with hairs projecting from the side of the head and two pairs of large tubercles on the vertex. The larva of *Anaea suprema* Schaus (= *Anaea zikani* Rebel) has been described and figured by Zikan (1921), and is much like the other naked, papillated larvae of the *Anaeinae*, but has a pair of short bifurcate horns on the head. The caterpillars of the *Anaeinae*—unlike those of *Charaxes* and *Prepona*—have a tendency to roll up the edge of a leaf in which they hide during the heat of the day, but, according to Edwards (1868-72), the larva of *Anaea andria*, if placed in a shaded room, seldom rolls up leaves, but feeds at random over the plant, and when at rest simply lies extended on a leaf. The caterpillars of the Charaxidae feed mainly on dicotyledons, but several African species feed on monocots, i.e. the *Charaxes boueti* group on bamboo, *Arundinaria* spp. (Gramineae), and *Ch. jasius epijasius* Reiche and *Ch. castor* (Cramer) on Sorghum (Gramineae).

The pupae, which are suspended by a characteristic cremaster, are typically smooth, stout and rounded, with the abdominal segments compressed into a cone. In appearance they are perhaps nearest to the Danaidae. The heads of the pupae of *Charaxes* are either truncated, rounded, or slightly bifid (figs. 2a, 2b, 3a, 4a, 5b, 5c, 5d), indicating that this genus is a heterogeneous one. The pupa of *Euxanthe* (figs. 6a, 6b) is ventricose and humped dorsally, with the lower part of the wing-cases bulging outwards; while that of *Palla* (figs. 1b, 1c, 1d) is somewhat triangular in shape, being much broader towards the base than at the apex. The chrysalis of the *Agrias-Prepona* species (figs. 7a, 26a) is more elongate than that of the above genera, and has two strong cephalic projections, and in appearance is somewhat reminiscent of certain *Apaturids* and *Limenitids*. The pupae of *Zaretis* (fig. 8a) and *Siderone* (figs. 9a, 10a) are squat and stout, and resemble those of *Anaea* (fig. 29b) and *Memphis* (figs. 11a, 14a) all of which are some-

what *Charaxes*-like in appearance. The pupa of *Consul* (see Stoll, 1791, pl. 2) is also compressed like that of *Anaea*, but has a dorsal hump and a pair of short protuberances on its head; that of *Anaea suprema*, as figured by Zikan (1921, p. 2, figs. 3 and 4), is also broad, stout and gibbous; while that of *Hypna* (fig. 30) is broadly fusiform, humped dorsally, and has a bluntly bifid head. The somewhat deformed pupa of *Cymatogramma*, with its dorsal humps (see fig. 12a), is perhaps nearer to *Hypna* and *Consul* than to the other New World Charaxids, and in this respect supports Westwood's (1850) opinion that *Cymatogramma* was a link between *Consul* and *Hypna* on the one hand, and *Anaea* (including *Memphis*) on the other.

From the foregoing it can be seen that the genera comprising the Charaxidae have in common a smooth globular egg which is flat, or has a fluted depression, on top; and hence these genera belong together in the same family—that is if one accepts Doherty's system of classifying the butterflies by the eggs. However, on the basis of the larvae (already discussed above), the Old World Charaxidae can be subdivided into the following subfamilies: Charaxinae; Euxanthinae *subfam. nov.* (type-genus, *Euxanthe*); and Pallinae *subfam. nov.* (type-genus, *Palla*). I have not seen figured anywhere in the literature the larvae of *Agatasa* or *Prothoe*, but, according to Corbet and Pendlebury (1956, *Butterflies of the Malay Peninsula*, pp. 243-244), the larva of *Prothoe franck* Godart (not *P. franckii* Hübner; *vide* Cowan, 1968, p. 19; 1970, pp. 23, 58) is "pale purple-brown" in colour, with one pair of horns on the head. However, the adults of *Prothoe* and *Agatasa* are morphologically distinct enough from the other Charaxids for them to be given a subfamily of their own, i.e. the Prothoinae *subfam. nov.* (type-genus *Prothoe*). In addition, the New World members of the Charaxidae can be divided into three subfamilies, with the *Archaeoprepona-Agrias* group of species comprising the Preponinae *subfam. nov.* (type-genus, *Prepona*); the *Zaretis-Siderone* group the Zaretidinae *subfam. nov.* (type-genus, *Zaretis*); and the *Anaeinae* a third subfamily, making a total of seven subfamilies for the Charaxidae in all. The differences in the larvae of these subfamilies are, as we have already seen, supported by differences in the pupae to a certain extent, and also, as is to be expected, by differences in the adults, some of which will be given in the key to the subfamilies below. Using a combination of these characters, the seven subfamilies of the Charaxidae can be further subdivided into a number of distinct tribes which will be dealt with below under the various subfamily headings. These subfamilies and tribes are based primarily on the type-species of the type-genera, as given in Hemming (1967) and as amended by Cowan (1968, 1970). The classification of the Charaxidae proposed here, however, can only be regarded as a provisional one, in view of the fact that the early stages of some of the genera (i.e. *Coenophlebia*, *Polygrapha*, *Anaeomorpha* and *Agatasa*) are apparently still unknown. Much more is still

needed to be known about the early stages of the species comprising the Anacinae in particular, before it will be possible to finalize the systematics of the latter group. This lack of knowledge, however, should not preclude one from attempting a classification of the Charaxidae now, but rather it should serve as a spur to fellow lepidopterists to investigate the early stages of those species that are still unknown; nor should one hesitate unduly to use that information which is presently available, else, in the words of Swainson (1827), "months and years pass away, and that knowledge which, if properly used, might have advanced others one step nearer to the Temple of Truth, is suffered to lie useless and unemployed".

Key to the subfamilies of the CHARAXIDAE

- | | | |
|---|--|-------------------|
| 1 | Costa of the forewing serrated | 2 |
| — | Costa of the forewing not serrated | 4 |
| 2 | Palps dark above, with white spots, or a light stripe below; cell of forewing about two-fifths the length of the forewing, or obtusely rounded anteriorly; mid and hind tibiae and tarsi spined above and below; specialized triangular scales near the base of the underside of the dorsum of the forewing extending beyond vein 1 into space 1b; aedeagus long, extending almost the length of the abdomen, supported by a long, dorsally-grooved, juxta; vinculum narrow | 3 |
| — | Palps dark above and below; cell of forewing about one-third the length of the forewing; mid and hind tibiae and tarsi spined below only; specialized scales on underside of forewing delimited by vein 1, not extending into space 1b; aedeagus relatively short and very spiny, without a prominent juxta; vinculum broad and thick ... | |
| | <i>PALLINAE Subfam. n.</i> | |
| 3 | Palps relatively short and erect, the middle segment being about three times the length of the basal segment, black in colour with white spots; hindwing rounded, entire; first and second subcostal veins of forewing (V.11, 10) typically anastomosing with the costal vein (V.12); abdomen in the males longer than the thorax; tarsus of foreleg in the males short and bluntly rounded, about one-quarter the length of the tibia; mid and hind tibiae and tarsi with long spines above and below | |
| | <i>EUXANTHINAE subfam. n.</i> | |
| — | Palps relatively long, S-shaped, porrect, the middle segment being four times the length of the basal segment, dark-coloured above with a light longitudinal stripe below; hindwing angled or tailed; subcostal veins not anastomosing but running free; abdomen in the males usually shorter than the thorax; tarsus of foreleg of the males longer and more slender but slightly shorter than the tibia; spines on legs shorter than in the Euxanthinae | CHARAXINAE |
| 4 | Subcostal veins of forewing typically running free; | |

- palps quite large and strong, dark above and light-coloured below 5
- The first two or three subcostal veins of the forewing anastomosing with the costal vein, or if running free, the third subcostal vein (V.9) arising distad of the fifth subcostal vein (V.7); palps not so large and strong, unicolorous above and below, or with alternate dark and light longitudinal stripes below ANAEINAE
- 5 Palps erect; third subcostal vein (V.9) ending in apex of forewing; "ambient" vein not present at base of the inner margin of the hindwing; hair-tufts typically present in the hindwings of the males 6
- Palps somewhat S-shaped, porrect; third subcostal vein ending in costa of forewing basad of the apex; "ambient" vein vestigially present at base of the inner margin of the hindwing; hair-tufts not present in the hindwings of the males ZARETIDINAE *subfam. n.*
- 6 Third and fourth subcostal veins (Vs. 9, 8) of forewing running independently of one another, with the third subcostal vein running almost straight to the apex, and the fourth subcostal ending with a downward curve in the termen; hindwing typically rounded; cell of hindwing typically closed; mid and hind tibiae and tarsi typically spined below only PREPONINAE *subfam. n.*
- Third and fourth subcostal veins of forewing running closely together for much of their course, then both veins suddenly bending away from each other, like a pair of bent callipers, before ending in the apex and termen respectively; hindwing produced into a lobe between veins 3 and 4; cell of hindwing open; mid and hind tibiae and tarsi spined above and below PROTHOINAE *subfam. n.*
- (to be continued)

Early stages of some of the Charaxidae

- Fig. 15. Egg of *Charaxes cithaeron* Fld.; approx. $\times 6$.
- Fig. 16. Egg of *Charaxes varanes vologeses* Mab.; $\times 6$
- Fig. 17. Larval head of *Archaeoprepona demophon* (L.); $\times 1\frac{3}{4}$
- Fig. 18. Larval head of *Archaeoprepona licomedes* (Cr.); $\times 1\frac{3}{4}$
- Fig. 19. Larval head of *Prepona laërtes* (Hbn.); $\times 1\frac{3}{4}$
- Figs. 17-19 in Miles Moss's coll. B.M. (N.H.).
- Fig. 20. Larval head of *Euxanthe eurinome ansellica* Butl.; $\times 1$
- Fig. 21. Larval head of *Charaxes jasius epijasius* Reich; $\times 1$
- Fig. 22. Larval head of *Ch. varanes vologeses* Mab.; $\times 1$
- Fig. 23. Larval head of *Polyura pyrrius sempronius* (F.); $\times 1$. In Rothschild coll., B.M.(N.H.).
- Fig. 24. Larval head of *Agrias claudina* (Godt.); slightly enlarged. In Adams Bequest, B.M. (N.H.)
- Fig. 25. Larva of *Prepona laërtes* (Hbn.); nat. size. In Miles Moss's coll., B.M.(N.H.).
- Fig. 26. *Agrias claudina* (Godt.); 26, larva; 26a, pupa (nat. size). In Adams Bequest, B.M.(N.H.).

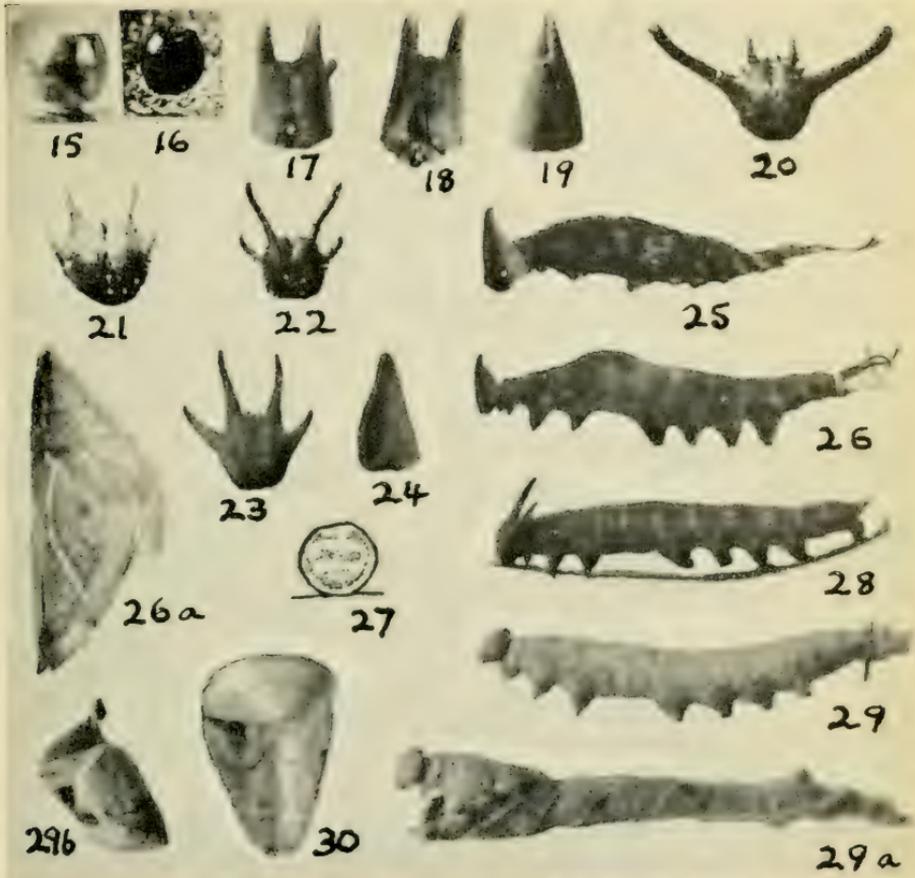


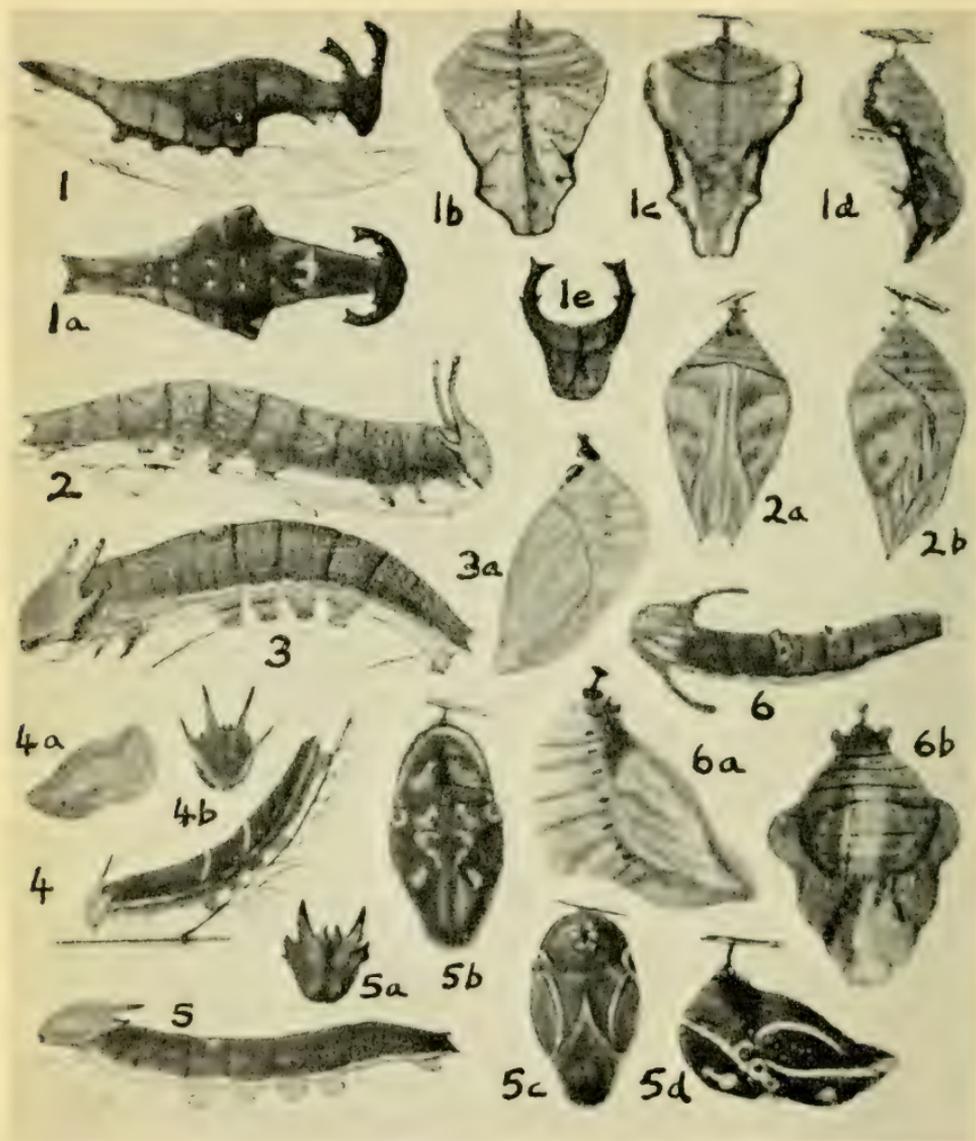
Fig. 27. Egg of *Prepona omphale guatamalensis* Le Moutl (after Le Moutl, 1932).

Fig. 28. Larva of *Polyura pyrrius sempronius* (F.); somewhat reduced in size. In Rothschild coll., B.M.(N.H.).

Fig. 29. *Anaea andria* Scudder; 29, 29a, larvae; 29b, pupa. In Rothschild coll., B.M.(N.H.).

Fig. 30. Pupa of *Hypna clytemnestra* (Cr.); dorsal view; nat. size. In Rothschild coll., B.M.(N.H.).

Figs. 15, 16, 20-22 reproduced from photos by V. G. L. van Someren (1926) by courtesy of the Royal Entomological Society of London; figs. 17-19, 23-26, 28-30 photographed by A. H. B. Rydon with the permission of the Trustees of the B.M.(N.H.).



Larvae and pupae of African Charaxidae

Fig. 1. *Palla ussheri interposita* J. and T.; 1, 1a, larva; 1b, 1c, 1d, pupa; 1e, larval head.

Fig. 2. *Charaxes fulvescens monitor* Rothsch.; 2, larva; 2a, 2b, pupa.

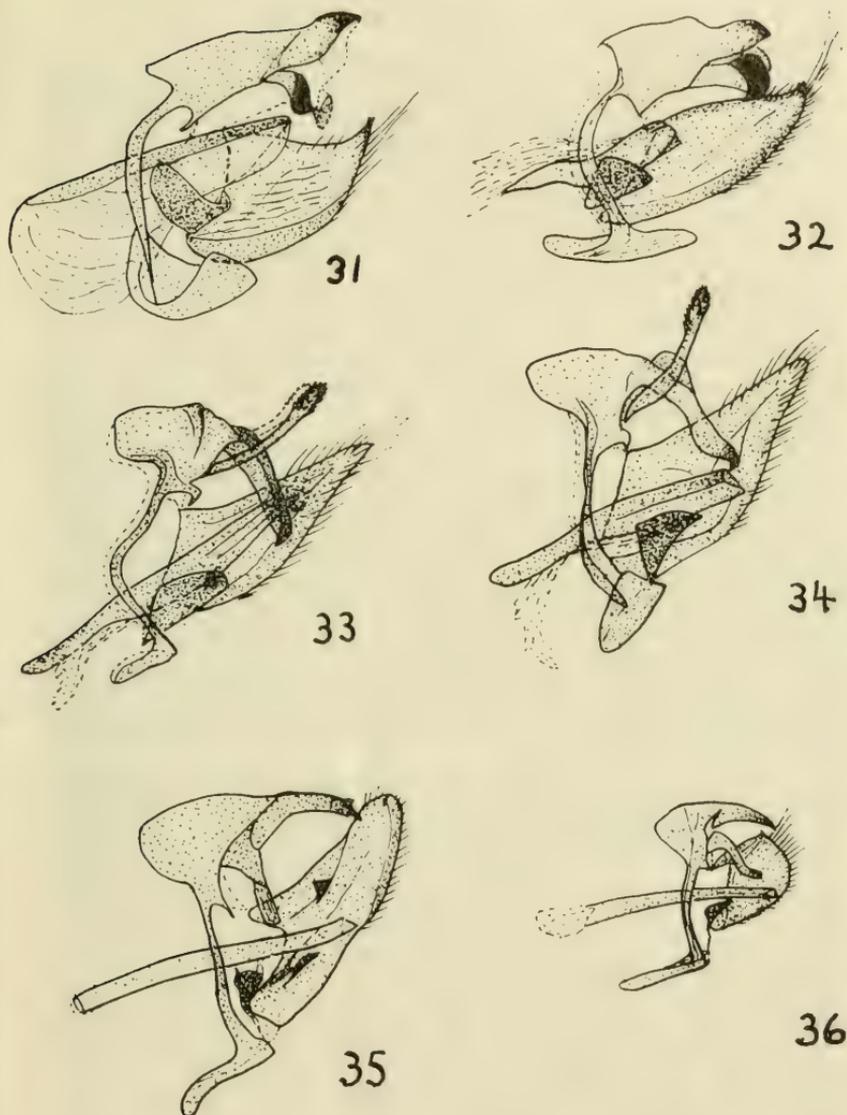
Fig. 3. *Ch. jasius epijasius* Reiche; 3, larva; 3a, pupa.

Fig. 4. *Ch. baumanni* Rogen.; 4, larva; 4a, pupa; 4b, head.

Fig. 5. *Ch. etesipe* (Godt.); 5, larva; 5a, head; 5b, c, d, pupa.

Fig. 6. *Euxanthe eurinome ansellica* Butl.; 6, immature larva; 6a, 6b, pupa.

Reproduced by courtesy of the Royal Entomological Society of London from the coloured drawings by V. G. L. van Someren, 1926.



Male genitalia of some of the Charaxidae
(The left valve has been removed)

Fig. 31. *Archaeoprepona demophon* (L.); fig. 32, *Nymphalis (Prepona) chromus* Guér.; fig. 33, *Prepona omphale* (Hbn.); fig. 34, *Agrias claudina* (Godt.); fig. 35, *Agatasa calydonia* (Hew.); fig. 36, *Prothoe franck* (Godt). A. H. B. Rydon del.

Mt. Etna (Sicily) Re-visited

By ANOTHONY VALLETTA F.R.E.S.

Having been encouraged by the number of different species of butterflies taken last year on Mt. Etna, and fascinated by the richness of its flora, this spring I again paid a week's visit from May 1st to the 7th, a week later than last year, hoping to come across different species from those of last year's, but as the saying goes: "Man proposes and God disposes", I not only did not get new species, but bagged 16 species less than last year!

I left Luqa Airport on May 31st at 7.30 p.m. vice 6.00 p.m. as there was a delay in the departure and consequently, I arrived at Catania Airport rather late, but by 9.00 p.m. I was at Hotel Costa at the far end of Via Etnea. Again this year I was accompanied by old friend, Sig. Sebastiano Distefano. Our first visit on May 1st was to Adrano 660m. The weather was cloudy with periods of sunshine. By 11.00 a.m. we were on the hunting ground, an area planted with almond and olive trees and clusters of prickly pears. The first insect that came into the net was an *Arctia villica*, a female, which laid several eggs in the pillbox that very night and on the following days. *Euchloe ausonia* was the most common butterfly that morning, but a few *Anthocaris damone* and *A. cardamines* were also on the wing, only a few *G. cleopatra*, *G. alexis*, *Philotes baton*, *C. pamphilus*, *P. rapae* and *Brassicæ* were noticed, the greyish geometer *Lithostege duponcheli* was quite common and two other *A. villica* came our way, but were difficult to take owing to the rough ground especially that part planted with prickly pears (*Opuntia ficus-indica*).

At 1.00 p.m. we left this spot and proceeded to Randazzo 765m, a rough ground with little vegetation in the open spaces, but vineyards stretched all over the fertile fields. This is the ideal place for the *A. damone* but unfortunately, a strong wind was blowing at this height, still a few were flying in the sheltered fields, resting on the various wild flowers. Here again, the *A. ausonia* and *A. cardamines* were on the wing; a single *Lycaenopsis argiolus*, a male, was taken. At 3.00 p.m. it started to rain and kept raining all night and the whole of the following day. Monday May 3rd, we went to Lentini 56m and Carlentini 200m, it was a sunny, warm day, but we had a very poor catch. Last year *Amata marjana* Stgr. and *Synapha moldevica* Esp. were so common yet this time not a single specimen was seen. The most common butterflies, as one would expect at such altitude were *P. icarus* and *C. pamphilus*. A few *P. daplidice*, *P. rapae*, *L. phlaeas*, *L. agestis* and *P. megrera* were also on the wing.

Only one *P. machaon* and *M. phoebe* were seen. Beating the vegetation the following moths were taken: *A. luctuosa*, *A. efformata*, *A. ochrearia*, *P. sanguinalis* and *Z. purpuralis*.

The following Hemiptera were also taken: *Calocoris nemoralis* F and the f. *erythronota* Rbr., f. *exastigma* Rbr., f.

hispanica, *F. Calocoris nemolis* F., *f. Picea* Eyr., *Caloris norvegicus* G. M., *Rhinocoris erythropus* L., *Haploprocta sulcicoris* F., *Cercopsis sanguinolenta* Scop., *Coriomeris hirticornis* F., *Eurydema ventrale* Kol., *Holcastathus albipes* F., *Cydnus aterrimus* Forst. and *Doycoris baccarum* L.

Tuesday, May 4th: A miserable day, cloudy and very misty. We drove to Nicolosi 800m hoping for the best, but there was no improvement at all. Only a few *Chiasma clathrata* L. ssp. *aurata* Turati were on the wing. We went lower down to Pedara 610m but still there was nothing on the wing. Two *C. pamphilus* were disturbed and that was all for the day. At 10.30 a.m. it started to rain and kept on up to late in the evening.

Wednesday, May 5th: It was still cloudy in the morning, but by 1.00 p.m. it cleared up a bit. We drove again to Nicolosi, and we noticed that *P. brassicae*, *P. rapae*, *C. croceus*, *Euch. ausonia*, *A. cardamines*, *A. damone*, *L. phlaeas*, *V. atalanta* and *P. icarus* were quite common; *C. clathrata* was also met with as well as *Hipocrita jacobaeae*. By 3.00 p.m. it became dull again and it started to rain.

Thursday, May 6th: A sunny, warm day after two gloomy days! Our venue was Zafferana 1000m. At first we collected at a lower level where *Anth. cardamines*, *Anth. damone*, *Euch. ausonia* and *P. icarus* were quite common, then we went higher up where we came across *Z. hysipyle latevittata* Vrtý. flying freely in the shade of chestnut trees. *P. napi* and *Pyrigus malvoides modestor* Vrtý. were also on the wing. In this locality one would be fascinated by the predominant yellow colour of the *Spartium junceum*, *Euphorbia biglandulosa*, *E. dendroides*, *Ferula nodosa*, *F. chiliantha*, *Chrysanthemum coronaria*, *Calendula arvensis*, *Genista acanthoclados* and *Phlomis fruticosa*. At 11.30 a.m. we moved to Valle di San Giovanni where we came across *P. manni* and *P. napi* and a few *G. alexis* which had already past their best. Only in this locality we came across the *P. manni*.

Friday, May 7th: The weather kept sunny and we again drove to Nicolosi but this time to a different locality where we could, at the same time, see a bit of the eruption of the volcano. Here we saw three *I. podalirius* and only one specimen of *Z. hysipyle*. The most common butterfly in this locality was the *Anth. ausonia*, however *P. icarus*, *G. alexis*, *L. phlaeas*, *A. agestis*, *C. pamphilus* and *Anth. cardamines* were also on the wing. *Anth. damone* appeared now and again but it was not so common as at Zafferana. By noon we had to pack up, as I was supposed to leave for Malta at 4.00 p.m. Thus my second visit to Mt. Etna came to an end, not as fruitful as the previous visit of 1970 when 38 different species were taken. It seemed that the season was retarded owing to the severe winter. No females of *Anth. Damone* were noticed. In 1970, a week earlier than this time, *M. jurtina hispulla*, *C. semiargus*, *Prygus armoricanus*, *Cartharodus alceae* and the wintering species were quite common in the same localities I visited this year.

When I reached the airport at Catania I found the last straw . . . a strike was on at the airport in Rome, and so the

plane had not arrived. After waiting up to 7.00 p.m. we were told that the flight to Malta had been cancelled, so the only alternative was to take the 10.00 p.m. boat from Syracuse to Malta.

My thanks are due to Sig. S. Distefano and to Prof. M. La Greca the director of the Istituto Policattedra di Biologia Animale, for their valuable help.

257 Msida Stret. B'Kara, Malta.

30th June, 1971

A Review of the Butterflies in the Bristol Area

By A. D. R. BROWN, F.R.E.S.

(Continued from page 216)

RIODINIDAE

Hamearis lucina Linn. (Duke of Burgundy Fritillary)

Although once widely distributed across the Cotswold escarpment, this species is now restricted to several specific localities. Two of these are known to the author, the first of which is threatened by sight-seers, since it is a typical beauty-spot overlooking the Severn Estuary and the mountains of Wales beyond. Picnickers trample down the breeding grounds on every sunny weekend, and never more than three butterflies have been noted on any one occasion. The other haunt of the Duke of Burgundy Fritillary is situated on the edge of a golf course where the grass is rarely cut, small conifer trees are planted at intervals and many unusual plants live here, including several species of Orchis. About a dozen butterflies were observed at this locality about two years ago, but the habitat is restricted, and is quite vulnerable.

We have a single record for the species from North Somerset, with eight butterflies being observed at Goblin Combe in May 1964, but despite frequent searches since that time, no other butterflies have been seen.

LYCAENIDAE

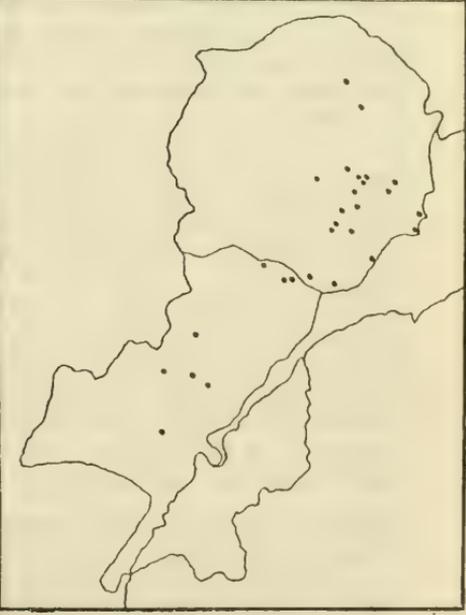
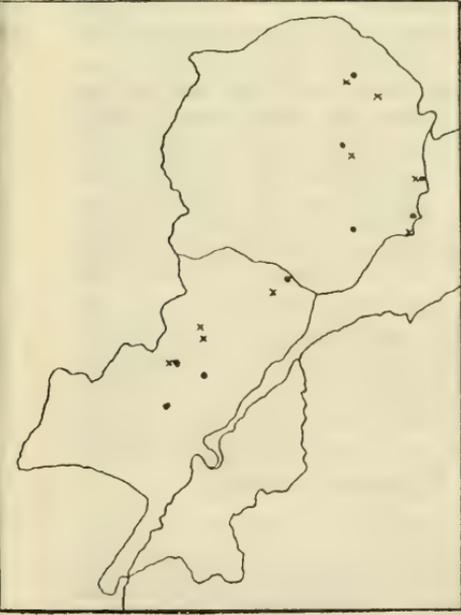
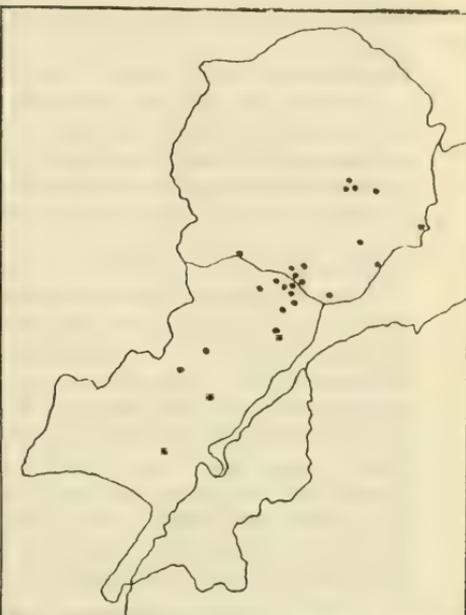
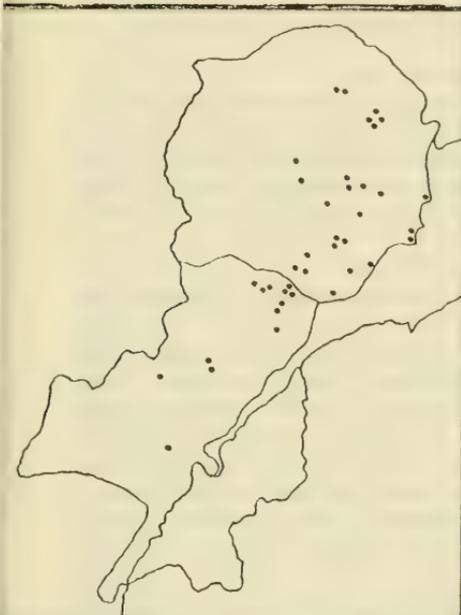
Aricia agestis Schiff. (Brown Argus)

As with the species just described, the Brown Argus is mainly confined to the western slopes of the Cotswold Hills in Gloucestershire, where its colonies are none too strong. At Kingsweston Down just to the north of Bristol, a few of these butterflies are seen each year, despite frequent clearing of the long grass.

In North Somerset the Brown Argus occurs in a wide variety of habitats, where it also flies in greater numbers. Once again, Goblin Combe is one of the strongholds, while

Aricia agestis Schiff.
Brown Argus

● *Lysandra coridon* Poda
(Chalkhill Blue)
× *Lysandra bellargus* Rott.



Celastrina argiolus L.
(Holly Blue)

Lycaena phlaeas L.
(Small Copper)

the other colonies seem to be centred around the western end of the Mendip Hills, in places such as Cheddar and Crook Peak near Weston-super-Mare. The Somerset moors provide another habitat for this species, although our knowledge of its distribution in that area is very incomplete at present.

Cupido minimus Fuessl. (Small Blue)

Unfortunately, we have very little information concerning the Small Blue, but we have reason to believe that it is quite widespread throughout the Cotswold Hills. In Somerset it is common on the hills around Weston-super-Mare, but no other localities in this vice-county have been reported to us.

Polyommatus icarus Rott. (Common Blue)

The Common Blue is widespread and may be observed in a variety of habitats over the two vice-counties. In West Gloucestershire, it is particularly common at Wetmoor near Wickwar and along the entire range of the Cotswolds. The western end of the Mendip Hills appear to be another good locality for this species, where there are extensive areas of open limestone downlands with well-cropped turf and an abundance of flora. Further east, too, around the abandoned lead-mines at Priddy and Charterhouse, the butterfly is met with in considerable numbers. There appears to be little in the way of local variation.

Lysandra coridon Poda (Chalkhill Blue)

As far as Gloucestershire is concerned, our knowledge regarding the distribution of the Chalkhill Blue is far from complete. At present, the Gloucestershire Trust for Nature Conservation is sponsoring a scientist to study this species and its ecology along with the Large Blue (*Maculinea arion* Linn.), the Adonis Blue (*Lysandra bellargus* Rott.) and Small Blue (*Cupido minimus* Fuessl.). We know for certain that there is considerable scope for variation within the colonies of the Cotswold Hills, owing to the abundance of this butterfly in some years.

In North Somerset the Chalkhill Blue occurs in several places along the south side of the Mendips, and also on the Polden Hills near Street. Along the coastal areas around Weston-super-Mare, this species is seen every year. It is feared, however, that this butterfly is on the decline as it is elsewhere in the country, due to the cultivation and destruction of habitats, particularly for farming purposes.

Lysandra bellargus Rott. (Adonis Blue)

From the map it appears that the Adonis Blue is more widely distributed than its cousin the Chalkhill Blue (*Lysandra coridon* Poda), but this is probably not the case and is rather misleading. We seriously doubt the validity of some of our records, owing to the places where it is claimed to have been observed. In fact, the foodplant, Horseshoe Vetch, has been

totally absent in some cases, and it is more likely that this butterfly has been confused with the Common Blue (*Polyommatus icarus* Rott.), which may sometimes be very bright in colour.

Starting with West Gloucestershire, four males were seen in September of the year 1963 near Wotton-under-Edge, but despite regular searches since that date there has been no sign whatsoever of the Adonis Blue. A number of years ago, a large number of pigs were released onto the hillside to graze, but the damage that they caused was quite phenomenal and the greater part of the breeding grounds was totally ploughed up. The pigs are no longer there, but it is without doubt that this caused the eradication of the Adonis Blue from that particular locality. As can be expected, the strength of the Chalkhill Blue colony at this place was reduced considerably. We have been sent in other observations of the Adonis Blue from the region around Wickwar, but we have yet to check up on this. This species very likely occurs in many other places in the Cotswold Hills, but the present survey being carried out will reveal the extent of its distribution in this area to a greater degree.

In North Somerset regular reports come in of sightings along the coast near Weston-super-Mare. The habitat appears suitable enough but we still doubt these observations due to the abnormal times during which this butterfly has been noted. Further reports are of sightings near the Cheddar Gorge in the Mendip Hills and also from a Roman encampment south of Clevedon, and we believe these to be correct.

Unfortunately, the Adonis Blue is obviously on the decline in the Bristol area as elsewhere in the country, and every effort is needed to protect it.

Celastrina argiolus Linn. (Holly Blue)

Although very widespread, the Holly Blue is never common and is usually observed in ones and twos. The greater part of our records comes from within Bristol itself, and in a few places it appears to be on the increase. Little more can be said than that, since we have no idea what controls the strength of this species in the Bristol area. Its various food-plants are abundant nearly everywhere, and the only possible explanation is the dependence upon the weather conditions, which are on the whole mild and damp in comparison with the rest of the country.

Lycaena phlaeas Linn. (Small Copper)

This species, like the Holly Blue (*Celastrina argiolus* Linn.), is scattered widely over the two vice-counties but is rarely seen in any substantial numbers.

Nowhere in West Gloucestershire is it common other than the north of Bristol. At Kingsweston Down, a healthy brood is observed in each generation every year, with a good proportion of ab. *caeruleo-punctata*, the form with a series of blue

markings on the hindwings. Sorrel, being the larval food-plant abounds here, since the grass is cut back each year and there also being a large number of anthills in the vicinity. In an orchard not far away, the Small Copper is equally plentiful, even though cattle are regularly allowed to graze there. This butterfly is often bred by the author, from larvae collected in a number of localities, and it is of interest that the above-mentioned variation appears in as much as eighty or ninety per cent of the resulting brood.

In the Mendip Hills, the Small Copper occurs in the famous areas around Priddy and Charterhouse with an equal proportion of aberrations, but its numbers have reduced drastically in the former locality. At Shipham, near the western end of these hills, this species was common in the years 1965 and 1968, but it was much scarcer in 1969.

On the whole, the prospects look good for the Small Copper in our part of the world, its only real enemies being disease and parasites.

Notes on Some of the British Nepticulidae

By Lieut. Col. A. M. EMMET, M.B.E., T.D., M.A., F.R.E.S.

(continued from p. 171)

MALUS (Apple)

We have six apple-feeding species, viz., *Stigmella aëneella* Hein., *S. desperatella* Frey, *S. malella* Stt., *Nepticula pomella* Vaughan, *Dechtira atricollis* Stt. and *Etainia (Dechtiria) pulverosella* Stt. On this occasion I shall confine my remarks to the last two.

Etainia pulverosella is now assigned to the same genus as our three species which feed on the wings and seeds of maple and sycamore (*E. sericopeza* Zell., *E. sphendamni* Hering and *E. decentella* H.-S.). Both in the markings of the imago and the life-history it is the odd man out. Feeding in apple leaves, the larva makes a short gallery soon opening into a blotch, which is nearly always situated at the leaf-margin. The single generation comes early in the year; Ford (1949) is accurate in giving mid-June to early July for the larvae, but in forward seasons they may all have gone by the end of June. This is one of the easiest of the univoltine species to rear, the larvae spinning up readily between leaves or on tissue. I have found mines in all the areas where I have collected microlepidoptera in the south-east of England, though normally in limited numbers. Meyrick (1928) gives the distribution as "England to York, rather local"; it also occurs in the west of Ireland, in Co. Galway and the Burren.

D. atricollis makes a very similar mine, not only on apple, but also on hawthorn (most commonly), pear and cherry. According to Meyrick (1928) and Waters (1924) there is only one generation of larvae in the autumn, but Tutt (1899) and Ford (1949) state there is also an earlier one in July, and Hering

(1957) and Borkowski (1969) concur. I have not yet met with this earlier brood of larvae, even in places where they occur plentifully in October. I suggest that, in Britain at any rate, July larvae are few in number and erratic in appearance, if they exist at all.

Until recently I found the mines of *pulverosella* and *atricollis* hard to differentiate, and it was not until I came across a colony of tenanted *atricollis* mines on apple and hawthorn together (see notes on *Crataegus*) giving me unquestionable examples of that species' mines that I was able to make a detailed comparison and work out the differences. These are tabulated below, being based on the study of thirty-six mines of *pulverosella* from six localities, and sixteen mines of *atricollis* all from Kent. It is possible I would have found more variation in the mines of *atricollis* if I had had more examples drawn from different localities.

	<i>pulverosella</i>	<i>atricollis</i>
Ovum	Laid on either side of the leaf, generally near the margin, but occasionally in a central position.	Always laid on the underside of the leaf, about 1 mm from the margin.
Mine	Short and convoluted, but occasionally following the margin. Frass in a relatively solid line. Gallery sometimes absorbed in subsequent blotch.	Longer, generally following the margin. Widens gradually and filled with dispersed frass.
(a) Gallery		
(b) blotch	Frass blackish and concentrated in a thick line or cone near the junction with the gallery.	Frass brownish, and distributed irregularly throughout the mine.
Larva	Yellow, head light brown.	Greenish white with ventral row of dark spots sometimes visible. Head dark brown.
Larval exit-hole	Underside	Upside.

HYPERICUM (St. John's Wort)

Few people realize how late in the year the larvae of *Fomoria septembrella* Stt. feed. Last year I found a larva on the 14th of December which did not spin up in its mine until the 19th, on which day I noticed another wild larva only just beginning to make its cocoon. Waters (1924, p. 96-97) records larvae "commonly on December 17th 1922, many being still quite young."

POPULUS spp. (Poplar and Aspen)

Nepticula trimaculella Haw. has a very variable frass-line, like *N. speciosa* Frey, and, possibly, *Stigmella ulmivora* Fol. On the 23rd July last, having a little time to kill on a visit to London, I collected some Nepticulid mines in Hyde Park. I was at once struck by the unfamiliar pattern of frass in some

vacated mines on *Populus italica*. The grains were well separated and filled the whole width of the gallery. On my return to Saffron Walden, I collected, for comparison, thirty-nine mines in leaves of *Populus nigra* (all but five vacated), but none was similar to the London examples. Thirty-eight had fine lines of frass, and one was intermediate, but tending to fine. The names *populicola* Sorh. and *subtrimaculella* Dufr. have been given to the miners with the thin frass line, but both are now regarded as identical with *trimaculella* and their names are reduced to synonymy (see Hering, 1951, p. 88, where both types of mine are figured, and Borowski, 1969).

In writing about *Dechtiria turbidella* H.-S. at Wicken Fen (Emmet, 1970). I stated that I had failed to find the larva. This proved not to be the case. In October 1969 I noticed green islands and larvae in the fallen leaves of a tree which I then thought was an aspen, growing in another part of the fen, over 600 yards as the nep flies from the white poplars on and around which I had taken the imagines of *turbidella* the previous spring. I assumed the larvae were those of *D. argyropeza* Zell. and, as I wanted only the record from the fen, and not the moth, I collected very few of the leaves. These I neglected, even leaving them in the plastic bag in which I had placed them in the field. However, on the 25th of May, almost by chance, I noticed an imago in the bag which, to my surprise, proved to be *turbidella*. And so, despised and ignored, the first British specimen of *turbidella* was reared in captivity. I have since identified the tree from which the mines came as *Populus canescens* (grey poplar).

Last spring the imagines of *turbidella* were even more plentiful on the trunks of the white poplars and neighbouring alders in the part of the Fen where I first found them in 1969. I took a dozen more specimens, some of which are now in the British Museum (Natural History); had I wished, I could have taken scores. Yet a search of the fallen leaves of these white poplars in October again drew blank, while the grey poplar leaves on the other side of the Fen were heavily infested; it was a pity that I failed to look for the imago on the trunk of that tree in late May. On checking in the Hering herbarium I find that his *turbidella* mines are (in my opinion) in leaves of *P. canescens*, though they are designated as *P. alba*. Whilst walking in Chippenham Fen, Cambridgeshire, last October, green islands in fallen leaves caught my eye; the cause proved to be larvae of *turbidella*, and in this case too the trees were *P. canescens*. This variety of poplar, therefore, seems to be the dominant foodplant.

I can now give a more detailed description of the mine and larva, made from material collected at Wicken Fen on the 18th and 30th of October 1970. All were in *Populus canescens*, with, more often than not, two larvae in a leaf. The eggs are laid on the petiole about half an inch below the base of the leaf, usually one on each side of the stalk. The early mine shows up as a dark expanding ridge in the leaf stalk (a varicose vein, as

Mr Jacobs vividly expressed it after I had sent him some tenanted mines). The dark coloration is due to the frass which is appressed against the outer skin, leaving a roomy chamber in which the larva rests when not feeding. The stem is caused to swell slightly at the junction with the leaf, giving still more space. From this base the larva mines out into the lower part of the leaf, on the same side of the midrib as the egg on the stalk. Seventeen of the leaves I collected on the 30th of October showed larvae feeding when I examined them that night, but only nine of these larvae were visible the next morning; however, two had appeared in the leaves which had seemed empty the previous evening. I chivvied a feeding larva with a fine paint brush, and it slowly backed into its place of concealment, the process taking about two minutes—not much of a protection from the attention of predators! An unprovoked larva took about the same time to retire. The frass at the leaf base is arranged in a double wall, leaving a passageway between, and the retiring larva finds its way between these walls by wagging its tail. Ultimately it becomes too tight a fit for the larva to re-enter the petiole, and it then rests in the frass-lined passage. The larvae create green islands, but individuals feed on discoloured as well as green parts of the leaf. They seem to quit their leaves earlier than their relative *D. argyropeza* Zell., and all the mines were vacated by the middle of November.

The larva, seen in the mine, appears to be whitish green, exactly matching the colour of the excavated portion of the leaf. The dorsal vessel is darker and the head and mark on segment 2, which is rectangular with slightly concave sides, are pale brown. The cocoons are greyish green.

On the 19th of June 1962, when I was only just starting to take an interest in microlepidoptera, I took three specimens of *turbidella* at Withenshawe, a suburb of Manchester. These I did not determine correctly until this year. The moths were found on the trunks of sycamore, but I remember well that there was a large poplar (probably *canescens*) nearby; I have a specimen of *Nepticula trimaculella* which I boxed on its trunk two days later. This capture of *turbidella* constitutes a new county record for Lancashire; hitherto the moth has only been reported from Middlesex and Cambridgeshire.

Though I failed to get my record of *D. argyropeza* for Wicken Fen in 1969, I did so this year when I located genuine aspens growing not far from the grey poplar. This species has had a remarkably good year and the green islands caused by the larvae gave rise to vividly contrasting hues never envisaged by Shelley among his "yellow, and black, and pale and hectic-red Pestilence-stricken multitudes" of autumnal leaves swept along by the wild west wind. Wood (1894, p. 152) writes "to see an aspen tree with nearly every leaf of a pure yellow, save for a bold splash of vivid green striking across from the stalk to margin, is an extraordinary sight, and one that can scarcely fail

to attract attention." Waters (1924, p. 102) adds his testimony, "Sometimes nearly every leaf of a good-sized tree shows the vivid green splashes which betray the larva's presence." So it was in 1970. On one particoloured tree at Debden in Essex, I counted the leaves along a couple of branches chosen haphazard; out of a hundred leaves, fifty-six were tenanted by larvae, in some instances two to a leaf, and of the forty-four that were clear the majority were small, inconspicuous leaves. Yet, for all Wood's eloquent words, I wonder if many readers noticed this beautiful phenomenon last October.

Our other aspen-feeding Nepticulid is *N. assimilella* Zell. Tutt gives only Sussex and Hereford as the counties in which it occurs. To these Waters (1928) added Berkshire and Oxfordshire. Meyrick (1928) had nothing new to contribute. I have bred this species from Farningham in Kent, and have found mines at Wicken Fen in Cambridgeshire and Quendon in Essex; all these, as far as I know, constitute new county records. The species is never plentiful, but is clearly far more widespread than the meagre reports suggest.

PRUNUS (Blackthorn)

Though I had a single cocoon from a late larva of *Dechtiria spinosella* Joan. taken in 1969, I failed to breed the moth (Emmet 1970). So in 1970 I visited Benfleet in Essex very much earlier—the 11th of August as against the 22nd September in 1969. But even so, I was on the late side, and far more *spinosella* mines were vacated than tenanted. Nevertheless, an afternoon of searching produced nearly fifty tenanted mines. May I here interpose that it is not my usual practice to take this number of larvae of any species. My reasons for excess in this instance were, first, that the abundance of empty mines showed that there would be no threat to the species; secondly, this being an insect not previously taken in Britain, I was collecting not only for myself but for museums and, possibly, other interested entomologists; and, thirdly, the casualty rate is nearly always high with neps, and I was anxious to make sure of getting the imago. With this last object in view, I varied my treatment of the larvae as they left their leaves to pupate. Some I put in moss, others in peat, and yet others in sawdust. Probably all these precautions were unnecessary, for a dozen or so spun up well enough between leaves or on the tissue lining their container. Unfortunately, I have mislaid the description I made from life of the larva; my recollection is that it is whitish green with a darker head. The cocoons are light brown. Mr Jacobs found recently vacated mines of this species at Box Hill, Surrey, in September 1970.

I introduced this species as *Stigmella spinosella*, following the nomenclature used by Hering (1957). I see, however, in my copy of the draft of the new Kloet & Hincks check-list that it has been assigned to *Dechtiria*.

QUERCUS spp. (Oak)

Our oak-feeding Nepticulids fall into two groups, *Stigmella* and *Dechtiria*. Meyrick (1895) initially recognised two species as British in each genus, viz., *atricapitella* Haw. and *basiguttella* Hein. in the former, and *subbimaculella* Haw. and *quinquella* Bed. in the latter, to which he added (1928) *S. suberivora* Stt., when it was discovered by Waters in the Isle of Wight (Waters 1928). Since then *S. ruficapitella* Haw. has been reinstated as a good species, and finally Waters added *D. albifasciella* Hein., bringing the total up to seven (Waters 1928). Currently, however, the *atricapitella* group is undergoing a thorough and long overdue revision in the hands of continental entomologists, amongst whom Borkowski and Johansson are taking a leading part. Anyone who has studied the mines and imagines carefully must have felt that Meyrick's single *atricapitella* was a hotchpotch and that the restoration of *ruficapitella* fell short of resolving the problem. Dr Borkowski informs me by letter that they have found at least five new and unpublished species, in addition to *samiatella* Zell. (long recognised on the continent but not in England) and *zangherii* Klimesch.

It remains to be seen how many of these species occur in Britain, and it is desirable that a good supply of British material should be available to the continental workers for appraisal. Accordingly the British Museum is sending its series of the *atricapitella* group to Borkowski in Poland and I am adding my own few specimens to the parcel. If any other British collector is prepared to lend his material in the cause of science it would be welcomed by Dr Borkowski.

The task is twofold. First we need to know what species we have; then will follow the fascinating work of matching the moths and the mines. As these notes show in other contexts, with a few of the Nepticulids the mines are variable; but in the majority of cases minutiae of difference are valid guides to specific determination. So we must approach the oak-mines with an open mind and not be too disappointed if variation in their characters blunts our ability to separate the species that made them.

I have seen little comment in our entomological literature about the specialised scales possessed by some of these species. Tutt (1899, p. 185) writes of *atricapitella*, "The blue-black cilia extend in the female almost to the base of the wing without perceptibly decreasing in length, and in set specimens they distinctly lie over the posterior wings". Beards are normally an embellishment of the masculine sex, and among my own few specimens I would judge that it is the males which boast this feature. Amongst the tawny-headed imagines, the males have distinctly thickened cilia at the base of the costa and dorsum of the hindwing. The red-headed moths appear to have no specialised cilia. The colour of the collar also varies; though most commonly white, it is black in some specimens, while it is pale orange-white in the redheads.

There the matter must rest for the present, and I pass on to species which, as yet, have not presented us with problems. *Stigmella suberivora* Stt. was first recorded as British in 1928, when Waters bred the moth from larvae feeding on ilex growing on St. Catherine's Down in the Isle of Wight. The vacated mines are so conspicuous and durable in the leaves of an evergreen tree that it is inconceivable that they could have been overlooked if they had long been present in this country. It is therefore safe to assume that *suberivora* first became established in the Isle of Wight through immigration or accidental importation and that it has since spread to other localities in the south of England. In order to take stock of its present distribution, I shall list the localities that I know in the hope of eliciting supplementary records. It occurs as follows: Suffolk—Thorpness district (common); Essex—Epping; Kent—Greenwich; Middlesex—south London parks; Dorset—Portland and Weymouth (common); Devon—Torquay. The last locality was communicated to me by Mr J. L. Gregory, who adds that, though holm oaks are common round his home in St. Austell, Cornwall, he has searched them in vain for the mines of *suberivora*. I can supply another piece of negative information. There are plenty of ilexes in the Gog Magog Hills near Cambridge, but when I examined them in the spring of 1968 and again in 1971 I drew blank. So *suberivora* is widely but patchily distributed, and it will no doubt continue to spread its range.

Both Meyrick (1928) and Ford (1949) state that April is the month for the larvae. Hering (1957), more accurately, gives November to April as the larval season. I have found full grown larvae at the end of February and by late March most of the mines will have been vacated. March is therefore the best time for the larvae, unless there has been a prolonged spell of severe weather.

Stigmella basiguttella Hein. has had a relatively good year. I have always regarded this as an uncommon species and in the past have had to be content with finding one or two vacated mines. In 1970, however, I noted them (though mostly in small numbers) in various localities in Cambridgeshire, Essex, Kent and Surrey; at Durfold in Surrey they were almost common. I even found one or two tenanted mines in Kent which yielded cocoons. The difficulty with this species is that the mine is exceptionally hard to see; it is completely filled with green frass, and the larva, too, is green, so that the whole harmonises with the colour of the leaf. After the larva has gone, the mine becomes more conspicuous; there is the clear spot where the larva last lay, and with the passage of time the frass in the mine turns brownish.

An even better year was enjoyed by *Dechtiria albifasciella* Hein. This species was added by Waters to the British list in 1928, and until his untimely death in 1930 he found it freely in many localities, chiefly around Oxford. This is one of the species which is liable to marked variation in abundance, and

Waters's discovery must have corresponded with one of its peak periods of plenty. Since then little has been heard of it. I had not knowingly seen the mines till last September, when I first met with them, already mostly vacated, in a wood near Westerham, Kent. The hunt was on, and I found them, sometimes not uncommonly, in Cambridgeshire, Essex and Surrey; they were in fact, wherever I searched for them. A bizarre locality was the Annual Exhibition of the Amateur Entomologists' Society held in London on the 26th of September, where I noted the mines in oak leaves provided as provender for exotic silk-moth larvae; I was informed that the leaves had been picked near Wokingham in Berkshire. Mr Gregory sent me mines of this species for determination which he had gathered near his home at St Austell—almost certainly a new record for Cornwall. My latest date for a tenanted mine was the 5th of October, but they had already passed their peak when I found my first mine on the 11th of September.

The egg is laid against a rib, generally the midrib (upper-side) and the larva starts by making a narrow gallery alongside the rib. On reaching a branch nervure it turns outwards and follows it for some way before changing its manner of feeding and making a squarish blotch. Sometimes, when the egg is laid on a branch nervure, the larva keep a straight course beside it before starting its blotch. Occasionally the blotch is excavated directly from the midrib; this is most likely to happen in the confined space at the base of a leaf. Ford's description, therefore, of the mine as a "blotch away from a rib" as contrasted with that he gives of *D. subbimaculella* Haw.—"an oblong blotch next to a rib"—is completely misleading. "Away from" has two meanings. Compare "a path leading away from the door" (initial contact) with "a man living away from home" (complete physical separation). *Albifasciella*'s blotch starts in contact with a rib and not infrequently, when the larva has worked inwards, extends back to the midrib, making contact there too. *Subbimaculella* is variable in the location of its blotch especially when there are several mines in a leaf. The favourite position is in the angle made by the midrib and a branch rib, but the mines may also be found along any of the branches, though even then the angle between veins is preferred. The gallery phase of *subbimaculella* tends to be shorter and broader, and it is often absorbed into the blotch. I shall mention the slit cuticle later. *Albifasciella* is by far the earlier species, as I have already indicated. *Subbimaculella* starts when *albifasciella* leaves off in early October, and continues, often feeding in green islands, till the end of November. It literally swarms in some localities and in my experience is our commonest oak-feeding nep.

It seems possible that two or even more species are mixed up under the name *subbimaculella*. Writing of it, Waters (1924, p. 101) says, "I noticed also on several occasions that larvae of this species (in captivity) made their cocoons inside the blotch, in the same manner as *N. septembrella*." I found such a cocoon

in the wild at Keston in Kent in November 1968, from which I bred a parasite which could have accounted for abnormal behaviour. Hering, however, considers that possibly a second unnamed species is indicated by this habit (Hering 1957, species No. 4215).

One of the characteristics of *subbimaculella* is that it slits the lower cuticle of the leaf, generally at the angular junction of veins. Let me quote Hering, "All species of *Nepticula* leave their frass in the mine except one, *Nepticula subbimaculella* Haw. on *quercus*, which makes a slit on the underside of the leaf through which some of the grains of frass are ejected. A whole group of closely related species make no such slit in the lower epidermis, species which are so closely related to the above-mentioned, that they were systematically for centuries past united with it, until E. G. R. Waters drew attention to this point of difference". (Hering, 1951, p. 83). However, mines of "*subbimaculella*" often lack this slit. These, then, are the alternatives: either we have one of Hering's "closely related species" in this country, or *subbimaculella*'s slit in the cuticle is optional. Here is another field for research.

Dechthiria quinquella Bed. is one of our most local neps and one that is subject to periodic population explosions. I only know one locality for it, where it has been found regularly for about a century. I have visited this site, which is near Cambridge, for the past three years and have formed the impression that *quinquella*'s numbers are increasing. This may well be the prelude to another "bang."

The large, conspicuous, dark, round spots distributed along the dorsal vessel of the larva of *quinquella* are well known, but I have never seen it recorded that, in the last instar, they are detachable. One by one they become displaced, losing their alignment and overlapping each other on their journey towards the anus. Finally the larva advances clear of them, and they are lost in the trail of frass. I put a dead larva under a low-powered microscope and found that I could remove the spots with a micro pin. There is scope for research into the nature and function of these spots.

(To be continued)

Subscriptions

The cost of printing The Record has increased very substantially in the past year. This and the recent and projected rises in postage rates have necessitated a review of our subscriptions. If the present size of The Record is to be maintained our subscriptions as from January 1972 must be:

For payment in sterling	£3.00
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The expense of collecting the large number of overdue subscriptions is a significant factor in our costs and the Treasurer will offer a discount of 25p to all private subscribers

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The Treasurer takes this opportunity for reminding subscribers that

- (a) subscriptions are due and payable on 1st January each year and that, regretfully, we just cannot afford in future to send the February and subsequent issues to those whose remittances have not been received by the time the February issue is ready for posting.
- (b) in accordance with the usual subscription magazine practice they should kindly advise her *before the New Year* if they intend to cancel a subscription.

Thoughts on the Origin and Pronunciation of Scientific Names

By H. SYMES

In recent years the names of Lepidoptera have been subjected to a severe spring-cleaning, and many old favourites have been flung out on to the dust-heap. It is hard to contemplate some of the changes without regret: for instance the replacement of the time-honoured *Edusa* by the upstart *Croceus*, which is so very obvious. *Paniscus*, a little Pan, is an ideal name for the Chequered Skipper, as anyone who has seen this lively little butterfly frisking about in the woods will agree; *Palaemon*, a minor sea-god, is not. Again, *Dictaea* and *Dictaeoides* convey the close relationship between the two species: *Tremula* and *Gnoma* do nothing of the kind. The same applies to the substitution of *Hermelina* for *Bifida*. How apt, too, was the old generic name of *Minucia lunaris*. *Ophiodes*—snake-like—must surely appeal to all who have seen and reared the larvae of this species. I do not know what *Minucia* means, but I rather think it was the name of a Roman lady. However, I suppose it is useless to repine, and sometimes the change is for the better. *Pavonia* is in every way an improvement on *Carpini*, especially as the Emperor larva does not normally feed on Hornbeam, and the graceful White Admiral has more affinity with *Camilla*, a warrior maiden, fleet as the wind than with the ancient prophetess *Sybilla*, besides, the other Admiral, *Atalanta*, is named after a similar character. And purely on colour grounds, *Aethiops* is a more suitable name for the Scotch Argus than *Blandina*, the heroic slave-girl martyr of Lyons.

There are times when some pronunciations of scientific names come as rather a shock. Like so many of my generation, I received a classical education, which included the reading of Greek and Latin poetry and even some attempts at writing Latin verses. In those days the perpetration of a

false quantity was regarded as an almost unpardonable offence, though no longer punished, as in earlier and more barbarous times, by a flogging. The result of this early training is that a false quantity still grates on one's ear, especially when the name in question has been taken straight from classical literature.

Among my treasured possessions is a slim volume entitled "An Accentuated List of British Lepidoptera, with hints on the derivation of the names". It was published by the Entomological Societies of Oxford and Cambridge in 1858, and among the officers of those Societies the best-known is J. O. Westwood. Pencilled on the fly-leaf is the one word "scarce". It starts with a list of authors and nomenclators. This, I notice, does not include Fourcroy, to whom we owe the substitution of *Croceus* for *Edusa*. The volume contains much valuable and some rather amusing reading. I often used to wonder why the Large Elephant Hawk should have been called *Elpenor*, a name taken straight from Homer. This unfortunate young man, one of the comrades of *Odysseus*, had missed the ladder and fallen off the roof of *Circe's* house after drinking to excess, and so had broken his neck. The Accentuated List—to which I shall in future refer as A.L.—supplies the connection with *Porcellus* (piglet) and with the old generic name *Choerocampa* (hog-larva) by assuming, though Homer does not say so, that *Elpenor* was one of the twenty-two comrades of *Odysseus* who had been turned by *Circe* into pigs.

In rather strange company among the heroes and goddesses of classical mythology appears a characeer from the Bible, the ambitious *Athalia*, daughter of *Ahab* and *Jezebel*, who, like her mother, came to a sticky end (II Kings, xi. 15-16). But I suspect that the name was originally *Thalia*, one of the *Muses*, and that one day an entomological friend, presumably an Englishman, went up to *Rottenberg* and said something like "Last summer I caught a *Thalia*", with the consequences we know. I have no idea why *Cydippe* (L.) has replaced *Adippe* (L.), for A.L. quotes *Linnaeus* as expressing preference for *Adippe*, but the change seems immaterial, as both nymphs probably came from the same row of the *Olympian* chorus. Then we have a fashion note that should appeal to the ladies in the name *Xerampélina*, a word used by *Juvenal* to describe clothes of the colour of dead vine-leaves (Sat. vi.519), a rather subdued shade of purplish-brown.

The derivation of some names was a cause of perplexity to A.L. The Dinky Skipper, now *Erynnis tages*, has been blessed with a variety of generic names. The two given in South are *Thanaos* and *Nisoniades*. Of *Thanaos*, A.L. says "perhaps a typographical error for *Thanatos*, death, in allusion to the dark colour of the species". Plausible, but the palm for this sort of conjecture must be awarded to an explanation of *Nisoniades* which I read in another old book whose name I have forgotten. This was to the effect that *Nisoniades* was probably a mistake (presumably a 'typographical error') for

Bisoniades, in allusion to the bull-headed appearance of the butterfly in question. And why not? After all, the Dipterous family of Simuliidae are known as Buffalo Gnats for this reason.

Some names seem particularly inappropriate. Why should the beautiful Orange Underwings be saddled with two such disreputable titles as Parthenias (child of an unmarried mother) and Notha (bastard)? In some cases A.L. makes pointed comments on specific names taken from the food-plant of the larva. Of *Catocala fraxini* it merely says "feeds on Ash, Poplar, etc.," and of *T. betulae* "feeds on the Birch," without further comment, but of *L. sinapis* it says "named from the common mustard (*Sinapis*)" and adds, rather plaintively "but the larva feeds on Vicia, Lotus, etc." Similar protests are justifiably made about *L. quercus*, *C. gnaphalii*, *Z. filipendulae*, *Z. loniceræ* and *P. statices*.

There is one name whose pronunciation has always given me some uneasiness, and that is Cardamines. A.L. gives Cardamīnes, and this seems to be generally accepted. But the derivation of the word is doubtful, and I am not alone in preferring to say "Cardámines", a more euphonious and, in moments of exasperation, more satisfying word. I wonder how many readers of the "Record" have seen a charming little poem by C. J. Longman, quoted by W. H. Hudson in one of his books. I made a copy of it, and should like to conclude by quoting it again.

"To the Orange Tip Butterfly"

"Cardamines, Cardamines!

Thine hour is when the thrushes sing,
While gently stirs the vernal breeze,
When earth and sky proclaim the spring;
When all the fields melodious ring
With cuckoos' calls, when all the trees
Put on their green, then art thou king
Of butterflies, Cardamines.

What though thine hour be brief, for thee
The storms of winter never blow,
No autumn gales shall scour the lea,
Thou scarce shall feel the summer's glow;
But soaring high or fitting low,
Or racing with the awakening bees
For spring's first draughts of honey—so
Thy life is passed, Cardamines.

Cardamines, Cardamines!

E'en among mortal men, I wot,
Brief life while spring-time quickly flees
Might seem a not ungrateful lot:
For summer's rays are scorching hot
And autumn holds but summer's lees,
And swift ere autumn is forgot
The winter comes, Cardamines".

I am indebted to Mrs Connie Symes for the manuscript of this paper which she discovered among her late husband's notes. Ed.

Current Notes

The Annual Exhibition of the Amateur Entomologists' Society will be held at Holland Park School, Airlie Gardens, Campden Hill, London W.8, on Saturday, 25th September, 1971 from 11.30 until 16.00. Admission is free and visitors are welcome.

The exhibition may be reached from Notting Hill Gate Station (Underground) or Kensington High Street Underground. Omnibus services 27, 28, 31, 46 and 52 may be used to Kensington Church Street. There is a certain amount of parking space for cars in the school grounds.

Is the season so bad that no one can find subjects for Notes and Observations, or is it so good that no one has time to write up such notes? Ed.

Current Literature

Two separates from **Teodoro Monteiro O.S.B.** include "**Revision des Espèces Portugaises du Genre Procris Fabricius (Zygaenidae Lep.)**" with six genitalia drawings, and "**Lépidoptères de l'Algarve**" which gives an account of localities visited with a map, followed by an account of the Geometridae found, with some figures of genitalia dissections.

These represent Nos. 111 and 105 of the publications of Instituto de Zoologia "Dr Augusto Nobre". Faculdade de Ciencias do Porto, and both are in the French language.—S.N.A.J.

From **Emilio Berio** I have an account of a method for extracting the genitalia of Lepidoptera, invented by him some 30 years ago, but never previously recorded. It is set out with six photographic illustrations, in *Memorie della Societa Entomologica Italiana*, XLVIII (1969): 368-378.—S.N.A.J.

Flora of a Changing Britain, Edited by **F. Perring**, 157 pp., Classey £2.10.

This book is a report of the 11th Biennial Conference of the Botanical Society of the British Isles, held at the Imperial College of Science on 19th September 1969. After a preface by the Editor, the sixteen papers read are given with notes on the subsequent discussion of each paper. The first, entitled "Our Changing Climate" is by H. H. Lamb, of the Meteorological Office, Bracknell, and is followed by "Changes in Plant Life following Changes in Local Climate" by Dr J. P. Savage of the University of Aberystwith. The third paper by Professor C. D. Pigott, of the University of Lancaster is entitled "The Response

of plants to Climate and Climatic Change". The subject of Land Use is dealt with by P. J. O. Trist O.B.E. writing on "The Changing Pattern of Agriculture". M. Brown's paper is entitled "The Effect of Planting Trees" while Dr M. D. Hooper writes on the Botanical Importance of our Hedgerows and A. J. Gray on The Colonisation of Estuaries following Barrage Building.

The third session deals with the effect of Transport, and J. E. Lousley opens with the Influence of Transport on a Changing flora, dealing with paths, roads, canals, railways, motor ways and air transport and in summing up he looks to the future. There is a long list of references. A. P. Dumbrill discusses the subject of the Management and Planting of Motorway Verges, and he stresses the advantage of these inaccessible sites for the establishment and development of the flora. Dr May Gillham concludes with a paper on seed dispersal by birds.

Session four resumes on Saturday, 20th September with a paper by Dr K. Mellanby entitled "Our Filthy World — The Pollution of Land, Air and Water" in which the aspects of the disposal of industrial and domestic waste are discussed.

J. D. Fryer and R. J. Chancellor provide a paper entitled Herbicides and our changing weeds, and Dr H. J. M. Bowen discusses the effects of air pollution on plants.

Session five, on Past and Future opens with "The Last Seven Years" by F. H. Perring followed by "The Next Twenty-five Years" by Dr S. W. Walters, and the Summing Up by E. Milne-Readhead.

The whole is well indexed, and should make most interesting reading for a very wide circle, for it concerns all of us, naturalists or not. The book is well printed on good paper and is strongly bound in cloth.—S.N.A.J.

Centurie de Lépidoptères de l'Île de Cuba by P.H. Poey (1823)
reprinted by E. W. Classey, with a biographical foreword
C. F. Cowan (1970), 56 pp., including 20 coloured plates.
£12.50

In producing this reprint, a most interesting foreword by C. F. Cowan puts the work into focus for the reader by a careful reconstruction of the circumstances surrounding the original project and the portion of it which saw the light of day. This most interesting account concludes with a warning that the written descriptions should always be checked because some of the colours then in use were not stable, and became black with the passing of time. The early retirement of his engraver, Paul Dumenil, seems to have been the main reason why the work was not completed.

The Preface gives an account of the situation and nature of the Isle of Cuba, pointing out that it has some species of lepidoptera not recorded from the neighbouring islands. The author mentions his eight years of collecting in the island and his research in Parisian libraries to identify his captures, and

states that of the hundred species selected for this work, about eighty are entirely new and of the rest, some features is figured which had not previously been noted.

Of the twenty plates which actually appeared, the beauty of design and colouring (excepting the few cases of chemical change already mentioned) makes one regret very much the failure of the projected other eighty to appear.

The accompanying text gives Latin and French versions of the descriptions, followed by a good account of the species in the French language.

The book is beautifully printed on good paper and, is strongly bound in grey cloth boards with a blue spine. The printers of the plates have done an excellent job, and the work will thus become available to students of the Cuban insect fauna. The price may seem high for a book of this size, but the work involved and its quality justify it.—S.N.A.J.

West African Butterflies and Moths by **John Boorman** 79pp., including 16 coloured plates: Longmans £0.60.

This little paper back gives some account of about 225 species of Lepidoptera, set out to give an account of the main families represented. Besides the coloured plates, the outer margins of the pages bear black and white photographs and line drawings illustrating the text.

The text begins with some account of the physiology and life cycle of a lepidopteron, followed by hints on making a collection and on handling insects, and finally on rearing and photographing specimens. The author's final paragraph about scientific names puts the matter very concisely, and should be read by all who now show a preference for vernacular names.

The main text goes through the macrolepidoptera by families, mentioning some of the species to illustrate them, the accompanying photographs being marked with their scale when not life size, as also are the coloured plates. The colour work, while it cannot be described as first class, is none the less good, and will be a great help in identification. Richard Bonson's line drawings are excellent throughout but Ben Johnson's excellent photographs lose something by being reproduced on a coarser screen than one could have wished for such subjects, but here again it must be borne in mind that art paper, which is really required for a fine screen would not be suitable for a paper-back book which is to be handled frequently.

At the end there is a useful appendix headed "Going on from here" which commences with a short note on museums, Natural History Societies, and University Zoological Departments. It goes on to give a list of publications on the subject and finishes with addresses enabling readers to get in touch with the two Nigerian societies.

The author's style makes the book useful to both the beginner and the more advanced student of the West African Lepidoptera.—S.N.A.J.



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THE ENTOMOLOGIST'S RECORD

AND JOURNAL OF VARIATION

Edited by S. N. A. JACOBS, F.R.E.S.

with the assistance of

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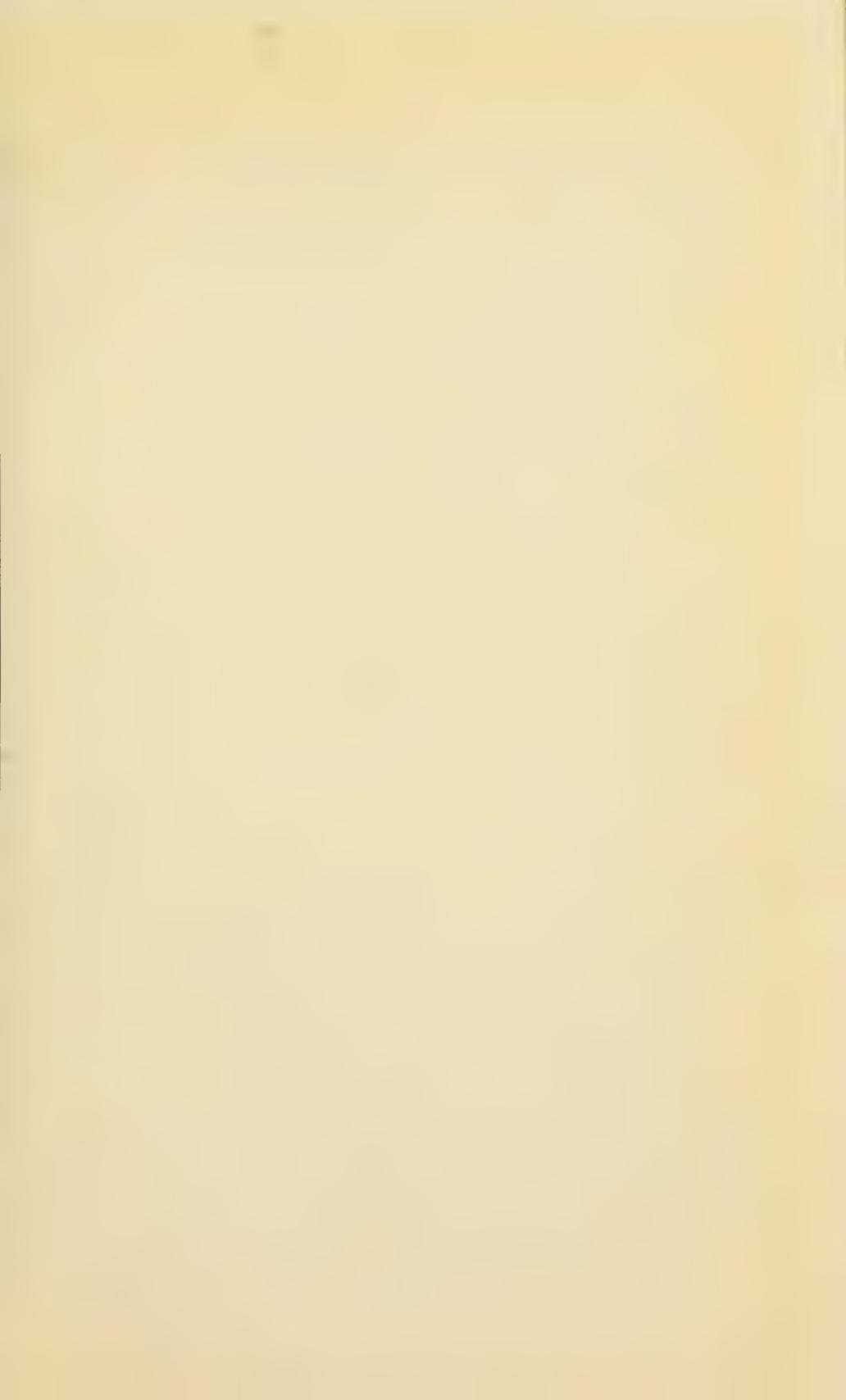


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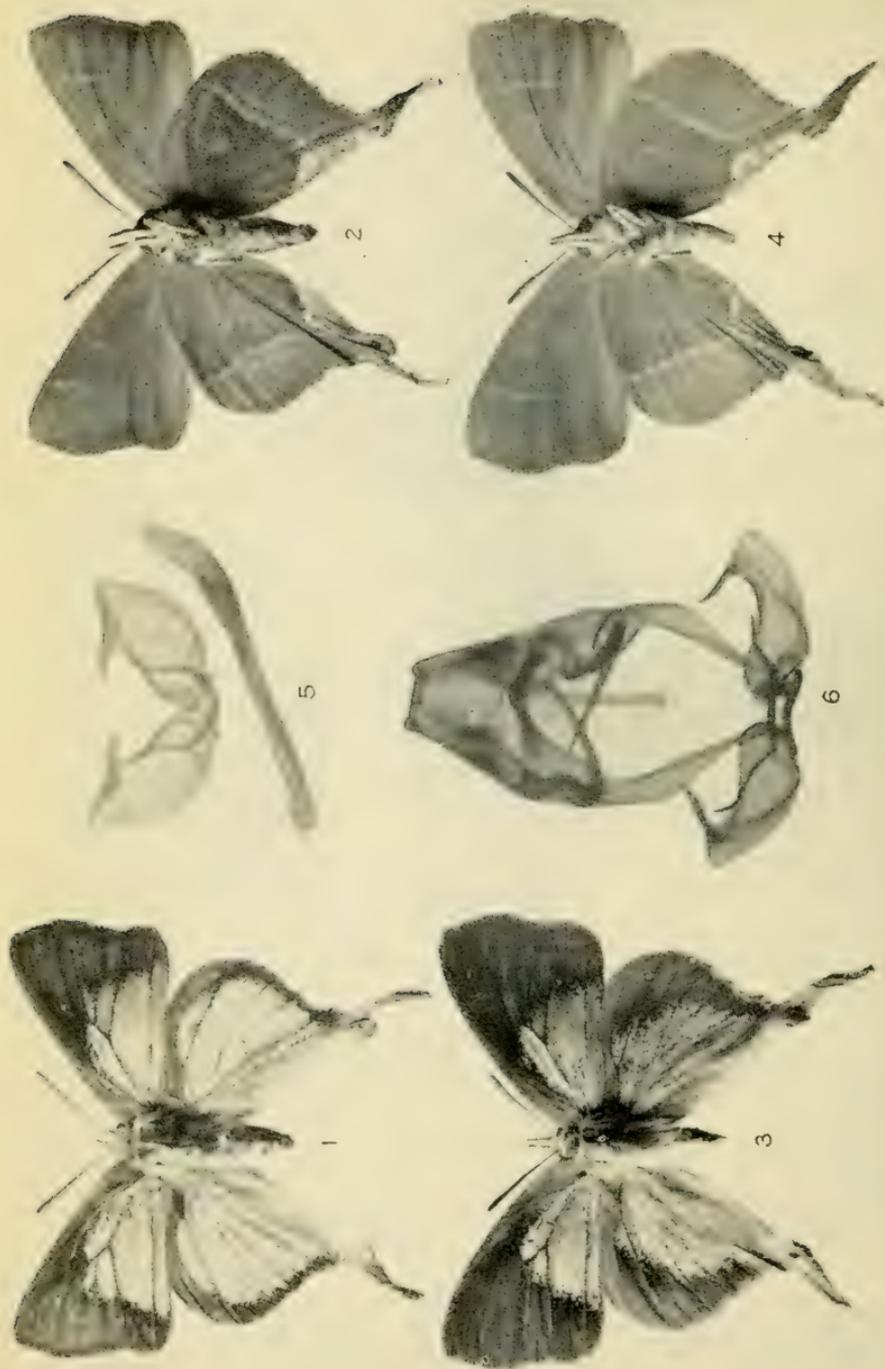


Photo by H. R. Wykeham

Myrina silenus penningtoni subsp. nov.

A New Race of *Myrina silenus* (F.) (Lepidoptera: Lycaenidae) from the North Western Cape

By C. G. C. DICKSON and R. D. STEPHEN

Occurring in Little Namaqualand and for some distance further south but still in the more north-westerly portion of the Cape, this butterfly constitutes a race which differs quite appreciably from *Myrina silenus ficedula* Trimen, and can also be separated readily from *M. silenus deserticola* Stempffer from South West Africa. It is decidedly different from *M. silenus silenus*, which does not occur in Southern Africa. The characteristic features of this new race are given herunder.

Myrina silenus penningtoni subsp. nov.

Average size of both sexes below that of *M. silenus ficedula* and tails of hindwing not as long, and narrower, than in this race.

Male. Upperside.

Forewing. The ferruginous area not reaching the extreme distal-margin but bordered or at least edged here with brownish-black.

Hindwing. Inner-marginal area, the anal-lobe as a whole and the untwisted portion of the tail markedly whitish and much lighter than in *ficedula*.

Underside.

Forewing. No apparent constant difference, in comparison with *ficedula*.

Hindwing. The inner-marginal edging and the broad strip in lower half of inner-marginal area lighter and much whiter than in *ficedula*. (In some specimens of the latter race the upper edging of the inner-margin and a curved streak of light scaling bounding the upper part of the broad lighter strip are nearly as white as in *penningtoni*—but not the strip itself.)

Length of forewing: 15-16 mm. (the latter measurement, applying to holotype).

Female. Upperside.

Forewing. The dark costal border more clear-cut than in *ficedula* in relation to the ferruginous colouring, where the border approaches the blue area of the wing. (In the female

Myrina silenus penningtoni subsp. nov.

Fig. 1. ♂ Holotype (upperside) Fig. 2. ♂ Holotype (underside).

Fig. 3. ♀ Allotype (upperside) Fig. 4. ♀ Allotype (underside).

Fig. 5. Valves of ♂ genitalia, viewed at right angles to main surface, and aedeagus of lower, second, preparation.

Fig. 6. Armature of ♂ genitalia, with aedeagus removed, three pointed processes of uncus directed towards observer.

Figures of imagines 1.7 times natural size.

Figures of genitalia 21 times natural size.

the distal margin is not or is at the most barely dark-edged.)

Hindwing. Commencing from a little below vein 6, the space between the blue area and the distal-margin is largely, ferruginous coloured, instead of dark-brown to blackish as in *ficedula*. Inner-margin, anal-lobe and tail whitish as in the male of the present race.

Underside.

Forewing. Like that of male.

Hindwing. As in the male, with the same remarks applicable to the inner-marginal area, etc.

Length of forewing: 17-18.5 mm. (the former measurement, applying to allotype).

Antennae, in both sexes, with the clubbed portion beneath lighter (i.e., partly rather bright ferruginous as a rule) than in *ficedula*, and underside of thorax and abdomen as well as legs, considerably more white than in this race.

♂ Holotype, WESTERN CAPE PROVINCE: Doorn River, N. of Clanwillam, 2. x. 1970 (C.G.C.D.); British Museum Reg. No. Rh. 17288.

♀ Allotype, W. CAPE PROVINCE: data as holotype; British Museum Reg. No. Rh. 17289.

Paratypes in Coll. C.G.C.D. data as holotype, 2 ♂♂, 1 ♀ (C.G.C.D.).

Paratypes in Coll. R.D.S., as holotype, 15.x.1967, 1 ♂.

Paratype in Coll. J. Brown, W. CAPE PROVINCE: Kuboes (Little Namaqualand), 19.xi.1962, 1 ♀ (H. D. Brown).

Paratypes in Coll. K. M. Pennington, W. CAPE PROVINCE: Soebatsfontein (Little Namaqualand), 18.xi.1946, 1 ♂ (K.M.P.); Garies (Little Namaqualand), 22.ix.1967, 1 ♂ (K.M.P.).

Paratypes in Coll. Mrs J. V. Sipser, as holotype, 1.x.1970, 1 ♂, 1 ♀ (J.V.S.), 1-2.x.1970, 1 ♂, 5 ♀♀ (C.G.C.D.).

Paratypes in Coll. W. Teare, as holotype, 19.xi.1970, 6 ♂♂, 11 ♀♀ (W. T.).

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Some specimens of both sexes have the blue a little less extensive than in *ficedula*, but this is by no means a constant feature. In a few individuals the colouring may be a shade more violaceous than is usual in the latter race — with the majority apparently not showing any real difference in this respect.

The butterfly cannot be confused with *M. silenus deserticola*, although the females of the two races can be more alike than the males. An extension basad, of the ferruginous colouring of the upperside (this applying to the forewing only, in the male) is a feature of *deserticola*, and with the blue itself absent or simply consisting of a little scattered scaling in the hindwing of the female. Furthermore, this race lacks the dark border to the distal-margin, in the male

as well as the female; and, from a single specimen that has been seen, the inner-margin and the adjoining part of the hindwing are less whitish on both surfaces than in *penningtoni*. The underside of the latter race is usually but not invariably of a duller brownish tone than in *ficedula*; in the female paratype from Garies, caught by Mr Pennington, it is of a mustard-yellow colour. The distinctness of the transverse streaks on the underside of the wings is individually variable, while the marking at the end of the cell may be prominent in some specimens (at least in the hindwing) and in others barely visible—or in some cases not discernible at all, in the forewing anyway.

It is necessary to mention that a single male specimen which has been seen—of two obtained by Mr Pennington on 23rd November, 1946, at Otavi in the northern part of South West Africa and 250 miles from the coast—is close but not identical to *penningtoni* from the N. W. Cape. In this specimen (in which the dark border on the upperside of the forewing is well developed) the blue is visibly a shade more violaceous and slightly less extensive than is usual in the males of *penningtoni*, while a broad inner-marginal zone as well as the anal-lobe and most of the tail of the hindwing are, on the upperside, decidedly darker and more like the corresponding parts in *ficedula*. Otavi, incidentally, has a higher annual rainfall than the localities in which *deserticola* has been found.

The male genitalia of *M. silenus silenus* have been fully described and figured by M. Stempffer in "The Genera of the African Lycaenidae (Lepidoptera: Rhopalocera)" (*Bull. Br. Mus. nat. Hist. (Ent.) Suppl.* 10 p. 111, 1967); and this author states "As I have pointed out (1943, *Ann. Soc. ent. Fr.* 1942: 117) the male genitalia of *M. ficedula* are identical with those of *M. silenus* and it is probable that *ficedula* is a subspecies of *silenus*." In his figure which includes the valves, these organs are shown in immediate proximity to one another—the broad folded portion of each valve being clearly apparent in the lower part, of the drawing.

In the accompanying figures, the valves are not represented in an inverted position as in the drawing referred to above; and, since they are spread outwards in the preparations, with the main surface of the upper folded portion more or less on the same plane as the line of vision of the observer, an alternative view of the valves is given in our own paper.

The late Rev. D. P. Murray has given a good figure, in the lateral view, together with a short covering statement, of the male genitalia of *M. silenus ficedula*, in *J. ent. Soc. S. Afr.*, Vol. x. No. 2 (1948).

Mr W. H. Henning and his son Graham most obligingly furnished suitable male specimens of *ficedula*, from the Florida Hills Transvaal, just when these were required for a comparison of the genitalia with those of *penningtoni*. In the

present specimens of both these races which we have examined the aedeagus has in all cases been decidedly less robust than that of *M. silenus silenus* in Stempffer's very clear drawing in the publication cited. The valves of *penningtoni* have been relatively broader and the total length of the folded portion has been greater in relation to the length longitudinally of the rest of the valve, than in the above specimens of *ficedula*; and some other differences in detail have been noticed in the valves of the two races. Preparations of the genitalia of *penningtoni* were made from Mr Teare's captures, from the type locality.

Mr Pennington himself has stated, in a letter of 15th May, 1971:—"I first took two males at Soebatsfontein in 1946 when I camped against a large rock with a running fig along its face. I spotted them as I was having breakfast in November. I took two more a week later at Otavifontein a thousand miles north in S.W.A. From time to time since I have seen odd specimens in Namaqualand, but did not actually catch any till 1967 when they were fairly common round our camp in September under the Kamiesberg eight miles out of Garies". One of us (R.D.S.) gives his own experience of the butterfly in the paragraph which follows hereunder.

I was fortunate in taking a few specimens of this new race of *M. silenus* on the huge wild fig trees on the Doornrivier near Klaver, in October, 1967. I have so far not found them any closer to Cape Town, although the fig trees are evident further south. In addition, I have taken *M. silenus ficedula* in one spot at Mossel Bay on the ridge above the town. At the time of writing, these localities each represent the spots recorded closest to Cape Town where these two individual races are to be found.

As a result of the earlier experience of R. D.S., the locality in which the type-specimens of *penningtoni* were duly caught was visited by C. G. C. D. and Mrs J. V. Sipser with the express object of obtaining specimens (on 1st and 2nd October, 1970) which were found in fair numbers round the wild fig trees (*Ficus cordata* Thunberg) on which the butterfly obviously breeds. This insect does not seem to be as quick in its movements as *ficedula*. While habitually remaining about the same tree for long periods, specimens do on occasion fly from one tree to another, as was observed in the earlier part of the morning, and they may be seen feeding at low-growing flowers, including a deep pink species of *Mesembrianthemum* (*sens. lat.*), during this time of day.

It is believed that Dr Bernard Kettlewell took specimens of *deserticola* in S. W. Africa in 1952, judging by specimens that were shown to one of the writers (C. G. C. D.) by him at that time — in which case, these examples are now in the British Museum (N.H.), as Mr G. E. Tite referred in a fairly recent letter to specimens which answer to them.

The specific name of the *Ficus* tree with which this butterfly is associated was kindly furnished by Miss W. F. Barker,

Curator of the Compton Herbarium, National Botanic Gardens, Kirstenbosch, Cape—and who referred at the same time to the distribution of the tree, stating “It occurs from Clanwilliam northwards into S. W. Africa and Griqualand West.”

As mentioned by Stempffer (1967), the caterpillars (or early stages) of *M. silenus* and *M. subornata* have been described by Farquharson and by Lamborn, in 1911 and 1913 respectively, and those of the former species by Jackson in 1937; while Murray has covered those of *M. silenus ficedula* in 1935, and Clark and Dickson (in *Life Histories of the South African Lycaenid Butterflies*) in 1971.

“Blencathra”, Cambridge Avenue, St Michael’s Estate,
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Observations on British Butterflies in 1970

By Dr C. J. LUCKENS

The first free-flying butterfly of the season is always a special delight, and a worn *Aglaia urticae* L. bravely sunning itself in the garden on March 26th was indeed a welcome herald of Spring. Apart from the release of a few more housebound *A. urticae* and a *Scoliopteryx libatrix* L. fluttering to get out into the weak sunlight during that week, we had to be content with this brief glimpse of Spring until well into April.

On April 9th, however, my father saw our first *Gonopteryx rhamni* L. in the garden and a few days later, just before our return to Glasgow, I myself saw one near Bolney.

We saw nothing of butterflies after that until the early Spring ‘Whites’ started flying in the Glasgow area on May 9th. I saw *Pieris rapae* L. around the University and a few *Pieris napi* L. and *A. urticae* near Kirkintilloch.

A few days later we went over to the moss near Kilmacolm. It was a perfect Spring day—curlews were nesting among the grass tufts, Cuckoos called in the surrounding copses, and at the entrance to the moss a pair of Stoats played to within a few feet of us. Yellowish heavily-marked females of *P. napi* were beginning to emerge (males were plentiful), and there were also a number of quite bright looking *A. urticae*.

I started to get very worried about my final exams. in Medicine after that, but in the lull between the end of the written papers and the start of the clinical exams, we took a few days off to stay with friends at Connel, near Oban. We were very fortunate in that our last three days there were gloriously sunny, and on June 1st we travelled up to Fort William in search of *Carterocephalus palaemon* Pall.

Carrying our small son, my wife and I quartered the ground for this elusive insect; but though we saw several *Callophrys*

rubi L. and took a few dusky female *P. napi* we again had no success with *C. palaemon*. Commander Harper has since informed me that it has become very scarce in Lochaber.

The following day we made an even longer journey from Oban to Badenoch. It was a great pleasure to see our first Scottish *Antocharis cardamines* L. alongside the road just before Laggan Bridge. Thereafter males of this species became quite plentiful along the Spey valley, though not one female was seen all day.

In the afternoon we explored the birch woods around Aviemore, where plenty of richly-coloured *Clossiana euphrosyne* L. were skimming over the violets and bugle, together with more *A. cardamines*, *P. napi*, and a few *Phragmatobia fuliginosa* L.

Our last day was spent around Oban where we dropped in at some of the coastal localities for *Euphydryas aurinia* Rott. We were a few days too early for this fritillary, but *Lycaena phlaeas* L. was common and there were a few *Nymphalis io* L. about also.

June 13th was the next day I could feasibly take off and fortunately the weather promised fair, so we sped on our way to Argyll again.

E. aurinia was out in very good numbers in several local colonies between Lochgilphead and Oban but already beginning to get worn. As usual there is a wide range of variation but in general *aurinia* is of a large and strongly coloured race in this area.

Flying with this attractive butterfly were *Coenonympha pamphilis* L., *P. napi*, very tattered *N. io*, and *Callimorpha jacobaea* L., but this usual attendant *Polyommatus icarus* Rott. had not yet emerged.

We left Glasgow on the 19th June for the south of England, paying a flying visit to Meathop Moss en route. Here *Maniola jurtina* L. was about, and a sprinkling of *Coenonympha tullia* f. *philoxenus* Esp., the latter not nearly so abundant on the moss as I had been led to believe. It was fairly early in the season, I had no guide to the locality, and perhaps sampled a less favourable part of it, but I got the general impression that the future of *C. tullia philoxenus* is a bit precarious in this country if Meathop is its stronghold. I would be very glad to be reassured to the contrary.

We stayed the night in Lincolnshire and the following morning visited Castor Hanglands Reserve.

It was a hot sunny day and numbers of *Ochlodes venata* Br. and Grey were buzzing about in the rides. Little else was on the wing, however, and about midday we went on to Monkswood, where we were treated to the sight of scores of *Strymonidia pruni* L. over the old blackthorns. Indeed this rare and local hairstreak seemed one of the most abundant butterflies in the wood, and we spent some time watching it flying around the tops of the bushes.

About 4 p.m. we left Monkswood in order to fit in a quick

visit to Salcey Forest on our way south.

On arrival almost the first butterfly we saw was the one we had come for—*Leptidea sinapis* L., fluttering feebly through the tangled underbrush. This delicate insect seemed reasonably common here so I took a few specimens (some were still fresh at this late date) to compare with Devonshire and Sussex races in my collection. In one of the rides a late *A. cardamines* made a surprise appearance. It was very disappointing, however, to find that one of the old 'iris' breeding grounds in Salcey had been destroyed since our last visit the previous August. We arrived at my parents house near Haywards Heath late that evening.

Our next butterfly expedition was on the 25th June when we went to Blean Woods in Kent. The last time we visited this area two years previously, my wife and I had found a thriving colony of *Mellicta athalia* Rott. in one of the lesser known enclosures, and we were keen to see how it had fared in the interim.

Soon after we entered the wood we started to see numbers of this dark little fritillary skimming over the herbage, and found that it had greatly extended its former confines in this locality. In fact the original site of the colony had become too overgrown to support much cow-wheat, and the butterflies had mostly spread to a large flowery area, which two years ago had been composed of tree stumps of felled chestnut with little or no vegetation in between. This part of the Blean Woods system is not deliberately managed to suit *M. athalia*, but evidently the wood is still periodically coppiced and thus the cow-wheat thrives and hopefully so will the butterfly dependent upon it.

I came face to face with a half-grown dog fox in one of the rides, and he quite unconcernedly turned and trotted along the track in front of me for about fifty yards before scampering aside into the undergrowth. Later we all went to cool off in the quiet atmosphere of Canterbury Cathedral.

On June 27th I went to a wood about ten miles away, near Uckfield, where a good variety of butterfly species were flying. *Limenitis camilla* L was freshly out and sailing about the bushes in plenty; *Thymelicus sylvestris* Poda., *Aphantopus hyperanthus* L. and summer *P. napi* were just emerging; a few *Vanessa cardui* L. were about with *M. jurtina*, *P. icarus*, *Pararge megera* L., *Pararge aegeria* L.; and late and tattered *Erynnis tages* L. and *Clossiana selene* Schiff. were still flying. There were *G. rhamni* larvae to be found on nearly all the buckthorns.

I was particularly looking for *Argynnis cydippe* L. for which this wood was noted at one time, and soon I saw a large swift-flying *Argynnid* which I assumed was the butterfly in question. It perched on a tall field-thistle for a restless instant and then was off like the wind. Later I netted a large fritillary in one of the broad rides but to my surprise it turned out to be a perfect male *Argynnis aglaia* L. instead of the other

species. All the subsequent captures in the wood have proved to be *A. aglaia* and I wonder if it has recently colonised the wood and displaced the very similar *A. cydippe* by natural competition.

My parents travelled North with us on June 29th for my graduation in Glasgow. We took the journey in easy stages and included the Lake District. The weather was not of the best however, and conditions in the Honister Pass did not look promising enough to warrant a foray after *Erebia ephron* L. which is said to be abundant here.

We did not have much time to spare in Glasgow, but on July 4th we went to the Lochgilphead area where there were disappointingly small numbers of worn *C. tullia* about on Moine Mhor. However, we collected a few larvae of *N. io*, *Saturnia pavonia* L. and *Lasiocampa quercus callunae* L.

I snatched a few hours on July 7th to make a quick inspection of Flanders Moss near Stirling. On the wooded outskirts of this wild waste of cottongrass and heather *A. hyperanthus* was emerging, a very local species in Scotland, and of a constant ashy-grey tinge on the underside when compared with the more richly-coloured Southern English forms. On the moss itself *C. tullia* was about but already in tatters and again in fewer numbers than usual.

On our way south again on July 9th we dropped in at Arnside, and in spite of mediocre weather saw plenty of freshly emerged *A. cydippe*. One or two *Eumenis semele* L. of a very small and bright form skipped among the stones, and there were a few *P. icarus* and *Aricia agestis salmactis* about.

Back in Sussex it seemed high time to start looking for *Apatura iris* L., and on July 11th I went with Dr A. Rydon to West Sussex. Soon after arrival at the forest we met Mr Haines and Mr Meredith, both with the same quarry in mind as ourselves. It was the most beautiful day and many species were flying—*Argynnis paphia* L., *L. camilla*, *Polygonia c. album* L., *Thecla quercus* L., early *G. rhamnii*, and the usual woodland *Satyrids* including the first *Maniola tithonus* L. In spite of ideal weather I saw only one *A. iris*, and that a short glimpse as he skipped between oaks.

Dr Rydon and I left our two friends about 6.30 p.m., who decided to wander slowly back for a last look around—just long enough for Mr Meredith to take a fine male *iris* about ten minutes after our departure!

The next day the first flush of *Celestrina argiolus* L. (Summer brood) started to emerge around my parents garden—a most welcome sight after several seasons of scarcity. This dainty little butterfly remained abundant thereabouts until mid-August, when the last one was seen on the 18th. Numbers of ova and larvae could be found on practically any ivy clump in the area.

On the 13th July I drove over to the West Sussex Woods in the morning and again met Mr Haines, who told me of his friends success two days previously. As we were talking, a

male *A. iris* swooped down to my car (which I had parked strategically), flew around it for a few seconds while we stood immobile, dashed down the ride and then came back straight over our heads.

Quite a lot of adrenaline circulated for a minute or two!

The cause of it flitted about the oaks above us for a while before finally making off. I had to leave before midday but returned in the afternoon to find that Mr Haines had had only sporadic sightings of *iris* for the remainder of the day but had netted and released *A. aglaia*, an unusual butterfly in these woods nowadays.

July 15th was a generally cloudy day with occasional sunny spells, and I set off for a well-known locality for *iris* on the Hants/Surrey border. On arrival at about 1 p.m. I immediately saw two *iris* over the oaks, but when I got to the prime spot in the wood I could see no less than five at once, soaring about the oak crowns and engaging each other in aerial combat. One suddenly swooped down to the shrubs behind me, and sat just a few feet out of reach with spread wings for a moment before sailing up to the high tops again. This spectacular display of *iris* ceased about 3.30 p.m. and thereafter I caught only occasional glimpses of this superb butterfly.

A few *L. camilla* were about, looking diminutive beside *iris*, and there were quantities of *T. quercus* flying about the oaks and chestnuts.

After an interview in Ashford, Kent, the following day I called into the Uckfield wood on my way back. Weather conditions were poor, but I saw several *L. camilla*, *A. paphia* and a few *A. aglaia* careering along the rides.

The weather was again cloudy with chinks of sunshine on 17th July, when the whole family went to the Hampshire locality. Soon after arrival, my parents and my wife saw their first *iris* over the oaks and settled back to watch them with binoculars, while I wandered along the rides hoping for a capture. When I returned my wife told me that while I was away a male *iris* had leisurely inspected the car only a few feet away. After repeatedly calling me to no avail, she eventually grabbed a spare net and narrowly missed capturing "His Imperial Majesty"!

In spite of the long journey involved, I could not keep away from this place, and got back the following morning at about 8.45 a.m. I only saw one *iris* early on, but Mr C. Wyatt who was there when I arrived captured a perfect male on the forest track. There were plenty of *T. quercus* and *C. argiolus* and a fresh brood of *P. aegeria* was emerging.

The crowds started to gather about mid-morning so I left for the relative solitude of the West Sussex localities. In one of the copses there later that afternoon, I saw *iris* flap slowly straight through some scattered young oaks about twelve feet up—a type of heron-like flight I had not observed before in this species.

July 20th was changeable but generally sunny, and I went

to the wood near Uckfield where I hoped to net a female *A. aglaia* for breeding. For some time I chased these elusive butterflies which were flying wildly and haphazardly among young trees in a heathy part of the wood. Stopping to get my breath, I suddenly saw an adder sunning itself within striking distance of my canvas-shod foot! Thereafter I went with caution, and going with caution one simply does not catch fast-flying *aglaia*. The first newly emerged *N. io* were about here.

The next morning I made the long journey into Hants again, getting there just before 9 a.m., but *iris* was not forthcoming. Large numbers of *T. quercus* were coming down to moisture on the paths, however, about nine out of ten being females. I waited around for a while with Mr Wyatt who had also come early to the forest, but we saw no *iris* and eventually adjourned to his house where I had the pleasure of seeing part of his fine collection.

The weather turned rather sour after July 23rd, and apart from the first *Lysandra coridon* Poda. buffeted by the wind on the downs near Lewes, we saw little in the way of butterflies until the 29th, when my wife and I went over a stretch of downland in the Eastborne area. A number of local chalk butterflies had been reported from this ground around 1945 and we were interested to see how it had fared as a locality in the intervening twenty-five years. We were pleasantly surprised and recorded twenty-five different butterfly species just during August. On the first visit we saw scores of *L. coridon*, *P. icarus*, *P. megera*, *C. argiolus*, and a few *Melanargia galathea* L. and boldly marked *E. semele*.

The next day, July 30th, in the sunbaked rides of a West Sussex wood second brood *L. sinapis* were flying in fair numbers—males only at this date. *Vanessa atalanta* L. was very scarce this season, but on this occasion a female of the species was noted—while I was stalking a roe hind with my camera in one of the forest paths.

The last day of July was hot and sunny, and I went along with Dr Rydon to the Hampshire border where we visited several localities. In some of the woods *A. paphia* was still fairly fresh (we saw one pair *in cop.*, the male carrying the female); *C. argiolus* and *T. quercus* were frequent, and the trackside thistles were attracting plenty newly-emerged *G. rhamni* and *P. c-album*. We returned via Woolmer Forest where *E. semele* was flying, and visited the Chiddingfold Woods to see how the Summer brood of *L. sinapis* was coming along in Surrey. These dainty little whites were out in good numbers, fluttering along the verges of vetch and trefoil with *P. icarus*.

The hot humid weather continued into the first few days of August, and on the 3rd I went over to the North Downs around Mickleham. The morning was very misty at first but soon it became brighter. *P. icarus*, *A. agestis* and *L. coridon* were numerous, but I was looking for *Hesperia comma* L.

which turned out to be rather difficult to find. I saw it in one or two places over a wide area, mostly as single specimens. *A. aglaia* was fairly frequent in one downland valley, and much less wild than those I had been chasing in the Sussex wood, so at last a female was secured for breeding.

This splendid butterfly was also flying over the South Downs near Eastbourne the following day. *L. coridon* and *A. agestis* were now out in full strength in this locality, and there were still a few *M. galathea* flying. We were pleased to see a few *H. comma* here also, the first time we've ever found this species in Sussex. The weather became very changeable and we did not visit this place until August 11th, when on our arrival at the slope in fine weather almost the first butterfly we saw was a freshly emerged male *Lysandra bellargus* Rott. This delightful butterfly became abundant here as the days of August proceeded. *H. comma* was also gathering strength, and a pair was seen *in cop*. We did not see *A. aglaia* or *M. galathea* this time, but *E. semele* was everywhere in the hot sun and there were plenty of *L. coridon*, *A. agestis*, *T. sylvestris*, etc.

In the afternoon we investigated the downs around Lewes and took a perfect female *L. coridon* var. *semi-syngrapha* on arrival but *L. bellargus* had not emerged here.

I was very worried about this stretch of downland, which had taken a terrible trampling from cattle over the winter, and in March had looked so bare and cut up that I could hardly credit anything could survive. Much to my relief I was proved completely wrong when we visited the Lewes downs on the 15th August, and found *L. bellargus* even more plentiful than last year. I took a good ab. *striata* of *L. bellargus* and noticed others on successive visits. *L. coridon*, *A. agestis*, *P. icarus* and *P. megera* were all common. We were able to visit this locality frequently over the next fortnight. *L. bellargus* seems strongly entrenched over a wide area here, and is really plentiful in favoured little hollows. However, I have never seen *M. galathea*, *E. semele*, *A. aglaia* or *H. comma* here, all of which occur with *L. bellargus* at the aforementioned Eastbourne locality. Fresh *L. bellargus* were to be found at both Lewes and Eastbourne in the last few days of August when we visited the colonies for the final inspection of the season. The other species were mostly in tatters or finished but the astonishing thing was the large numbers of *M. jurtina* around that looked newly emerged.

I took up a hospital appointment in Ashford, Kent, at the beginning of September, and thereafter expeditions were few. We were disappointed to find the Wye Downs National Nature Reserve overrun by sheep and practically cropped bare. *C. pamphilus* was the only butterfly seen. However, on September 23rd we walked along Folkestone Warren and saw a number of autumn species including a single worn male *bellargus*. This was a surprise for we had heard that this insect had become really scarce in the area. It was a fine warm day

and a few *G. rhamni* and a single *V. atalanta* were seen in the lanes through Orlestone Forest on our return journey.

Apart from a couple of afternoons unsuccessfully searching for ova of *Thecla betulae* L., this virtually concluded our observations on butterflies for this year. It was a memorable one for us in many respects.

From the end of June to the beginning of September circumstances provided us with unparalleled opportunities for butterfly hunting, and in addition to that it was a splendid year for nearly all species.

Of the scarcer insects *A. iris* in particular was literally abundant in some localities, and *S. pruni* was common in more than one of its haunts. *E. aurinia* had an excellent year in Argyll, and so had *L. bellargus* and *A. aglaia* in East Sussex; and *C. argiolus* enjoyed a real population explosion throughout its range.

On the other hand *V. atalanta* was unusually scarce and we did not see one *Colias croceus* Fourc. throughout the season.

It may be interesting to add that in the last two seasons only, my wife and I have recorded no less than fifty species of butterfly in Britain—out of the sixty that regularly breed here. All of these were flying naturally in the wild. It is a source of great pleasure to us to add a new species each year but this becomes increasingly difficult, and a hard core of five natives remain that we have never seen.

Pinefield, Scaynes Hill, Sussex.

Why just "Schiff" ?

By CHARLES F. COWAN

Every recent list and article on European moths and butterflies contains names which are attributed to "Schiff." What ever's happened to Denis?

All these names were first published in the famous *Wiener Verzeichniss*, written anonymously by joint authors who called themselves "einige Lehrer am k. k. Theresianum", or Professors at the Imperial Theresian Academy (closed in 1784).

The "W.V.", as it was generally cited in deference to its anonymous authors, had a long gestation, the preface having been written and dated in March 1771. Even so, its birth was somewhat premature. It first appeared in 1775 under an apparently temporary title; *Ankündigung eines systematisches Werkes von der Schmetterlinges der Wienergegend* (Announcing a classification of the Viennese moths and butterflies). A review published on 7 December 1775 identified the two authors as Professors Denis and Schiffermüller, and mentioned that it comprised 322 pages and "8" plates [presumably an error for 3 plates]. There is a copy of this in the Library of the Museum and another in Linnaeus' own Library held by the Linnean Society of London; the latter indexed now under (just)

Schiffermüller! Then in, 1776, the identical 322 pages, frontispiece and two plates were reissued under a new title page, the more familiar *Systematisches Verzeichniss der Schmetterlinge der Wienergegend* (Classified catalogue of the Viennese moths and butterflies), still anonymously.

The foregoing has been common knowledge from the earliest times. Hübner, Ochseneimer and Horsfield (the last using Haworth's 1776 copy) each in turn discussed the work with approval before 1830. The entries in Percheron, 1837, *Bibliographie entomologique*, for Denis (1: 82) and Schiffermüller (2: 39) are typical; he dates the work 1775 and, quite understandably, cites the later title rather than the temporary one. L. B. Prout investigated the subject in 1900 (*Ann. Mag. nat. Hist.* (7) 6: 158-160), and finally the International Commission on Zoological Nomenclature fully discussed it in 1958. In their most useful Opinion 516 (*Opin. Decl. I.C.Z.N.* 19 (1): 1-44) they ruled on the precedence of five well known 1775 works on Lepidoptera and placed this one, as by Denis and Schiffermüller, on the *Official List of Works approved for zoological Nomenclature* with serial number 37. Its full official citation is given in the final paragraph below.

It would be interesting to know more of the history behind this book, but it is probably too late to recover details. No helpful obituaries have been found, but from various indications the following possibilities are suggested. Can anyone add to them?

Johann Nepomuk Cosmas Michael DENIS (1729-1800) was chiefly known as a poet but he published much else, both theological and scientific. He is commemorated by an article in the *Encyclopedia Britannica* (1910, ed. 11 vol. 8: 22a). He appears to have been something of an extrovert, dedicated always to the propagation and spread of knowledge. His interest in Lepidoptera was not evanescent, for he contributed in 1785 to Fuessly's *Neues Magazin*.

Ignaz SCHIFFERMÜLLER (1727-1809), in contrast, seems to have been more reserved. Possessing a magnificent collection, for which he became well known, he published little of his own.

It looks as if Denis was the prime mover of the book, and perhaps acted as "editor", compiling the results of their joint pioneering studies of the early stages of the Lepidoptera (how slowly these come to hand when needed!). The work abounds in lengthy footnotes and insertions, testifying to its laborious development after the 1771 preface was written. Then, as Denis noted in 1778, Schiffermüller was translated on promotion to the Linz Academy and its continuation had to be deferred. Was his move, presumably with his collection, the reason for the first hurried issue under the temporary title and then, after a brief interval during which hopes of continuation faded, the reissue of the bulk of the printing under its final title?

The statement has appeared from time to time, certainly as early as 1859, that Schiffermüller was "author of the *Ankun-*

ding (1775), and joint author of the famous *Wiener Verzeichniss*". No source or reason for such a statement can be traced. It is clearly false for two reasons; both authors were named in the 1775 review, and the texts of the two works are identical¹.

Whatever the background to the history the main facts are clear. Names cannot be attributed to just "Schiff.", it must be Den. & Schiff., or D. & S., wherever "W.V." was used by the old authors. As the work was anonymous, square brackets are needed for [D. & S.] if such distinctions are being made. The full and extended citation of the work is:

[DENIS, J.N.C.M., & SCHIFFERMÜLLER, I.], 1775. *Ankündigung eines systematisches Werkes von der Schmetterlinges der Wiener Gegend*. [2] tp., 1-304, [2 blank], 305-322, [323 Anzeige], [324 blank], ftps., 2 pls. 4°. Wien. (The two plates lie between pp. 304, 305).

If any change had been made, or if the work had been reprinted, the errata on p. 323, which refer only to pp. 45-98, would undoubtedly have been corrected (or augmented); but there is no change. The only difference in the texts which I have found is that page 313 of the 1775 issue was numbered "31". This presumably was a mishap corrected by the printer during the actual printing process. It is noted that the plates of the reissue are reversed right for left. The text figure on p. 304 is signed "T. I. Schiffermüller", which dispels any doubt as to the spelling of his name (T. standing for Theresian).

A Holiday in the East Pyrenees, June-July 1970, with Notes on the Lepidoptera Observed

By E. P. WILTSHIRE

SYNOPSIS

A stay in the Pyrénées Orientales, France, 17th June-13th July, is described. In the course of a general narrative, observations on the phenology, foodplant and morphology are given on some Lepidoptera. On 9th July at 2100 m. nocturnal migrant species came to light in large numbers in a thick cloud of mist; diurnal migrant species were noted at about 1000 m. on 21st and 23rd June in small numbers. Probably of interest to students of distributions are the capture of (a) *Satyrus ferula cordula* Scop. in the Val d' Eyne at 1500 m., (b) *Lycaena helle deslandesi* Hemm. and *Hamearis lucina* (L.) in the Tet valley just below Lac des Bouillouses at 1900 m., (c) *Pyrgus malvoides* El. & Ed., a much smaller form at Lac des Bouillouses at 2100 m., than at the localities near Vernet-les-Bains (700-1100 m.), (d) *Tethea* or *F.* at Casteil (not in Dufay, 1961), (e) *Mamestra bi-ren* Goeze (= *glauca* Kleem.) at Lac des Bouillouses (c. 2100 m.) (not in Dufay, 1961); (f) *Hadena ruetimeyeri* Boursin at Lac des Bouillouses (c. 2100 m.). A list is given of altogether 223 Macro-Lepidoptera noted

during the holiday with their localities. Of this total of 223, 81 were Rhopalocera and Grypocera, cf. in Dufay's list, 160 Rhopalocera and Grypocera out of a total of 1094, for the Department all the year round.

Narrative

One's first visit to a district as well known as the French East Pyrenees, particularly the Tet-valley, is unlikely to produce startling discoveries in the field of Lepidoptera. My aim was that my wife and I should enjoy a real holiday somewhere with a decent climate and a rich fauna and flora which might, to add interest, be sampled and studied to a reasonable extent. A real holiday for us, of course means avoiding the thickest crowds, household chores, snow, salt and sand, also excessive heat or rain. It seemed that a fortnight at 700 m., followed by another fortnight at 2000 m. in the Eastern Pyrenees would answer these requirements, and after consulting the Guide Michelin and several colleagues, bookings were made at (a) Le Catalan hotel in the village of Casteil above Vernet-les-Bains, and (b) at the Hotel BBones Hores, Lac des Bouillouses, north of Mont Louis on the eastern slopes of Pic Carlit. By the time the whole of France, triggered off by Bastille Day and the school holidays, were encumbering the roads to the beaches, we would be returning from Normandy to Normandy on a car-sleeper.

Our southward journey in mid-June, however, was made by road, with single-night stops and without reservations and went according to plan; it deserves no mention here except to say that rain and thunder did not tempt us to prolong our one-night stop at Gèdre (Hautes Pyrénées) (Pension Brèche de Roland), so we drove down again and westward.

As we passed over the Col du Portel on the evening of 16th June we left behind us the lush storm-wracked Atlantic zone and saw, spread out before us, the sunny Mediterranean maquis and limestone hills surrounding Quillan. In this town we spent the night at the Hotel Chaumière, in the town-centre, the other hotel, on the periphery, being full up. A further 110 km on 17th June, via Estagel by a roundabout but easy road brought us to our destination at Casteil. On the way, passing over the Col de la Bataille, we did not stop to pick up the *Melanargia* which seemed numerous there; they proved when sampled on a later visit to be *lachesis* Hübner, the distinctive subspecies of *galathea* L.; but our lunch stop near Millas showed *Pyronia bathseba* subsp. *pardilloi* Sag. flying in abundance on a bushy roadside bank, and also one or two *lachesis* amid the vineyards. The former, however, were already rather rubbed, but we found a few days later at Cattlar, above Prades, a population in fresher condition and with a slightly greater wing-span than the Millas ones. These two butterflies were a clear indication that we had arrived in a new zoogeographical region.

From Millas we turned again on the road towards the Spanish frontier and left it again at Villefranche-de-Conflent,

and halted briefly at a suitable spot not far from this town, in the gorge of the Cady which flows down from Vernet-les-Bains. A brief sample of the butterflies showed this to be rich terrain, with an admixture of Mediterranean with Euro-Siberian forms, as is equally true of all the surroundings of Vernet, including Casteil: southward facing slopes tended to be characterised by *Cistus* and lavender, while the northward slopes and valley bottoms, if not planted with apple, provided a great variety of meadow and woodland biotopes swarming with a high proportion of the typical European fauna.

The hotel Le Catalan at Casteil (700 m.) proved to be an excellent choice. Food, wine, and service were good, the atmosphere cheerful and friendly; a double bedroom with private bath (the only one such) and full pension for two weeks cost us about £100 all-in. It was surrounded on two sides by a small apple orchard and on the other two by the village, which is very small, and its fields. All around are wooded slopes, with numerous torrents. Excellent hunting ground was about $\frac{1}{4}$ mile away, easily accessible by motorable tracks or on foot. A well-organised camping ground in an orchard close to the torrent was noted about half-way between Casteil and Vernet, whose situation would be ideal for attracting moths without moving from one's tent. At the Catalan, one could get good moths to light but more and better ones by going a short distance away. The hotels at Vernet-les-Bains seemed entomologically poorly placed, except of course for the Hotel Angleterre, mentioned in previous articles about Vernet, nestling half a mile above the town in the Cady gorge, a little below the camping ground. It seemed however ill-maintained and lifeless; we were told it now took overflow tourists from other hotels to sleep only, the previous proprietrix having ceased to be active. However, this state of affairs could change again, and it would be worth investigating.

The lighted veranda of Le Catalan attracted a few moths every night, and on our first night I thus took *Epicallia villica* (L.), *Caradrina aspersa* Ramb., and a bleached, chipped female of *Gnophos mucidarius* Hübn., which laid ova between 18th and 21st June. A number of low plants were offered to the larvae which hatched about 1st July, but the only thing to please them were the pale mauve flowers of an undetermined species of *Linaria*, somewhat resembling the Jersey toadflax (*L. pelisseriana*) which grew on dry spots both at Casteil and higher in the department. They were fascinating little creatures to watch, sitting tight on the flower-petals and vibrating their fore-parts almost in unison at the slightest alarm. Only in their last instar did they drop this habit, which I have also noted when rearing from ova larvae of the Middle East species of the same genus, *G. dubitarius* Stgr., which in fact belongs to the same subgenus too. The mature larva of *mucidarius* is remarkable for its spine-like dorsal tubercles,

arranged in pairs on somites 5 to 8 and 10, each being bifid. On returning to Normandy in mid-July I succeeded in persuading them to transfer to *Linaria vulgaris*, and obtained a small series of gen. 2 at the end of August; this lot were coloured pale orange-brown, variegated with dark blue-grey. Nearly all the subgenus *Euchrognophos* Wehrli have this orange tint which makes them for me the most attractive group in the very large and rather confusing genus *Gnophos*. The rather southerly or, rather, Mediterranean to Central Asian, distribution of this subgenus gives it also a scarcity value.

For night-work, however, I relied rather on an actinic tube operated from my car-battery than on the hotel lights. One of the moths so taken was a ♂ *Pterostoma palpina* (L.), a chocolate-brown form darker and more nearly unicolorous than the *palpina* gen. 1 form which I have taken in Normandy which is variegated straw and grey; another was *Tethea* or F., a species not mentioned in Dufay's list of species inhabiting this department of France.

Perhaps the best of all localities close to Casteil, accessible to motor traffic, was the Col de Jou (1000 m.), on a western shoulder of Canigou. At the Col, one forest track branched eastward, mounting the far side of this 2785 m. mountain, whose peak, by this approach was too distant for us; probably, too, the track was only to be attempted in a jeep. The other fork, from the Col, was not on any map; it had been made some years before to a now disused quarry which disfigured a ridge further to the west of the Col, and indeed seemed to cut a new Col at about 1200 m. in this ridge, which might well be called Quarry Pass or Col de la Carrière. Just below the fork at the Col de Jou itself, and on the left, was a flowery meadow with terrace-like irrigation, rich in butterflies. The track to the quarry was also a productive walk, with steep slopes above and below; it was impassable for motor traffic. After the flowery, productive stretch, the track turned and became gloomier, overshadowed by a beech forest, with fewer insects on the wing by day. Finally, at about 1250 m. on the far side of the Quarry Pass, the path virtually ended at a grassy slope overlooking the Sahorre valley and the village of Py: glorious scenery, well worth the hour's walk, from the Col de Jou. We reached this point on 21st June, on a fine day following a rainy night; in the beech wood on the way back, we noticed a female *Phalera bucephala* L., apparently lifeless in a puddle on the track. Placed in a carton, and warmed by the afternoon sun, she came to life and during the following night laid two neat batches of yellow ova, which hatched on 7th July, by which date beech (*Fagus*) foliage was difficult to obtain, so I bred up the larvae on *Salix caprea* and later, at Le Havre, on *Salix babylonica* and occasional *Fagus*. Pupation took place in August and moths hatched, slightly forced, in April 1971.

Throughout our holiday there was a tendency for afternoon thunder-storms to creep eastward from the higher peaks

further west, but they seldom got as far as Canigou and Casteil. The quickest way up Canigou is by hired jeep from Vernet, as described by de Worms (1966), as far as the chalet-restaurant at Les Cortalets (2200 m.), amidst the pines, with the peak and its snows towering behind and a tarn frequented by grazing cattle. De Worms visited this place in July but was disappointed; nevertheless he took more than I did on 26th June, a date that seemed too early for any of the specialities. A few *Vanessa cardui* L., *Aglais urticae* L., *Issoria lathonia attenuata* Sag., *Pieris napi* L., and *Gonopteryx rhamni* L. were seen, also a single *Isturgia limbaria* F., a species common among broom at 1000 m. and higher over a wide area. Only a very fine female *Nymphalis polychloros* L., taken at 1800 m., where the track went through a tunnel, partly consoled me.

If June was too early to get much at 2200 m., the season was well advanced on the drier slopes below Vernet, which we visited on days when clouds or storms seemed to threaten the higher localities; indeed such day-fliers as *Papilio feisthameli* Dup., *Lampides baeticus* L., and *Synthymia fixa* F., which characterised these lower drier localities, were far from fresh.

The first of the two localities in this category which we visited appears as "Vernet 600 m." on my labels; it was in fact the Crêtes de Fully, a ridge-top crossed by the road linking Vernet with Sahorre in the Rotja valley. One can walk from the road, or even drive a car along an un-made track, northward along this ridge for some distance, and already it shows signs of tourist-erosion, a fate that awaits too many beautiful places which cars can penetrate. Quite a number of *P. feisthameli* were seen on this ridge, all past their best on 19th June, and some very active *L. baeticus*, so worn as to be colourless; these rapid ghosts, looking larger than life, were most intriguing and difficult to catch and when finally netted proved a disappointment! *Argynnis paphia* L. was already out here, but elusive. *Heodes alciphron veronius* Fruhst. and *Nordmannia ilicis* Esp. were fresh, too, and easier to catch, and a few *P. bathseba* and *M. lachesis* were also noted. Among the moths, *Chlorissa pulmentaria* Guen. was put up by day, amidst swarms of *Tortrix viridana* L., and in the evening the light attracted *Pseudoips bicolorana* Fuessly, *E. villica*, *Metopoceras canteneri* Dup., *Caradrina flavirena* Guen., and *selini* Boisd., etc., and among the Pyralids *Loxostege verticalis* D. & S. On two different species of oak half-grown larvae of *Lymantria dispar* L. were noted the same day.

The second locality in the dry, low category, was further away and involved a trip through Prades, the picturesque market-town in the Tet valley east of Villefranche, where Casals lives. Leaving the main road at Prades we crossed the river and mounted the slopes above Cattlar, and took the turning for Sourniya. It was a bit too far to work at night from Casteil; but on both our visits (18th and 28th June) we

found plenty flying here by day, no matter what the weather might be doing at Casteil or higher. On the 18th, we found *P. bathseba* plentiful not far from Cattlar, flying with *Pieris manni* Mayer, *Melitaea didyma* Esp., *garumna* Verity, etc., and a few *M. lachesis* on both visits. On 28th June we found also *Plebejus argus* freshly hatched in plenty; it was a larger and lighter form than the *argus* flying at higher elevations and rather reminiscent of *Lycaeides idas* L., but the fore-leg tibial spine, present in all examples, is a diagnostic character of *argus*. *P. bathseba* was still plentiful, and among others taken were *Strymonidia spini* D. & S., *N. ilicus*, and *Sterrrha ochrata* Scop.; *L. dispar* larvae were now mostly full-grown and plentiful both on the oaks and on *Pistacia terebinthus* but we did not take them. A larva of *Sterrrha circuitaria* Hübn. was found on flowers of *Silene inflata*, the moth hatching on 31st July.

A third locality in this category, which we did not work is that corresponding to the first, near Vernet, but on the crests of the right bank of the Cady; this ridge is crossed by the track linking Vernet with Fillols.

Doubtless we ought to have proceeded further along the road from Cattlar to Sourniya, where *Euphydryas desfontainii pierroni* Lajon. was discovered, but we might well have been too late for it, and I note from a recent article (Mazel, 1971) that the proprietor of the land where it flies charges for admission!

Casteil itself, and the Col de Jou thus provided the greatest riches, for the season seemed just right there, and the list of species at the end gives the details. Villefranche might have done equally well, but we were content with the 700 m.-1000 m. contour. The only *Erebia* species which we saw was *E. meolans* de Prun., in a form transitional to *bejarensis* common at the Col, but not quite reaching the village of Casteil. According to Bretherton the form on Canigou is *almada* Fruhst., while subsp. *zagazia* Fruhst. flies at Porté, so the former name appears to apply.

Just before the end of our stay at the Hotel Catalan, Dr and Mrs Dacie arrived and by a coincidence were placed at a table next to ours; they had just come from Porté (1625 m. and further west than any of the places we visited) and had a beautiful series of *Procllossiana eunomia* Esp. from there on the setting-boards; Dr Dacie had also seen *L. helle deslandesi* fairly commonly there but going over, only the females being in tolerable condition.

On 1st July we ourselves drove westwards, but branched north at Mont Louis up to the Lac des Bouillouses, stopping a-while at 1650 m. in the Forest de Barrès. Here, as in many other of the Pyrenean localities which we visited, *Clossiana euphrosyne* L. and *selene* D. & S. were both flying. *Cyaniris semiargus* Rott. was common, and there were not a few *Erebia oeme pacula* Fruhst. in a rather small form. The trees were now mainly conifers; and dwarf broom, with its thick scented

yellow flowers, began to replace the common broom. The narrow but adequate road climbed slowly towards the lake parallel to the Tet torrent whose banks here and there had been selected by motorist campers relishing the wonderful air and scenery.

On arrival below the barrage we found we had to cross an "Irish bridge" which, we noticed, deterred some visiting motorists from crossing towards the big hotel. On the left bank, as one approaches the barrage, are a few shacks used by educational organisations for summer camps and one or two tiny restaurants; one cannot call it a village. The Lac des Bouillouses is a comparatively new body of water formed by a straight barrage, whose top is not open to motor traffic; it crosses the quite wide neck of what was once evidently a vast swampy pasturage, the lower part of which, sloping due south and draining by a different valley towards Font Romeu, is still much grazed and on the maps is spelt "Bones Aures". The Tet valley gorge branches south-west from this just below the barrage, and an enormous water-pipe runs down it to the hydro-electric works below without in any way disfiguring the scene. The whole valley of Bones Aures, with its upper half now a lake, is surrounded by forest and crags, those on the west towards Pic Carlit (2921 m.) being intersected by torrents and small lakes where there is choice fishing; this is controlled by a keeper who also acts as a guide. Scores of anglers appear every week-end, parking their cars just below the hotel, which, however, they seem to find intimidating and pretentious; we had it very much to ourselves, though it would be full-up in late July and August, like most hotels in France. Our fortnight here in a room with private bath (all rooms are identical) cost us £100 on demi-pension, to which must be added about £10 for lunch-snacks at midday, when we often drove down the road to other localities.

The situation of the hotel is entomologically as good as one could wish—quite isolated, some fifty metres higher than the lake and several hundred metres away, with the forests and crags close to it on one side. Three enormous mixed-light lamps on the front attract the moths freely on most nights, but being at first-storey height are not easily worked. However, our bed-room was next to one, and by leaning out of the window with a net I managed to catch a good sample of the insects attracted, many also alighting on the window-sill. This performance aided the digestion and helped one to go to sleep later; it also entertained the hotel staff and occasional guests, but they got bored before I did. One also found on the ground floor a few moths which had entered by windows or doors, and on our day of arrival, I took in this way a specimen of *Hadena ruetimeyeri* Boursin, probably the seventh known example of this rarity, and a new locality for it, its easternmost.

There was, however, less variety, both in diurnals and nocturnals, at this height than at altitudes of 700-1500 m. which I worked; nevertheless certain species, obviously resi-

dents at Lac des Bouillouses, came to light in fairly large numbers, particularly *Lasionycta nana* Hufn., *Hadena bi-ren* Goeze, *Mythimna comma* (L.) and *Epirrhoe molluginata* Hübner. Of these, *H. bi-ren* seems to be a new record for the Eastern Pyrenees. Others, rather less numerous, included *Pergesa porcellus* (L.), *Apatele auricoma* D. & S., and *euphorbiae* D. & S., *Eucharia casta* Esper, *Agrotis simplonia* Geyer and *Hadena caesia* D. & S., and *tephroleuca* Boisd., also the Geometrids *Eupithecia linariata* F. and *Gnophos ambiguata* Dup. On 12th July, females of *Lasiocampa quercus* (L.) and *Macrothylacia rubi* (L.) were taken at light, but since the males, flying wildly by day, proved impossible to catch, I cannot say what form or subspecies of *L. quercus* occurs at this height in the East Pyrenees.

By day, the lake's immediate surroundings provided fairly good hunting, with agreeable walks in all directions; the variety of species might well be more interesting in late July or August. As it was, I took *Callophrys rubi* (L.) and *Pyrgus malvoides* E. & Ed. still in good condition: the latter's wingspan was about 3 mm. less than the Casteil and Col de Jou *malvoides*; but the reverse tendency was noted in the races of *Polyommatus icarus* Rott., the higher altitude forms of which were the larger. *Epirrhoe tristata* (L.), *Isturgia limbaria* and *Ematurga atomaria* (L.) were the commonest day-flying Geometrids and two species of *Erebia* were noted: *E. triaria* de Prun. fairly commonly and *E. epiphron fauveaui* de Lesse of which one was taken on 6th July in the narrow defile of the Tet not far from the barrage: probably later in the month more would have been in evidence. This defile was the most rewarding spot within close range of the hotel, as I took a few *L. helle deslandesi* there—apparently the highest elevation at which it has been noted, and also the odd *Parnassius mnemosyne* (L.) and *Hamearis lucina* (L.). The local East Pyrenean race of *helle*, is usually looked for by visitors at Porté, but has, in fact, been taken even further east than where I took it. Descimon (1960) has recorded capturing it in the Upper Aude basin at 1700 m. on 6.vi.58, and Real (1962) on 18.vii.62 near Col de Porthos.

Euphydryas aurinia debilis Ob. was not uncommon both above and below the lake, at 1900 m., on the pastures of Bones Aures (1900 m.) and among the fishing sites of the plateau below Pic Carlit (2200 m.). At the latter it flew perhaps more freely; and a number of Pyralids, but no *Psodos* were seen; it was perhaps too early for the latter.

On 9th July unusual meteorological conditions occurred which appeared to affect the numbers of certain species known to be migratory. The hotel was enveloped in a fog-like cloud as soon as the sun set, and between 9.30 and 10.30 p.m. the lights were visited by numerous *Noctua pronuba* L. and also not a few *Celerio lineata livornica* Esp., *Agrotis ipsilon* Hufn., and *Autographa gamma* (L.). (Of these, singletons of only one, *pronuba*, had hitherto been noted at the Lac; singletons

of *pronuba* and *ipsilon* had been attracted to light also at Casteil on 22nd June, and one *gamma* on 28th June. All three could well have been indigenous there.) On 10th July, a normal, fine night, with quarter-moon, no more *livornica* were to be seen and only one *pronuba*, one *ipsilon* and one *Nomophila noctuella*. 11th July was thundery and one more *pronuba* appeared at light, but other moths came in normal numbers. One *noctuella* was seen again on our last night, 13th July, but that is all. It seems evident that the conditions described for 9th July favoured a nocturnal migration, possibly northwards from Spain across the range into lowland France or, less probably, to some high point. Whatever their actual destination, the light can only have attracted those within a limited radius, vision being obstructed by the dense cloud, and one presumes that far greater numbers were performing the suggested migration. Mention has already been made of the small numbers of day-flying migrants, whose movements are often compared with those of the above nocturnal species, e.g., *V. cardui* and *A. urticae* at Les Cortalets and Col de Jou in late June.

On days not devoted to foot-expeditions in the immediate neighbourhood of the Lake, we used the car to visit several interesting localities lower down. The new road to Font Romeu, colourfully planted with lupins along its verges, traversed a forested ridge at about 1800 m., and had one or two favourable clearings or glades, where we noted a small dark form of *Plebejus argus*, one or two *Mellicta parthenoides* Kef., *Euchloe ausonia* Hübn., *E. oeme pacula*, and *triaria*. But there was better country further afield, in the Upper Aude or the Cerdagne, using the roads through Mont Louis and Font Romeu respectively. The Matemale barrage is the chief source of the Aude and is situated at about 1500 m., in a rather windy, open valley. The surrounding slopes are swampy or forested and seemed to have a rich diurnal fauna. Close to the lake itself at 1500 m. and again at 1600 m. near Les Angles we took several *E. aurinia debilis* and the two *Erebia* just mentioned, also *Palaeochrysophanus hippothoe mirus* Verity. Meadows close to the Matemale village produced *Plebicula amanda* D. & S. (= *icarius* Esp.) subs. *pyrenaeorum* Verity, *Scopula immorata* (L.), and torrent-slopes near La Llagone (1700 m.), closer to Mont Louis, *Cl. selene*, *P. argus*, and *Anaitis praeformata* Hübn.; the latter indeed, appeared in several localities in this neighbourhood, the large females flying by day being easy to catch and sometimes, as at our hotel, also coming to light.

On another day we crossed the Cerdagne southwards from Mont Louis and found the lower slopes of the frontier range at 1570 m. between St. Pierre les Forcats and Planes very rich in butterfly species on 7th July, including *Brenthis ino* Rott., both *Clossiana* species, two *Mellicta* species, *Coenonympha arcania* (L.) subsp. *cephalus* Geoff., and very ragged *Callophrys rubi*.

Our favourite locality on these slopes, however, was west of the Col de la Perche, at about 1500 m. in the Val d'Eyne, equally easily reached by road via Font Romeu. The flowery meadows close to the Eyne stream just before it passes under Route Nationale 116 were particularly rich, with woods on one side, and more rocky slopes on the other. Here a single male of *Satyrus ferula* F. subsp. *cordula* Scop. was taken, not in cabinet condition, but the first taken in this part of the Cerdagne. According to Dr Tavoillot, who has regularly spent entomological holidays in this area, the distribution of this species in the Pyrenees is wider than stated in Higgins and Riley: Dufay recorded it from Vernet and Col du Jou, and Dr Tavoillot himself had found it near Mont Louis and at St. Thomas (Tet valley) but not higher than 1600 m. De Worms (1966) of course reported taking it at Py, above Sahorre. The race of *Parnassius apollo* L. in the Val d'Eyne, seemed, from the one example I took, to be nearer the form *portensis* Ruet. from Porté than that of Canigou, which I had taken commonly at Casteil. The interesting *Coenonympha glycerion* Bork. (= *iphis*) was just appearing on my second visit to this spot. A fine show was put up by *Heodes virgaureae* (L.) *pyrenaicola* Graves, *P. hippothoe* was quite common, likewise *B. ino* and other Fritillaries, but of *Lysandra coridon* Poda only one male was seen. *Gnophos myrtillatus obfuscatus* Hübn. was one of the few moths seen, and though *M. lachesis* was taken again, it was disappointing that it was not *russiae* Esper!

I was sorry not to learn of Dr Tavoillot's presence at Mont Louis until our last day at Lac des Bouillouses, and I was unable to consult him about the localities to be worked. However, there is much to be said for striking out on one's own, and not going where others have gone before.

On 15th July we drove from Lac des Bouillouses to Narbonne, branching off at Millas across the Corbières, taking the less frequented route northward from near Estagel. A mistral gathered force through the day; clouds crept eastward along the chain, and in the low arid hills of the Corbières an intermittent drizzle was beginning. Stopping at 200 m. between Estagel and the Aude frontier we sampled the butterflies, and found them to include *M. g. lachesis*, still in good condition, *Hipparchia alcyone* D. & S., quite common, and *Colias australis* Verity. As we reached Narbonne station, our destination, the temperature had dropped and a northerly gale was blowing over the whole of France. Having been so lucky in the weather throughout our holiday, we felt no regrets as our train carried us rapidly away from the butterfly-rich slopes of southern France towards the green fields and pastures of Normandy.

(To be continued)

Notes on Some of the British Nepticulidae

By Lieut. Col. A. EMMET, M.B.E., T.D., M.A., F.R.E.S.

(Continued from p. 248)

ROSA spp. (Rose)

The mines of *Stigmella anomalella* Goeze and *S. centifoliella* Zell. are hard to distinguish, and one sometimes has to await the emergence of the moth to know which one has been taken. Hering (1957) and Borkowski (1969) give some guidance. The start of the mine is completely filled with frass in the case of *anomella*, while with *centifoliella* the early part of the mine has a central line of frass flanked by clear margins. Mines which later on have the frass dispersed in zig-zag arcs are *anomalella*, but that species does not always arrange its frass thus.

Dectiria angulifasciella Stt. has a mine which is quite distinct. Unlike the other two rose-feeders, it occurs only in the autumn. A sinuous gallery filled with dispersed, intensely black frass leads into a large blotch in which the frass is irregularly distributed. The larva is whitish, and not yellow.

SALIX spp. (Sallows and Willows)

What may be called the *salicis* group of *Nepticulidae* has long caused difficulty. Stainton named *salicis* in 1849; Frey added *vimineticola* in 1956 and Heinemann *obliquella* in 1862. Tutt (1899, pp. 317-324) accepted all three as good species, but Meyrick (1928), a confirmed "lumper", combined them all under the name *salicis*. Waters (1929) considered that there were two species, *salicis* and *vimineticola*, following Peterson (1927), who had found differences in the genitalia; the latter species evidently was considered to embrace *obliquella*. Beirne (1945) reached the same conclusion as Petersen, that there were two species. Ford (1949) tentatively added *obliquella* with the proviso that it might be a form of *vimineticola*. Heslop (1964) gave all three, and so will the forthcoming edition of Kloet and Hincks's check-list; in doing so they follow Hering (1957, p. 930) and other continental writers.

The current doctrine, then, is that we have three species: we therefore require to be able to distinguish between them. There are three avenues of approach—the foodplants, the mines, and the imagines.

(a) Foodplants. All authorities agree that *salicis* feeds on *Salix caprea*, *S. cinerea* and *S. aurita*; Hering adds that it is occasionally found on narrow-leaved willows as well. British writers, who have confused the other two species, say of them that they occur on *S. viminalis*, *S. fragilis* and *S. alba*. Hering, however says that *vimineticola* is confined to *S. viminalis* and that *obliquella* occurs on all types of willow. Borkowski (1969) who has not found *vimineticola* in Poland, restricts *obliquella* to *S. fragilis* and *S. babylonica*, the garden weeping willow. In our present state of knowledge it is reasonable to start from

the assumption that mines in broad-leaved willows are *salicis*, on osier *vimineticola* and on other smooth- and narrow-leaved willows *obliquella*; but at the same time we must be on the lookout for exceptions to this generalisation.

(b) *Mines*. The mines of *salicis* and *obliquella* are very similar, both starting as a narrow gallery which widens, more or less, into a blotch. Hering says that *salicis* has a more contorted gallery and that the frass is deposited more thickly, both in the gallery and the blotch, where it tends to be concentrated in a broad mass. He declares that the mines of *vimineticola* and *obliquella* are similar, and are only to be separated by means of the foodplant. Carolsfeld-Krausé (1961), however, says that Hering describes the mine of *vimineticola* wrongly and that he knows of no accurate account of it in British literature, except where Tutt (1899) quotes Frey's original description in German. Since our text-books are misinformed, and Carolsfeld-Krausé's paper is little known, I will quote his description in full.

"The *vimineticola* mine, as the writer knows it from Austrian specimens on *Salix incana* (ex. coll. Klimesch), has the ovum on the upper side of the leaf, most often near to the stalk, in which case the mine is completely straight, running along and very close to the midrib of the leaf towards its tip. More rarely the ovum is placed on the margin of the leaf, some distance from the stalk, in which case the mine runs towards the base of the leaf before it turns towards the tip. A single mine of the batch has the ovum placed near the tip and runs towards the base.

"The first part of the mine is practically invisible, even by the microscope, but where after an ecdysis it becomes visible to the naked eye, it is rather broad and nearly filled by dark, blackish-brown frass. It *never* terminates with a blotch, but only with the usual, straight and slender part of a normal gallery-mine, and this part is not conspicuously broader than the last part containing frass".

(c) *Imagines*. *N. obliquella* has the yellow fascia in a central position and less oblique (in spite of the insect's name) than the other two species. Beyond the fascia the apex is more coarsely scaled and lacks the violet gloss possessed by its relatives. The terminal cilia have a dark base and yellow tips, and the division between the two colours is more sharply defined in *obliquella*. *N. salicis* and *N. vimineticola* have the fascia beyond the middle of the forewing and it is outwardly oblique; it tends to be broken into two spots. The fascia is in most cases thinner and less distinct in *vimineticola*. Tutt quotes Fletcher as saying that *vimineticola* is a smaller and darker insect. These differences are insufficient for separating *salicis* and *vimineticola* with certainty; with them the foodplant remains the best guide. *N. obliquella*, on the other hand, is reasonably distinct.

Warren (1884) reported finding between twenty and thirty cocoons on mined or adjacent leaves of *Salix alba* at Cambridge;

all except one of the cocoons were at the extreme tip of the leaf. Though recorded as *vimineticola*, the foodplant suggests that they were *obliquella*. I have now found a good many mines of *obliquella* the majority of which have been vacated, but I have never seen cocoons in such a situation.

N. salicis is a common insect with its range extending to the north of Scotland and the west of Ireland. The other two species have been so much confused that it is difficult to unravel their records. Tutt recorded *vimineticola* from Sussex and Lancashire and doubtfully from Cambridgeshire and Herefordshire; only in the case of the Lancashire specimens does he specifically state that they were bred from osier. His one locality for *obliquella* is in Herefordshire. Water's specimens from the Oxford district (taken both in Oxfordshire and Berkshire) are referable to *obliquella*, since none was bred from osier. I have seen the specimens and their wing pattern is consistent with this determination. I have reared *obliquella* from Biggin Hill, Kent, and have found mines at Bromley, Kent, and Wicken Fen. No doubt there are other records, but they have not come to my notice.

Carolsfeld-Krausé says: "It is quite sure that *vimineticola* is a British species, as Beirne's figure of the male genitalia of a specimen from the B.M. . . . certainly represents *vimineticola*". But this is a false deduction. I have seen the specimen Beirne used, and it hales from the Frey collection, and is certainly of continental origin. There are eighteen specimens of *vimineticola* in the general collection of the British Museum; nine of these are from the Frey collection, seven from the Stainton collection and two from the Rothschild Bequest. Each of the last pair bears the label "Bred 5.8.83" without locality; none of the others has a data label. The Stainton specimens may have been British or may have been a gift from Frey. Since *vimineticola* and *obliquella* have always been confused in this country, I do not consider that any of the records for the former can be accepted without question, and there is a distinct possibility that it is not a British species at all.

Our other sawfly-feeding Nepticulid presents no such problems. It surprises me that so few entomologists, including some who have made a special study of the family, have encountered *Dechtiria intimella* Zell. I think the trouble is that they go into winter quarters before *intimella* does, for it is one of our latest leaf-miners. The egg is laid on the midrib (or, very exceptionally, on the petiole) of leaves of *Salix caprea*, and, less commonly *S. cinerea*. The larva first excavates a chamber in the midrib, from which it later mines out into the blade of the leaf, flanking this part of the mine with walls of frass. These are often constructed in the shape of the letter "L", with the shorter arm directed at right angles to the midrib. When small the larva retreats into its midrib hideout, like its relatives *D. argyropeza* Zell. and *D. turbidella* Hein. When it has outgrown this feat, it is more careless in the disposition of its frass, and generally blocks the entrance to the carefully

constructed passageway. The larvae may be found in fallen leaves, when the green islands which they cause make the tenanted leaves conspicuous. Those I was breeding in 1970 continued feeding until early December. I collected some larvae in fallen leaves on a very wet day in mid-November, and noticed that many of the mines were full of water; nevertheless, the larvae were feeding unconcernedly. I sent this batch to a friend, and do not yet know how they fared. Mr E. S. Bradford tells me that he, too, observed the same phenomenon. I have seen two leaves, one taken by Mr D. W. H. Fennell at Durfold, Surrey, early last November, and the other by myself a week later in north Essex, in which the mine starts in the midrib in the usual way and then advances up a lateral rib for some distance before breaking out into the parenchyma of the leaf. Sorhagen described the larva as pale yellow, and all our authors have echoed him. To me it looks whitish green, whether seen in or out of the mine, and Mr Jacobs, who has had mines from me, agrees with this point. The cocoon is dark brown and in captivity is spun on tissue or between leaves.

The following narrative shows how this species, like so many of its relatives, can suddenly spring into abundance. In the autumn of 1968, after finding *intimella* commonly at Wicken Fen, I also searched for it at Debden, near my home in north Essex; with difficulty I found a single mine. I never looked there in 1969, but in 1970 it was ubiquitous and outnumbered *N. salicis*.

SORBUS AUCUPARIA (Rowan)

According to Ford (1949), there are four British Nepticulids which feed on rowan. These are *Stigmella aucupariae* Frey, *S. nylandrella* Tengst., *S. oxyacanthella* Stt. and *Nepticula sorbi* Stt.

The last of these species presents no problems. Its "tadpole" mine (a blotch with a wiggly tail) is not unlike that of *N. plagicolella* Stt. on *Prunus*. I have as yet only found vacated mines of *sorbi*, which is an early larva and must be sought in June; there is only one generation. It is common in the north of Britain, but local in the south. Tutt gives Norfolk, Sussex and Hereford as the southern counties in which it occurs, and Meyrick added Surrey. Waters never took it in the Oxford district. I have found the mines sparingly at Keston and Westerham in Kent, and have taken the imago on tree trunks in the former locality. I believe it to be a new record for the county.

S. nylandrella appears to be confined to the north of England and Scotland, and does not seem to have been recorded for many years. No doubt it would still be found if looked for.

It is the other two species which cause problems. The evidence for rowan as a foodplant of *oxyacanthella* seems to be derived from Tutt (1899, p. 203), who gives no further details. Meyrick (1928) dodged the issue by giving *oxyacan-*

thella's foodplants as "hawthorn, pear, apple, etc."; we cannot therefore tell his position regarding rowan. Ford (1949) gave rowan, but may have been only echoing Tutt. The issue was further complicated when *oxyacanthella* was split, losing its apple- and pear-feeding element to a separate species called *S. aëneella* Hein. (Brown, 1964). We are not told to which species the rowan-feeding insects are assigned. Hering (1957, p. 1012) does not include either *oxyacanthella* or *aëneella* among the leaf-miners on *Sorbus*, but offers another species called *oxysorbi* Skala, saying that further investigation is needed to decide whether it is distinct from *oxyacanthella* or *aëneella*.

Before we go any further with this problem, let us take a look at *aucupariae*. The mine of this species appears to have an exceptionally variable frass-line. In some cases it forms a thin central thread; all the examples I found in the west of Ireland were of this type, and I wondered if I had *nylandriella* until the imago proved otherwise. In other instances the frass is deposited in a broad belt of separate grains; in others again it is in zigzag arcs. Borkowski (1969) also records this variability and adds that from mines with the characters of *oxysorbi* (reddish frass dispersed in arcs) he has bred typical *aucupariae*; he is therefore of the opinion that *oxysorbi* is a synonym for *aucupariae*.

So now we come back to *oxyacanthella*. On the evidence I have given, I do not think we can continue to number rowan amongst its foodplants. The probability is that collectors have quite understandably been led astray by the variability of *aucupariae's* mine. In one of its forms it closely resembles that of *oxyacanthella*, and the larvae, too, are similar. I have been unable to find any specimens of *oxyacanthella* bred from mountain ash in the collections at the British Museum (Natural History).

The localities given by Tutt for *aucupariae* lie north of a line from Hereford to the Wash. Waters (1929) added Oxford, and Meyrick Surrey. I have found the mines not uncommonly at Keston and Westerham in Kent, and have a number of cocoons overwintering from the latter locality. This appears to be a new record for the county of Kent.

(To be continued)

BISTON BETULARIA L. AB. GRISEA SMITH IN KENT.—I took a male example of this peculiar grey form in the m.v. trap in my garden at West Wickham on 4th July. I am only aware that *grisea* has previously occurred in Cheshire, and there is a short series from there in the R.C.K. collection. S. Gordon Smith bred the holotype from Chester in 1938 (cf. *Ent. Rec.*, 66: 97). —J. M. CHALMERS-HUNT, 1 Hardcourts Close, West Wickham, Kent. 10.viii.1971.

The Systematics of the Charaxidae (Lepidoptera: Nymphalioidea)

By A. H. B. RYDON, F.R.E.S.

(Continued from p. 233)

(1) Subfamily CHARAXINAE

Charaxidae (Doherty, 1886)

(Type-genus: *Charaxes* Ochsenheimer, 1886, *Schmett. Europa*, vol. 4, p. 18; type-species: *Papilio jasius* L., 1767.)

This subfamily comprises *Charaxes* and the closely allied Indo-Australian genus *Polyura*, the latter differing in having the cell of the hindwing open, whereas in the former it is closed. There are also differences in the male genitalia of the two groups, mainly in the formation of the juxta, which, in *Charaxes*, has the dorsal groove extending posteriorly into the basal part of the ventral hook, but in *Polyura* the hook is not grooved dorsally (see Rothschild and Jordan, 1898, pl. 14). The pattern of the wings of the two groups differs, too, as has been pointed out by the latter authors, i.e. in *Polyura* the cell of both wings never has more than two bars below, while in *Charaxes* four bars are typically present. The antennae of *Charaxes* are black at the tip in nearly all the species (but not in the *varanes-fulvescens* group in which the antennae are reddish-brown throughout their length), while in *Polyura* the last few segments of the antennae are usually rufous-brown in colour. Sexual dimorphism is common among *Charaxes*, but not *Polyura*.

Charaxes is a large genus, consisting of more than one hundred species in the Ethiopian region and some twenty-odd species in the Indo-Australian region, with one species (*Ch. jasius*) in the Mediterranean Subregion. The African members of this genus were subdivided by Aurivillius (1911) into 18 groups on the shape, colour and pattern of the wings. These groups are, to some extent, supported by differences in the early stages (e.g. in the larval head-pieces, the cremastral hooks of the pupae, and so on), in the foodplant preferences, and in the male genitalia. Poulton (1926) rearranged Aurivillius's groups, and divided them into *Leptodontiae* and *Hadrodontiae* (i.e. those with small serrations on the costa of the forewing, as opposed to those with large serrations). Some authors have already split *Charaxes* in a small way into separate genera. Moore (1880) created the genus *Haridra* for the large brown Indo-Australian *Charaxes* based on *Ch. psaphon* Westwood; Hemming (1939) erected the genus *Zingha* for *Ch. zingha* Stoll, as a replacement name for *Monura* Mabille; and Cowan (1968) coined the name *Stonehamia* for *Ch. varanes* (Cramer), to replace *Hadrodontes* Stoneham. If one is to split up *Charaxes* into separate genera, the genus *Eriboea* Hübner should be resurrected for the distinctive *etheocles-ethalion*

group of African *Charaxes*, with their black males and variegated, mimetic females. However, I myself do not think there is any real need for splitting up *Charaxes*, since the genus is an easily recognizable one, both in the early stages and in the morphology of the adults; nor, indeed, was such action advocated by Rothschild and Jordan (1898-1900) in their monograph of the genus. The same thing applies to the genus *Polyura*, which Moore (1896) divided into *Murwareda* (based on *Charaxes dolon* Westwood) for the larger members of the group, retaining the invalid name "*Eulepis*" for the rest. Although Rothschild and Jordan (1898) separated *Polyura* into three groups according to the development of the pattern of the wings, represented respectively by *pyrrhus*, *eudamippus* and *delphis*, they did not maintain Moore's genus *Murwareda*, as they considered the characters upon which it was based were completely unreliable. There are, nevertheless, differences in the male genitalia of the larger and the smaller species of *Polyura* that would justify splitting up the genus into subgenera if one felt so inclined. Using the following characters, the Charaxinae can be divided into two tribes:

- (1) Hindwing cell open; tip of antenna rufous-brown; ventral hook at distal end of juxta not grooved at its base
tribe POLYURINI tribus n.

(Type-genus: *Polyura* Billberg, 1820, *Enum. Ins. Mus. Billb.*, p. 79; type-species: *Papilio pyrrhus* L., 1758.) This tribe also contains *Murwareda*. (*P. pyrrhus*, incidentally, was the first member of the Charaxidae to be named by Linnaeus.)

- (2) Hindwing cell closed; tip of antenna typically black; ventral hook at distal end of juxta dorsally grooved at its base tribe CHARAXINI
(Type-genus: *Charaxes* Ochs., 1816). This tribe also comprises *Haridra*, *Zingha*, *Stonehamia* and *Eriboea*.

(2) Subfamily EUXANTHINAE subfam. n.

(Type-genus: *Euxanthe* Hübner, 1819, *Verz. bekannt. Schmett.*, vol. 3, p. 39; type-species: *Papilio eurinome* Cramer, 1775.)

This Ethiopian subfamily comprises some seven-odd species, one of which, *Godartia madagascariensis* (Godart), occurs in the Malagasy Republic. They are large butterflies with rounded, entire wings, the pattern of which superficially resembles that of certain African Danaids. Their flight is slow and somewhat undulating, with much flapping of the wings, although they possess a considerable turn of speed if molested. They are woodland butterflies, and have much the same feeding habits as *Charaxes*, the males also having favourite perches to which they will return day after day. If two males share the same territory they will be seen performing an aerial *pas de deux* for hours on end, whether in flight or in play it is difficult to say. *Hypomelaena tiberius*, being a shade lover, is found only in the depths of forests. (On one occasion I disturbed a "dormitory" of a dozen or so

males of the latter species resting head downwards on saplings in the heat of the day in the depths of a forest on the Kenya coast.) Schultze (1920, pp. 570-571) considered *Euxanthe*, like the Danaids, to be distasteful, their similarity to the latter being a convergence phenomenon (Konvergenzerscheinung).

The Euxanthinae can be divided into two separate groups, centred around the dark *trajanus-tiberius* species on the one hand, and the lighter *eurinome-madagascariensis* ones on the other. For the former group Aurivillius erected the subgenus *Hypomelaena* in 1899, because they differ from the latter group in having the cell of the forewing almost triangular, with the anterior and the posterior sides of the cell being nearly equal in length, and the cell of the hindwing closed; while in the *eurinome-madagascariensis* group the cell of the forewing is obtusely rounded anteriorly, and that of the hindwing is open. In *tiberius* and *trajanus* the forewing has a red-brown patch in the cell, which is not found in the members of the other group. The forewing cell, incidentally, in *tiberius* differs from that of *trajanus* in having the lower discocellular vein markedly convex proximad; furthermore, in *tiberius* the subcostal veins of the forewing run free, but in *trajanus* the first subcostal vein (V.11) anastomoses with the costal vein (V.12). In the *eurinome* group the first and second subcostal veins (Vs.11, 10) anastomose with the costal vein, the second vein (V.10) cutting through the costal vein to enter the costa of the wing basad of it. In *Godartia madagascariensis* the first subcostal vein (V.11) is absent), the second (V.10) running free to the costa. In the male genitalia there are also differences in the two main groups, the aedeagus, for example, being shorter in *tiberius* and *trajanus* (between 8-9 mm. in length) than in the *eurinome* group, in which it is between 10-12 mm long. In *tiberius* the saccus is relatively short and pointed, while in *madagascariensis* and *eurinome* it is larger and bluntly produced anteriorly. The Euxanthinae differ among themselves in the early stages too, the larvae of *tiberius* and *trajanus* having the lower pair of cephalic horns pointed at their extremity, while in the *eurinome* group the horns terminate in a club (see van Someren and Rogers, 1927, pl. 41). This subfamily can be divided into two tribes, as shown in the key below:

- (1) Forewing without red-brown discal patch; forewing cell dome-shaped; hindwing cell open; aedeagus from 10-12 mm. in length; the lower pair of horns on the head of larva clubbed at the tip tribe EUXANTHINI *tribus n.*
(Type-genus: *Euxanthe* Hübner, 1819).
Also contains *Godartia* Lucas.
- (2) Forewing with red-brown discal patch; forewing cell somewhat triangular in shape; hind-wing cell closed; aedeagus relatively short, between 8-9 mm. long; lower pair of horns on head of larva pointed at the end
tribe HYPOMELAENINI *tribus n.*
(Type-genus: *Hypomelaena* Aurivillius, 1899, "Rhopal-

ocera Aethiopica", *K. svenska Vetensk Akad. Handl.*, Stockholm, vol. 31 (No. 5), p. 220; type-species: *Godartia trajanus* Ward, 1871.)

(3) Subfamily PALLINAE *subfam. n.*

Type-genus: *Palla* Hübner, 1819, *Verz. bekannt. Schmett.*, vol. 3, p. 47; type-species *Papilio decius* Cramer, 1777.)

The African genus *Palla* differs from *Charaxes* not only in the early stages, as already described above, but also in the morphology of the adults. The scheme of markings of the wings, especially on the underside, differs from that of *Charaxes*, as has been pointed out by Aurivillius (1911-12). The male genitalia are quite unlike those of *Charaxes* or *Euxanthe*, in that the aedeagus is relatively short and is spiny throughout its length, and the valves are short and somewhat rectangular in shape, with a ventral hook at the apex. The vinculum is wide and heavily sclerotized. The male and female genitalia of *Palla decius* have been figured by Rothschild and Jordan (1898, pl. 14). The specialized triangular scales, as already stated above, are delimited by vein 1, and do not extend into space 1b (see Rothschild and Jordan, 1898, pl. 13, fig. 12). This subfamily consists of only one tribe, namely Pallini *tribus n.* (Type-genus: *Palla* Hübner). The genus contains five or six species.

(4) Subfamily PROTHOINAE *subfam. n.*

(Type-genus: *Prothoe* Hübner, 1824, *Samml. exot. Schmett.* vol. 2, pl. 54; type-species: *Nymphalis franck* Godart, 1824 (not *franckii* Hübner, 1824).)

The species comprising this Oriental subfamily were placed among the Charaxidae by Schatz and Röber in 1892, although Herrich-Schäffer (1864) had separated them from the "*Proto-gonius-Agrias*" group of his family "Nymphalina" because of the open cell in the hindwing, and because the hindwing was bluntly produced between veins 3 and 4. Semper (1886-92) placed the genus in his "*Pseudo-Nymphalis*" group, just before *Charaxes*; and Moore (1899, pp. 127, 128) placed the genus in the Nymphalinae between *Symbrenthia* (which it mimics on the underside) and *Rhinopalpa*. Moore erected the genus *Agatasa* for the larger, more robust species, as typified by *Nymphalis calydonia* Hewitson. As already noted, the basal sensory patch of the palps of *Prothoe* and *Agatasa* is distinctive, being proximally placed on the basal segment, and is wide, short, and somewhat oblong in shape, being in appearance nearer to *Polygrapha* (a genus of the Anacinae) than to any other member of the Charaxidae. According to Moore (1899), and Fruhstorfer (1913-4), the species comprising the Prothoïnae have much the same kind of habits in the field as *Charaxes*. Fruhstorfer also said, "The genus *Prothoe* is, in the frequently most gorgeous colouring of the under surface, related to *Charaxes* in the same way as *Agrias* is to *Prepona*". Schatz and Röber (1892) stated that the Prothoïnae can be

divided on the shape, pattern, and venation of the wings into three groups based respectively on *calydonia*, *franck* and *australis*. Fruhstorfer (*l.c.*), however, divided them into two groups according to the shape of the lower discocellular vein of the forewing, which is obtusely bent proximad in *Prothoe* but is almost straight in *Agatasa*. Fruhstorfer's subdivision is borne out by the configuration of the male genitalia, in that the genital armature of *Agatasa* (see fig. 35) is altogether much larger than that of *Prothoe* (fig. 36), the valve of the former being elongate, with a lower and an upper spiny projection on its inner surface, and is, as Fruhstorfer noted, somewhat Limenitoid in shape; while the valve of *Prothoe* is rounded and terminally spiked, without any projections on the inside. *Prothoe* also differs from *Agatasa* in having a hair-tuft in the hindwing of the males, such as is found in *Prepona* and *Agrias* (q.v.). For these various reasons the Prothoïnae can be subdivided into two tribes, using the following key:

- (1) Veins 7 and 8 of forewing short-stalked; lower discocellular vein nearly straight; hindwing without a hair-tuft in the males; adults large and robust, with the wings chiefly creamy-white above tribe AGATASINI *tribus n.*
(Type-genus: *Agatasa* Moore, 1899, *Lep. Ind.*, vol. 4, p. 127; type-species: *Nymphalis calydonia* Hewitson, 1855.) This tribe also includes *A. chrysodonia* (Staudinger).
- (2) Veins 7 and 8 of forewing longer-stalked than in *Agatasa*; the lower discocellular vein obtusely bent proximad; hindwing with a hair-tuft in the males; adults not so large or robust as in the Agatasini, with a dark ground colour on the upperside of the wings, and typically with a pale blue postdiscal band in the forewing
tribe PROTHOINI *tribus n.*
(Type-genus: *Prothoe* Hubner, 1824). This tribe contains those species centred around *franck*, *australis* Guér., *ribbei* Gr. Sm. and *regalis* Butl. respectively.

Notes and Observations

NEPTICULA SPECIOSA FREY: A UNIVOLTINE OR A BIVOLTINE SPECIES?—In my "Notes on some of the British Nepticulidae", under the heading of *Acer pseudoplatanus* L. (Sycamore) (antea 77-78) I pointed out that there are conflicting opinions expressed in the literature on whether *speciosa* has one or two generations a year. I also recorded that I had four cocoons from larvae taken on the 29th July 1970. These produced no imagines in the following August, as one would expect if the species were bivoltine, but a moth emerged on the 28th April 1971. It is dangerous to generalise from a single example, but the indications are that *speciosa* has a single generation with a prolonged period of emergence.

The moth in question came from a *pseudoplatanella*-type mine, and the wing-pattern is indistinguishable from that of specimens bred from *speciosa*-type mines. This corroborates Borkowski's view that *pseudoplatanella* Skala is a synonym of *speciosa* Frey.—A. M. EMMET, Labrey Cottage, Victoria Gardens, Saffron Walden, Essex. 8.v.1971.

A RARE ABERRATION OF VANESSA ATALANTA L. IN SUSSEX.—On the 29th July last, in full sunshine, I was parking my car on the roadside verge of a Weald wood. As I glanced through the far side car window I was amazed to see what was obviously an aberration of *V. atalanta* resting, with wings closed, near the top of the clipped dogwood hedge about four feet from the ground. I had my net ready and was able to capture the insect successfully after an uneasy excursion round the rear of the vehicle!

Careful examination of the specimen confirms that it is an example of the aberration illustrated by South, pl. 49, figs. 1 and 2, and described in the text on p. 82. It is also illustrated by Frohawk in Natural History of British Butterflies, plate 27, figs. 14 and 15, and described in the text on page 165.

My example is more extreme in that (a) on the upperside forewings the first white costal blotch is absent except for a small white speck on the margin, and (b) on the underside forewings the large blue costal area is heavily suffused with black. On the underside hindwings the central areas of the wings are darker and the marginal bands lighter in contrast. Only two blue ovoid spots are present on the edge of the bands.

The insect would appear to be a male and unfortunately is not in mint condition.—R. M. CRASKE, 29 Salisbury Road, Hove, Sussex, BN3 3AE.

YPSOLOPHUS HORRIDELLUS TREITSCHKE IN KENT.—On the 7th of August in my garden, I saw a sooty black moth fly past me and settle on some brickwork. I had no pillbox in my pocket

and had to run indoors for one. Fortunately the insect had not moved and I was able to secure it. Meyrick gives a narrow belt in the south of the country for *Y. horridellus*, and Kent is to the north of that area, so perhaps it is of interest to publish a Kentish record. I have taken the insect once before, a larva at Dunsfold, and have in my collection a series bred by W. Fassnidge from New Forest, Southampton and Eastleigh larvae.—S. N. A. JACOBS, 54 Hayes Lane, Bromley, Kent, BR2 9EE. 11.viii.1971.

PSEUDOPANTHERA MACULARIA L. (LEP. GEOMETRIDAE).—On 6th June 1969, I received a female moth which had been captured in London, together with about twenty ova which she had laid before expiring. The ova duly hatched and the larvae fed up well on *Teucrium*, with few losses, eventually pupating amongst soil and dead leaves of the food-plant.

During the winter of 1969-70 the pupae were kept in my garage where they remained cold, but were nevertheless protected against extremes of temperature. In mid-May of 1970, only one moth emerged, a male. I examined the rest of the pupae, and after throwing out some which were obviously dead, I kept the others in a warm room indoors for a few weeks before returning them to my garage, where they spent a second winter. In May of 1971 the remaining nine living pupae produced moths. I would be much interested to hear of any records of this moth passing two winters in the pupal state.

The species seems to have been exceptionally abundant this year in many parts of Cornwall, including a fair number with a whitish ground colour instead of the usual yellow. It would be interesting to know to what extent the populations of imagines are controlled by the number of individuals passing a one-year or a two-year life cycle.

Thanks are due to Mr Brian Wurzell for supplying the live-stock in 1969.—JOHN L. GREGORY, 17 Grove Road, St Austell, Cornwall. 19.vii.1971.

Current Literature

From Dr Eugene Munroe I have received a fine collection of separates of his more recent papers. These include "Revision of North American Species of *Udea* Guenee (Lep. Pyralidae)", *Memoirs of the Entomological Society of Canada* No. 49, 1966. This describes as new six species and 18 subspecies. There are 48 half tone photographs of adults and 44 drawings of genitalia details. "Taxonomy and Distribution of the Genus *Ostrinia* (Lep. Pyralidae)"; *Memoirs of the Entomological Society of Canada* No. 71, 1970. This paper describes as new 5 species and 19 subspecies and gives a key to species and subspecies. There are 315 half tone photographs of adults and a large number of genitalia and other anatomical details; there are also distribution maps from which phylogenetic diagrams are

extracted. "Revision of the subfamily Midilinae (Lep. Pyralidae)" describes one genus, 27 species and 5 subspecies as new. There is a key to the genera, and after the text there are 62 half tone illustrations of adults and 56 genitalia drawings. Throughout these three papers, the drawings have been executed by Mrs Marie Spencer.

There are also several separates from The Canadian Entomologist, all interesting and all bearing testimony to the boundless industry of the author.

By Dr Munroe and Dr Akira Mutuura, also from The Canadian Entomologist, are several papers of a series headed "Contributions to a Study of the Pyraustinae (Lep. Pyralidae) of Temperate East Asia", set out in the manner of the three previously mentioned papers.

From The Proceedings of the Entomological Society of Oregon, Vol. 99, 1968, there is a paper on **Insects of Ontario: Geographical Distribution and postglacial origin**.—S.N.A.J.

Two papers by Axel M. Hemmingsen are from the Bonn Zoological Society and from Videnskabelige Meddelelser fra Dansk Naturhistorik Forening, the first "**on Copulation in Phyllolabis hemmingseni Peder Nielsen and Phyllolabis manheimiana Peder Nielsen (Limoniidae, Tipulidae, Diptera)**" and the other "**Copulatory Adaptions of the Male Hypopygium to the Female Tergal Ovipository valves (cerci) in some South American Crane-Flies (Tipulidae)**". Both these papers are in the English language and are illustrated by line drawings and photographs.—S.N.A.J.

From Josef Moucha I have "**Zur Kenntnis der Schmetterlingsfauna der Grusinischen SSR (Lepidoptera)**" from Acta Entomologica Musei Nationalis Pragae, Vol. 38, 1968, which gives an account of a collecting trip to the Caucasus in June 1957, with a list of the species taken.—S.N.A.J.

Some Observations on *Sepedon sauteri* Hendel (Diptera Sciomyzidae) during the Winter Months in Fukuoka, Japan by G. P. Channa Basavanna and Koji Yano, from Mushi. Vol. 42, Pt. 15, 31.iii.1969, deals with the winter habits of this fly, which is linked up with a snail which is a vector of a liver fluke, and whose eggs provide an alternative host for a hymenopterous egg parasite of certain Chilo species inimical to rice crops. The paper is in the English language.—S.N.A.J.

Separates received from Hermann Zoerner include two parts of a paper by him entitled **Zur Kenntnis der Blattminen der Naturschutzgebiete des Mittelbegebietes** (Entomologische Berichte 1969: 17-24 and 69-74) in which leaf mining species taken and reared are listed under their host plants, which are listed under scientific names in alphabetical order.

Blattminenstudien in der Umgebung von Prerow/Darsz (Ent. Berichte 1970: 19-30) lists in a similar manner species collected in the surroundings of Prerow and Darsz.—S.N.A.J.



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The British Entomological and Natural History Society announces that, as a result of applications received by 30th September 1971, awards have been made to Miss J. M. Ruse, Department of Zoology, University of Manchester, to help her research into the biology of leaf miners and their parasites on *Sorbus aucuparia* and related host plants; and to Mr P. R. Cobb, Editor of the Proceedings of the Heacham and West Norfolk Natural History Society, for continuation of his work on the life-cycle and distribution in Britain of the gall-wasp *Andricus quercuscalicis* (Burgsdorff).

Further applications are invited for awards to be made after 31st March 1972, for the promotion of entomological research with particular emphasis on:—

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- (d) General Entomology

in the above order of preference, having regard to the suitability of the candidates and of the plan of work proposed.

It is envisaged that awards would be made to assist travelling and other expenses, necessary for field work, for the study of collections, for attendance at conferences, or for exceptional costs of publication of finished work. In total they are not likely to exceed about £120 in 1972.

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THE ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

Edited by S. N. A. JACOBS, F.R.E.S.

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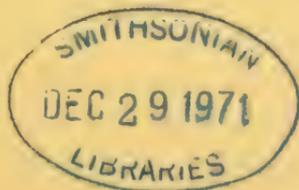
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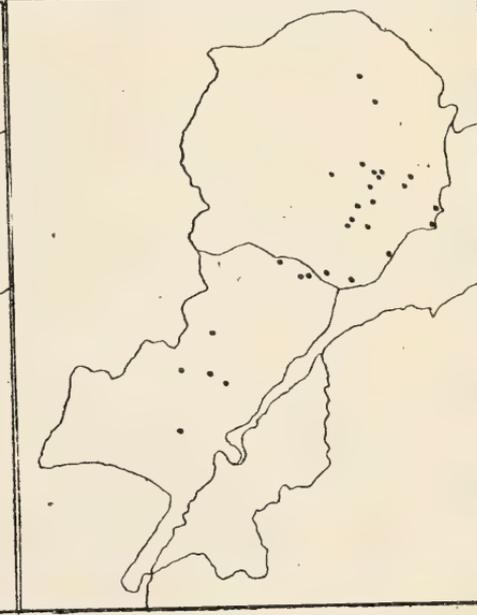
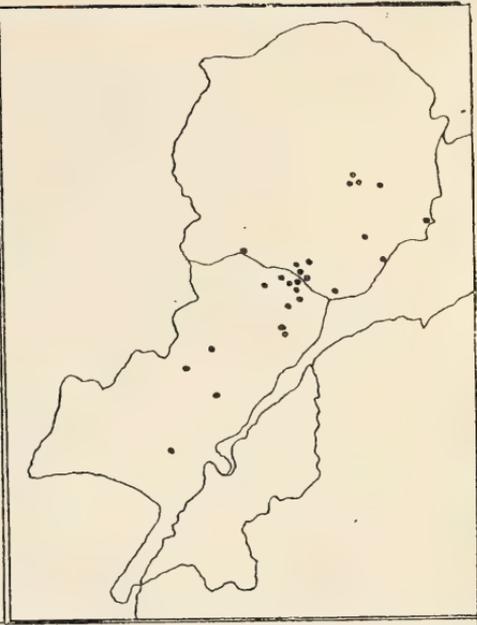
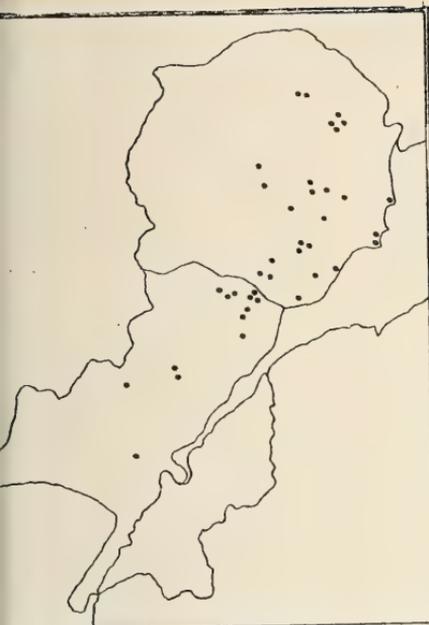
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FIRST RECORD, 1831: Stephens, *loc. cit.*

[**H. ruberata** Freyer: Ruddy Highflyer.

Doubtfully Kentish.

1. Halfway Street Woods (C. Fenn. in *Wool. Surv.*, 1909) (but Fenn.



Caloptilia rufipenella Hübner (Lep. Gracillariidae),
a Species new to Britain.

by Lieut. Col. A. M. EMMET, M.B.E., T.D., M.A., F.R.E.S.

My story starts on the 12th of July 1970, when I was at Chippenham Fen, Cambridgeshire, working the alders (*Ent. Rec.* 82: 253). By chance a sycamore leaf with one of its lobes spun into a cone caught my eye. Clearly the work of a *Caloptilia*, it looked like the feeding of one of our rarest moths, *C. hemidactylella* Fab. The cone and others nearby were all vacated and there was no trace of cocoons spun in adjacent leaves. On subsequent visits to the fen I pointed out the old cones to Mr J. M. Chalmers-Hunt on the 31st of July and to Mr R. W. J. Uffen on the 11th of October; both these entomologists agreed that they were likely to have been made by *hemidactylella*.

Remembering how I used to find *Caloptilia betulicola* Hering flying freely at dusk in a Lincolnshire birch wood in late September, I wondered whether the sycamore-feeding *Caloptilia* would behave in the same way. Accordingly I paid an evening visit to Chippenham on the 22nd of September. Only one *Caloptilia* fell to my net. This was not *hemidactylella*, but appeared to be a dwarf specimen of *elongella* L., a species which occurs, though rather sparingly, in the fen.

It is a long time to have to wait a whole year before seeking a solution to an entomological enigma, and as most *Caloptilia* overwinter as imagines, I decided to have a shot at locating my quarry in its winter quarters. So the 10th of February, 1971 saw me back at Chippenham, beating the lower branches of some yew trees which grow in the wooded part of the fen. I had a lot of healthy exercise, but the reward for my labours, at any rate in terms of numbers, was meagre: only four moths fell into my tray. Two of these were *Zelleria hepariella* Stt. and the other two apparently *elongella*. There is a marked similarity in the colour of these two well separated species: except that one cocks its head and the other its tail in the air when at rest, they might be mistaken for each other. Presumably the liver colour of the forewings gives them excellent concealment in the situations they select for hibernation.

But to return to my two "*elongella*." There was a striking disparity of size between the two specimens. One was of normal dimensions, but the other was a dwarf resembling the moth I had netted in September. My suspicions were aroused.

There matters had to rest until the summer. My next visit to the fen was on the 4th of June, when I was accompanied by Mr E. C. Pelham-Clinton. No cones were to be seen on the sycamores, but this was not unexpected so early in the season. I was there again, this time with Mr Uffen, on the 4th of July, when the sycamore-feeding *Caloptilia* was one of our principal objectives. We started to find cones at once, but at first it seemed we were too late as the spinings were already vacated.

However, in due course we took three which still contained larvae.

I exhibited these larvae, two of which had already spun up, at a meeting of the British Entomological and Natural History Society on the 8th of July, describing them as possible examples of *hemidactylella*, but adding the opinion that they could well turn out to be a new species, for which *caloptilia rufipennella* Hübn. was the most likely candidate.

On the next day I returned to Chippenham Fen and worked the sycamores thoroughly. The cones were not scarce, but most of them were empty; however, I came home with eleven more larvae to add to the three I had found on the 4th.

In all, ten imagines emerged between the 16th of July and the 5th of August, the average date of eclosion being the 28th of July. These moths all resembled the two small *Caloptilia* taken the previous September and February. Inspection of the continental material at the British Museum (Natural History) confirmed my suspicion that the Chippenham species was *Caloptilia rufipennella* Hübn.

It may be helpful to others who seek to breed *rufipennella* if I give the reasons for the four casualties. Two perished as larvae. One was in the leaf I gave to Mr Jacobs as model for the drawing he has so kindly made to accompany this paper. In order to keep the leaf fresh for him, I put in water. This was a mistake, for the leaf withered far more quickly than those placed in a plastic box, and this mismanagement proved fatal to the larvae. The second larvae "committed suicide." When I found it, it was still in its mine (see below for this phase). On quitting the mine, instead of making a cone, it insisted on feeding externally on the original leaf. Thus it lived for about a week, in spite of daily offerings of fresh leaves placed under its nose. This increasingly withered diet in the end proved fatal. No doubt I should have forcibly transferred it and confiscated the old leaf. Another of my larvae failed to make its final cone and fed exposed, stripping off about a square inch of the lower surface of a leaf; but this individual survived and eventually became an imago.

The other two casualties occurred in the pupal stage. Three larvae spun up in the lid of their plastic home, and it was two of these which perished. In each case the moth developed fully in the pupal case, but then failed to emerge. The remainder, including all those which made their cocoons on leaves, came out successfully. The casualty rate is notoriously high in the pupal stage of this family, and to prevent desiccation, I placed a pinch of damp sphagnum moss in the box containing the pupae. Perhaps the leaves absorbed sufficient moisture but the plastic surface could not do so. There were no parasites.

The following is an account of the biology of *rufipennella*:—
Ovum: I failed to find the egg, even with the help of a microscope. Possibly the shell is completely consumed, or the larva may travel some distance before starting to mine.

Larva: This is of a green colour, matching the lower surface of a sycamore leaf. Hering (1957) describes the head as yellowish, but to me it looks green and only slightly paler than the body. When the larva is feeding, the dorsal vessel shows distinctly darker, but when it is purged before pupation the caterpillar is unicolorous.

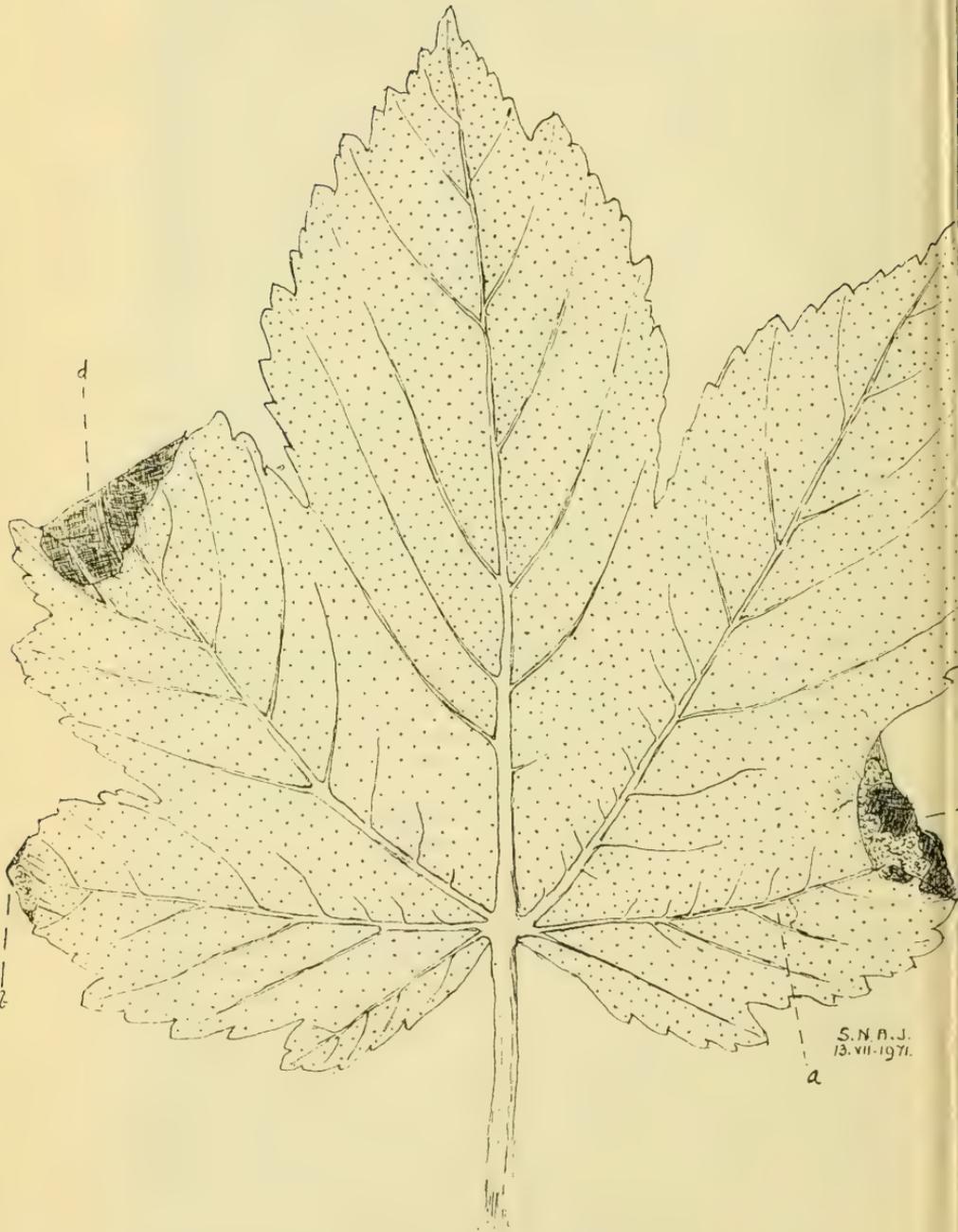
Method of feeding: At first the larva makes a tiny mine at the angle of two veins. The frass is packed to the sides leaving the centre tolerably transparent. On leaving the mine, the larva makes three cones successively. The first is a minute affair, consisting of the folding over of the extreme tip of a lobe. The second and third are more elaborate and are much of the same size. While making the cone, the larva leaves a small open "doorway" through which it emerges to do a deal of external spinning. The lobe is curled downwards so that the larva within can feed on the lower surface of the leaf. The first cone is commonly on the same leaf as the mine, but thereafter the larva almost always changes leaves before constructing a fresh cone. The leaf which I supplied to Mr Jacobs, which contains the mine and all three cones, is exceptional. The cones are generally five to ten feet from the ground, the higher ones being easier to see as they show up as dark blobs against the light. Most of those found were on saplings, perhaps only because the branches of the larger trees were out of reach. The larva feeds in June, sometimes continuing till early July.

Cocoon: I searched hard but failed to find the cocoon in the wild. In captivity the upper or lower surface of a leaf is generally selected; in two instances the chosen site was the angle made by the wall of the cone. The cocoon is small and compact, consisting of a shining yellowish membrane of silk.

Pupa: At first the pupa is green like the larva, but it darkens as the imago develops. For emergence, the pupal skin is extruded from the cocoon, and is transparent and colourless after its occupant has left. The pupal stage lasts from ten to fifteen days.

Imago: Span 11-12 mm. Antennae light golden brown, obscurely ringed darker. Head, palpa and thorax concolorous with the forewings. Abdomen, dark grey above, white beneath. Legs white, spotted above with dark brown; the tibiae of the forelegs and middle legs are clothed in dark chocolate brown scales, with a few whitish scales forming a narrow, ill-defined central pale band, more easily seen in fresh specimens. Forewings glossy mahogany or chestnut brown, with violet reflections when seen at an angle; terminal cilia concolorous with the wings, dorsal cilia dark grey. Hindwings and their cilia dark grey. Benander (1944) figures the male genitalia. The imago emerges during the second half of July or in early August and lives until the spring.

Variation:—In one specimen the colour of the forewings is golden brown. In two or three individuals there are suffused dark spots tending to form longitudinal lines. None shows



any trace of the triangular costal blotch found in most other members of the genus.

Distribution: According to Hering, *rufipennella* is a common species on the continent, feeding on imported species of maple as well as sycamore. In England, I have observed the larval cones at Chippenham Fen, Cambridgeshire, and at Barton Mills, Suffolk, about six miles from Chippenham. It would not surprise me if it turned out to be fairly widespread in East Anglia. The apparent absence of parasites suggests that it is newly established, and it may be extending its range. The larval cones remain in evidence until the leaves fall and as they are quite conspicuous, they will facilitate the quest for new localities; entomologists should, however, be careful not to confuse a rolled leaf with a cone. Dwarf specimens in collections which were taken as imagines and determined as *elongella* or *betulicola* should be checked in case they are *rufipennella*.

The three species are very similar, but the following points of difference may be noted:—

(1) Size. *Rufipennella* is much smaller, with a wing-span averaging 11-12 mm as against 16-17 mm in *betulicola* and *elongella*. Brown (1946) gives the dimensions of *betulicola* as 7-9 mm; this is evidently a misprint.

(2) Colour. *Rufipennella* is generally chestnut brown, and the other two more yellow brown, but the species are variable, and some of the colour forms overlap.

(3) Forelegs. In *elongella* and *betulicola* the tibiae are usually concolorous with the forewings and lack the obscure pale band. In *rufipennella* the tibiae are distinctly darker than the forewings and possess the band.

(4) Abdomen: The underside of the abdomen is silvery white in *rufipennella* while in the other species it is yellowish white.

In conclusion I wish to thank Mr S. N. A. Jacobs for his drawing to show the larval feeding, and Mr D. S. Carter of the British Museum (Natural History) for his advice over the wording of the description of the imago and its variation. Specimens will be placed in the British Museum after the autumn exhibitions.

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- Benander, P. 1944. Sveriges Lithocolletiden (Gracilaridae) Opuscula Entomologica.
- Brown, S. C. S. 1946. *Caloptilia* Hüb., a Genus of Tineina. Read 25th September 1946. Proceedings and Transactions of the South London Entomological and Natural History Society, 1946-1947.
- Hering, M. 1957. Bestimmungstabellen der Blattminen von Europe, 1: 24.

The History and recorded Distribution of *Coleophora wockeella* Zeller, 1849 (Lep. : Tineidae) with Notes on its Rearing from the Pre-hibernation Larva

By J. M. CHALMERS-HUNT and Lt. Col. A. M. EMMET

The recorded distribution of this species extends from Essex and Kent westwards through Surrey, Sussex, Isle of Wight, Dorset, Devon and Gloucestershire to Herefordshire. Though it is still not scarce locally in Surrey, its status elsewhere is uncertain, and it may now be extinct in a number of its former localities.

The sole foodplant of *wockeella* in Britain appears to be *Betonica officinalis* L. (*Stachys betonica* Benth.): Wood Betony, although Morris (1872) also gives "*Stachys hirta*" (now called *Stachys arvensis* L.): Field Woundwort and *Ranunculus ficaria* L.: Pilewort or Lesser Celandine. On the continent the foregoing are given, as well as *Genista tinctoria* L.: Dyer's Greenweed, *Ranunculus acris* L.: Common Meadow Buttercup and *Marrubium vulgare* L. White Horehound (Sorhagen, 1886 and Lhomme, 1951). Hering (1957) states that the feeding of *wockeella* on *Ranunculus* is an example of xenophagy.

Kent

The earliest reference to the occurrence of *wockella* in Britain that we have been able to trace in the literature is that of Stainton (1854), who states: "Two specimens were taken by Mr Weir, at Pembury a few years back. Last summer he bred a third from a dark brown slightly curved case he found attached to a leaf of *Genista tinctoria*, although there were no symptoms that the larva had fed upon that plant". The continental record of this foodplant (see above) suggests that it might, after all, have been feeding upon it. In a later reference Stainton (1859) gave Pembury and "near Canterbury" but without particulars. These appear to be the only two Kentish localities known, and though the species does not seem to have been noted at either since, there is no reason to doubt that it once occurred at both, and might in fact still do so.

Isle of Wight

Stainton (1860) records *wockeella* from the Isle of Wight, but without particulars.

E. R. Bankes (*Diary*) writing in the 1880's says that C. R. Digby found on May 16 and June 20 [cir. 1880] many larvae and a few pupae respectively, on Freshwater Down. Bankes and Digby then visited the locality on May 18, 1885, and between them got 62 larvae, mostly full-fed. Bankes went again on May 24-25, 1886, and at the same place, "on the down at Freshwater Gate, Isle of Wight", took a further 120 larvae, of which he says "some are very late and quite small still".

Both men bred the moth abundantly from these collectings.

So far as we are aware, *wockeella* has not been seen since in the Island, and, in the hopes of rediscovering it there, in late May 1969, R. W. Uffen and J. M. C.-H. visited Tennyson Down, Freshwater, where one suspects Bankes and Digby got theirs, but failed to see any sign of it, though the foodplant was there in abundance.

Gloucestershire and Devon

There are old records of *wockeella* from these two counties. T. B. Fletcher and C. G. Clutterbuck (1941) have "The Gully, Durdham Down" by Grigg (an old Bristol collector) on the authority of V. R. Perkins.

Meyrick (1895) gives Devon without particulars, but on whose authority is not known, and the record is not confirmed from any other source to our knowledge.

Essex, Dorset and Herefordshire

Likewise there seem to be only old records for these counties. Thus C. W. Dale (1886) states that O. Pickard-Cambridge took it at Lulworth, apparently the sole record for Dorset. There is also only one record for Essex; W. Harwood (1903) writes: "*C. wockeella* is rare and has only been found at St Osyth".

For Herefordshire, T. Hutchinson (1887) lists the species without details, though J. H. Wood (1908) is more informative with "Haugh Wood, Herefordshire, scarce".

Sussex

There are two old localities for Sussex. W. H. B. Fletcher (1905) has: "Abbots Wood; abundant amongst *Stachys betonica* in a rough meadow; Guestling, very rare". To these a recent record can be added: at Heyshott, near Midhurst, the Rev. D. J. L. Agassiz took a single imago at an atinic fluorescent lamp on July 20, 1969 (D. J. L. Agassiz *in litt.* to A.M.E., 8.i.71).

Surrey

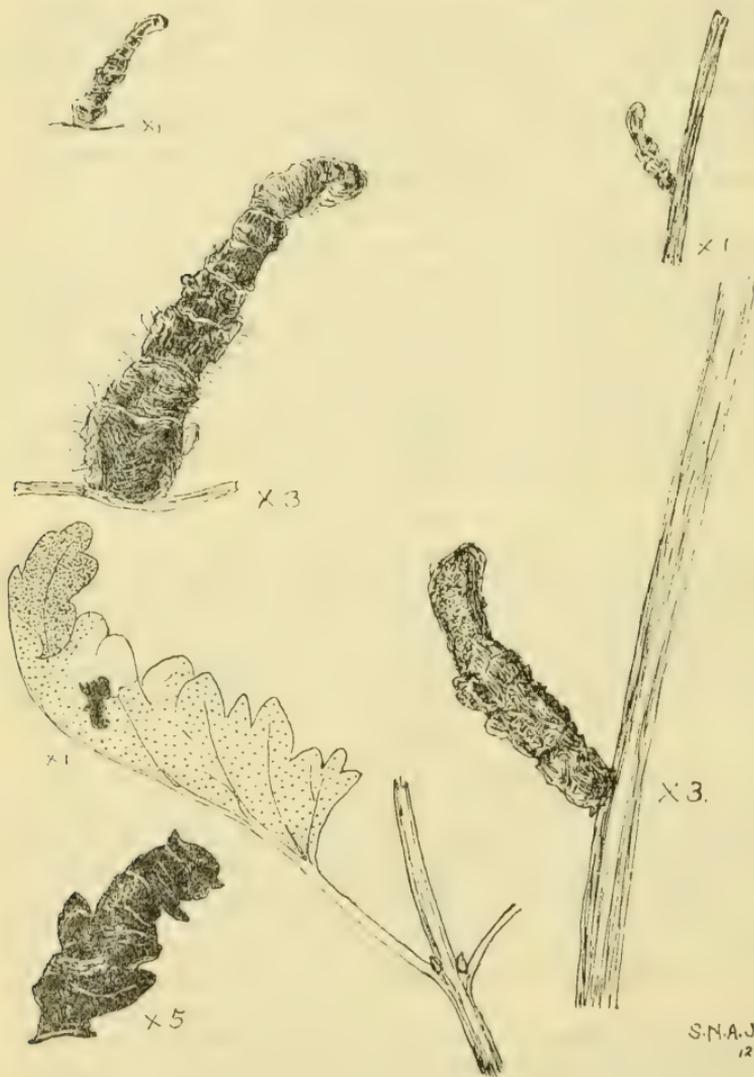
H. Goss and C. G. Barrett (1902) give: "Haslemere, very local, among wood betony".

L. T. Ford took a number of cases at Durfold in October 1933, from which he bred 32 imagines in 1934. He labelled these "Chiddingfold" (L. T. Ford *pers. comm.* to J.M.C.-H.; L. T. Ford coll. *per* D. J. Carter). R. M. Mere used to find *wockeella* occasionally in the light-trap he operated in his garden at Chiddingfold, *cir.* 1960 (R.M. Mere *pers. comm.* to A.M.E.).

R. Fairclough took a specimen in his light-trap at Leigh, near Reigate on July 14, 1964, though the foodplant is scarce in that neighbourhood (R. Fairclough *in litt.* to A.M.E., 27.iii.71).

Since the most plentiful recent records for *wockeella* came from the south-west corner of Surrey, we decided to search that area to see if it still occurred. Our first visit was rather a hurried one on November 2, 1969. We worked Durfold Wood

and Fisher Lane Wood, and J.M.C.-H. found two cases. He returned there on November 4, when he found 15 more. A.M.E. was unable to pay a second visit till November 13, when he found 17 cases in Fisher Lane Wood. The larvae were extremely local, occurring in small colonies (all A.M.E.'s cases were taken from only two plants). The larval feeding-places are conspicuous, and readily betray the whereabouts of the insect.



The larvae were kept on potted plants covered with nylon stocking supported by sticks. A few of the larvae retired to the base of the plant on the approach of winter, but the majority remained on the leaves or fixed themselves to stems for hibernation. The first post-hibernation feeding was noticed by

J.M.C.-H. on February 20, 1970, and by A.M.E. on February 22, although the pots containing his larvae had been under snow from the 12th to the 19th of that month. The larvae fed on the old leaves as well as the new growth. Whereas most seemed to prefer to feed from the underside of the leaf, a larva would sometimes feed from the upperside. A.M.E. placed one of his pots in a situation predominantly in sunshine, and the other predominantly in the shade; it made no difference to the survival or rate of growth of the larvae.

To fix for pupation, nearly all the larvae climbed to the tops of the sticks supporting the nylon covering, with the result that they tended to pupate gregariously. J.M.C.-H.'s moths (12 in number) emerged from 25. vi. to 20. vii. 70 and A.M.E.'s (14) from 2 to 8.vii.70. There were no parasites. The Surrey insects are mostly remarkably large, the majority having an alar expanse of 21-23 mm. On the other hand, J.M.C.-H. bred a very small one, with an expanse of only 17 mm. Two of Bankes' old Isle of Wight specimens in his possession measure only 18 mm. and 19 mm.

A field meeting of the British Entomological and Natural History Society was held at Durlford on November 8, 1970 to look for *wockeella*. The area where the cases had been found in 1969 proved unproductive, for only a single larva was taken, but Botany Bay Wood, a mile or so away, provided about 50 distributed amongst the party.

Our thanks are due to Mr S. N. A. Jacobs for the drawing of the larval cases made from the material collected on the field meeting just mentioned. The pre-hibernation case he reproduced from a drawing which he made from a case given to him by L. T. Ford.

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Notes on Some of the British Nepticulidae

By Lieut. Col. A. M. EMMET, M.B.E., T.D., M.A., F.R.E.S.

(Continued from p. 287)

SPIRAEA ULMARIA L. (Meadowsweet)

Nepticula ulmariae Hein. (Emmet, 1970) is a bivoltine species. My only opportunity to search for the first generation at Wicken Fen in 1970 was on a fleeting visit on the 28th of June, when the two or three mines which I found were already vacated. However, on three visits there between the 5th and 25th of September my companions and I found larvae in small numbers, and I have several cocoons overwintering. The larva is bright yellow with the dorsal vessel slightly darker; the head is light brown. The cocoons, which in captivity were spun between leaves, are brown.

Mr S. C. S. Brown (*in litt.*) writes: "You will be interested to hear that on the 20th of October I found the mines of *Stigmella ulmariae* Wocke in plenty in *Spiraea* just outside Basingstoke in a marsh beside the road. I should say I was a month late, as I gathered some thirty mines in a few yards and there was not one larva present. I could not find any mines that might have been of the July brood, so this species may have a very scarce first brood and a much commoner autumn one". Mr Brown's record is the first for the county of Hampshire.

ULMUS spp. (Elm)

Traditionally we have in Britain three Nepticulids on this foodplant, *Stigmella viscerella* Stt., *S. ulmivora* Fol. and *Nepticula marginicolella* Stt. To these the editor of the *Entomologist's Record* added a fourth, *S. ulmifoliae* Hering (Jacobs 1962) and later on Mr R. H. Richens recorded *ulmifoliae* again and introduced three further species, viz., *S. fulvomacula* Skala, *S. ulmicola* Hering and *S. ulmiphaga* Preisseker (now known as *ulmi* Skala) (Richens, 1963). The new species were identified from mines alone with the help of continental entomologists. The question arises whether we have as many as seven elm-feeding Nepticulids in this country. Let us consider their several claims.

(a) *Stigmella fulvomacula* Skala. This species is characterised by the mine, or part of it, being situated in a yellow fleck; the larva is yellowish. Borkowski (1969) states that he can detect no difference between the imagines of *fulvomacula*

and *marginicolella*, and that he therefore regards them as conspecific. This agrees with my own observations. *Fulvomacula* occurs commonly among colonies of *marginicolella*, but only in the autumn generation. There is considerable variation in the development of the yellow fleck, ranging from almost nothing to a major discoloration of the leaf. Sometimes the mines of both "species" occur in the same leaf. The fleck is indubitably occasioned by the mine and its causes would form an interesting subject for research, being antithetical to the formation of green islands by other leaf-miners. Our old writers were evidently familiar with *marginicolella*'s influence on elm-leaves in late summer. Stainton (1855, Vol. I, plate 3) figured a mined leaf with the character of *fulvomacula* to depict *marginicolella*; the artist, however, made the discoloration more brown than yellow. In Waters's herbarium some of his examples of the mine of *marginicolella* are of the *fulvomacula* type. The name *fulvomacula* Skala is now degraded and becomes a synonym of *marginicolella* Stt.

(b) *Stigmella ulmifoliae* Hering and *S. ulmi* Skala. I shall consider these species in conjunction with *S. ulmivora* Fol., all three having similar green or blue-green larvae feeding venter upwards in long sinuous galleries. In all three the egg is laid on the underside of the leaf, generally close to a rib. In all three the mine starts as a narrow gallery with a thin, but sometimes discontinuous line of frass. In the later stages, however, there are differences. *Ulmivora* has the frass in a broad line of separated grains; *ulmifoliae* has it concentrated in a thin central line; while *ulmi* has a thin frass line widening irregularly into blobs of frass or short stretches of dispersed grains. I have found these three species together in colonies. My natural inclination is to treat the mines as being all the work of one species with a variable frass-line, like *Nepticula speciosa* Frey (= *pseudoplatanella* Skala), *N. trimaculella* Haw. (= *populicola* Sorh. = *subtrimaculella* Duf.) and *N. aucupariae* Frey. However, continental writers regard them as distinct and I must bow to their greater experience. The imagines, other than *ulmivora*, have never been described in English entomological literature. I have kept my cocoons of the three types separate, and if I am successful in breeding the moths I may be able to fill this gap at a later date. Waters's herbarium includes mines of all three types under the name *ulmivora*.

(c) *Stigmella ulmicola* Hering. From an egg laid on the underside of the leaf, the larva makes for the nearest vein (if the egg was not there already). It then hugs the veins, generally proceeding first to the midrib, then along to the next branch nervure where it again turns outwards towards the edge of the leaf. Finally it turns away from the vein, often towards the spot where the egg was laid. Thus the mine forms an angular "U" or even a parallelogram. At first it consists of a narrow gallery like that of *ulmivora*, but then it widens abruptly and is almost completely filled with arcs of closely packed, reddish frass. There is, of course, some varia-

tion, but basically the mine is very constant in its character. It is a shorter mine than that of *ulmivora* and sometimes looks more like that of *marginicolella*. It can, however, at once be separated from that species because, if it is tenanted, the larva is bluish green, and if it is vacated the larva has left through a slit in the underside of the leaf, whereas *marginicolella* (and *fulvomacula*) have the slit on the upper side. I have taken the mines in the same localities as those of the *ulmivora* group, but the larvae seem to feed earlier, at any rate in the autumn. Thus on the 16th of September 1970, in north Essex, when the mines of the *ulmivora* group nearly all still contained larvae, the *ulmicola* mines were empty save one. This singleton provided me with the only cocoon I have, and if I rear the moth it may be the first recognised British specimen. Though the larva resembles that of *ulmivora*, I am sure that it is a separate species, since the mine is so different in all particulars. We need a description of this species, too, in our literature.

Mr Richens (*loc. cit.*) writes, ". . . since mines also occur intermediate in one or more characters between those described, it is most desirable that breeding and hybridisation experiments be made to ascertain the extent of variation of the species and their degree of differentiation from one another. With the exception of *S. preissecker* (Klimesch), which is not known to occur in the British Isles, all the European elm-mining *Stigmella* species are very similar to one another in the morphology of the larvae and imagines."

Mr Richens cannot mean exactly what he says because there is plenty of difference in the mines, larvae and imagines of what I have called the traditional British species. What he writes may apply well enough to the "new" species, but if hybridisation is possible, I doubt whether their claims to specific status could still stand.

Tutt was uncertain whether *ulmivora* had one or two generations. Meyrick, Ford, Hering and Borkowski regard it as bivoltine, though Hering gives *ulmi* (*ulmiphaga*) only a single autumn brood. Waters (1924, p. 95), however, maintained that the emergence of the imagines of *ulmivora* was spread out throughout the summer, with the result that there was an equally prolonged larval season; from larvae he took in September 1922 the moths emerged at intervals between early April and the end of August the next year. Perhaps he had more than one species, if there is more than one species in the group! So far I have only found their mines in September.

Both Hering and Borkowski give *ulmicola* as bivoltine. I could find no example of its mine in Waters's herbarium.

VACCINIUM MYRTILLUS L. (Bilberry)

Mr J. M. Chalmers-Hunt having shown me a single larva of *Nepticula myrtillella* Stt. which he had found near Westerham in Kent, I duly searched the area in 1968 and 1969,

but had to be content each year with one or two vacated mines. I tried again in 1970 and after an hour or two of frustration I came across the larvae in some numbers. They seem to favour, not the big, exposed clumps, but the smaller specimens of their foodplant growing amongst heather and under bushes. The main aid to the discovery of the mines is the discoloration they cause to the leaves, which turn a reddish purple. The same colour is also induced by the onset of autumn, but with a little practice one can generally tell which of the leaves houses a mine. There is another instance, like the *fulvomacula* form of *N. marginicolella* Stt., where the effect of the mine is to accelerate the development of autumn colours, not to retard it, as happens when green islands are formed. Hering's explanation leaves plenty of scope for further investigation: "Presumably some substance is produced by the mining larva, probably in its excrement, which results in a 'poisoning' of the cells in the vicinity" (Hering, 1951, p. 227).

Tutt's localities for *myrtillella* all lie north and west of a line through Hereford, Staffordshire and Yorkshire: Meyrick adds Devon on the authority of Waters. I imagine that Mr Chalmers-Hunt's discovery constitutes a new record for Kent. I was glad to be able to take him this year to his own locality and show him where the larvae were to be found.

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AN UNUSUAL FORM OF *CATOCALA NUPTA* L. — On 21st August 1971, at Orpington, Kent, I caught in my light trap a female *Catocala nupta* L. in which the red on the hindwings was entirely replaced by a chocolate brown colouration. The moth was normal in all other respects, although slightly larger than usual, having a wingspan of 84 mm. Other *nupta* in my possession range from 72 to 76 mm. in wingspan.—P. A. SOKOLOFF, 26 Pinchbeck Road, Green Street Green, Orpington, Kent. 28.viii.1971.

The Status of *Polygonia c-album* L. in North Wales

By R. L. H. DENNIS

I was interested to see in a recent issue of the Record (*antea*: 135) a note on the sighting of *P. c-album* on Moel Famma, Denbighshire, amongst the usual *N. io* L. and *A. urticae* L. which are always commonly seen in N. Wales from the beginning of April. My attention was particularly drawn to this note, since in the past a great deal of misunderstanding has surrounded the status of *P. c-album* in N. Wales.

It was of no surprise to me that it should have been seen on Moel Famma. The species is extremely common in the vicinity of Colwyn Bay, Llandulas, Gloddaeth (Creuddyn Peninsula), and down the Conway Valley, where both Mr H. N. Michaelis and myself are well acquainted with its presence. Mrs M. J. Morgan of Bangor University, mentioned to me that it has spread well into the Bangor district in recent years. It may well have been in the West Caernarvonshire region for some time however, and the records of D. Wright for Abersoch (2), August 1947, and E.J.T. for Llanbedrog, 1952, may be indicators of its continual presence there, and the lack of recorders rather than the lack of possible records.

However, Denbighshire and Flintshire are well covered with records, and I do not intend a comprehensive survey here. Nevertheless, as a stop gap until the distribution can be carefully dealt with in such a manner, a few records could place Mr M. Pons sighting in perspective.

As for *Denbighshire*, it was frequently found along the coast at Colwyn Bay, through Abergele to the Flints border at Rhyl in the 1930's and 1940's; into the interior in the upper Clwyd valley (e.g. Ruthin, 1945-1946 R.E.V.R.). Iâl (1943 R.E.V.R.), at Moel Famma's doorstep Llanferres, where several were seen in 1936 (H.D.). To the south of the region bordering its well known distribution as indicated in E. B. Ford's map II (text and material referred to below), it was occasionally seen at Glyn Ceiriog. In *Flintshire*, it was recorded from numerous localities surrounding Moel Famma, and from there to the east of the county at Sealand (1947), Caergwrle (1948), Ewloe (1948), Broughton and Bretton (1946-48), where several were seen. However, this easterly extension must have been thinning out, for the records from *Cheshire* are nowhere near as numerous. It was seen for example at Burton on the Wirral (1950), Mickle Trafford (1947), and at Delamere (1950). As will be indicated later, the writer believes this to have been a 'peak' period, as records from southern Yorkshire corroborate:—

J. Hardcastle Seago, 1959, for the area from Barnsley to Doncaster (areas B, C and D). 'This species was one well established in areas B, C and D, but it was probably quite

extinct by the end of the last century. It re-appeared in the district around 1945 and every year after that date the writer (H.S.) saw one or more specimens in area B, until 1950. It seems almost certain that the species has failed to re-establish itself'. More will be said of this later.

However, these records are now dated, and Mr M. Pons's record is as it were a resurrection of older records to the east of the Clwyd valley. Important changes in the environment could and obviously have taken place since then, and the range of the insect has been affected. For instance, it is well known in geographical circles that there has been a deterioration in climate in the last 20 years or so (Lamb, H. H., Chorley, J. and Barry, R. J.).

I wish now to refer to a subject that has long plagued E. B. Ford's valuable text. The 1957 third Edition, second Reprint 1967 is the current up to date volume, and still contains remarkable anomalies. These should have been corrected on information carefully gathered together in an excellent article by J. A. Downes (1948), and on information noted down by J. A. Thompson (1952). The former, whose work is not totally relevant to the matter at hand here, however, makes my point clear. Mr Downes compiled the historical records of *Pararge aegeria* L. ssp. *egerides*, indicating that its distribution in Great Britain was continuous until very recently; and denoted the distribution of other Rhopalocera in the past. I mention one for the sake of example.

E. B. Ford (p. 128) *N. polychloros* L.—'It has always been restricted to the Midlands and Southern England, . . .' Yet, Mr Downes noted down a whole number of localities where the insect was found in Scotland until 1910, and the writer is acquainted with a number of localities where it has been seen over the past century in N. Wales, the last record being the 15.vi.70 (J. Richens).

Now to the main subject of this paper. Professor E. B. Ford's references to *P. c-album* can be seen on pages 133 and 138 of the aforementioned volume:—

'Up to the middle of the last century, the Comma was widespread in the south of England and could be taken as far east as Kent and Surrey. But its true home has always been the counties of Gloucester, Hereford, and Monmouth, and to this area it had for many years been virtually confined'.

It is however his map II that really points out the grave error. The map includes a notation for distribution prior to 1915, which indicates the most northerly extension in N.W. Shropshire; and the extension of the species' range post that date. As I mentioned beforehand, Mr J. A. Thompson made a passing reference to the error in 1952. The insect has been in N. Wales for at least a century.

G. O. Day (1903) has the following records:—

Flints—Holywell (W.L.); Overton, moderately common (Pc., W.G.); Rhyl, July 22, 1897 (A. H. Thompson).

Denbs.—Ruabon (W.L.); Colwyn Bay (W.L., N., W.G.); Llandulas, one (P.C.); ditto, occasionally (Sh); Ruthin (Ta); Glyn Ceiriog, occasionally (Pe); the Loggerheads, Sept. 1877 (J.H.F.); near Chirk (W.G.).

Caerns.—Bettws-y-coed, occasionally (Pe., A.); Vale of Conway, plentiful (Bl.); near Deganwy and Trefriw, i.e., Conway Valley (W.G.).

This number of records should be sufficient to make my point. They are substantially backed by records given in Gresley-Jones's compilation of species for the Creuddyn Peninsula in 1910:—(e.g. T. H. Court, 1903, 5 specimens on Gloddaeth Hill).

What is more, the species was occasionally found in Cheshire, as Day's records certify. The records since then have been more numerous if sporadic, but definitely continuous. As the records given earlier indicate (from Gordon Smith, 1948, 49, 50, 51, 52, 53), the species was common in the 1930's and 1940's, and this is seconded in the Gordon Ellis Report of 1949 to the Llandudno Field Club, and again in J. A. Thompson's more sweeping generalizations 1952.

Gordon Ellis, 1949, *P. c-album* L. 'Fairly common throughout the district, especially around Llangwstennin and Bodysgallen Woods (Creuddyn Peninsula). Occasionally, fair numbers throughout the Conway Valley and in the Aber valley. This species has become much more common in recent years'.

The species has also been very common on the Creuddyn Peninsula these last two years, and I have frequently seen it in the Conway Valley, in Colwyn Bay suburb gardens and woods, and at Rhyd y foel Llandulas. My records are, however, too numerous to include them all here, but one will suffice as an example of the species' abundance:—

Llanrhos, Creuddyn Peninsula SH 23. 797800. Lix.69, in two fields absolutely full of the yellow flower, *Pulicaria dysenterica* L. 10 *P. c-album* seen, and two of these with *V. cardui* L., *V. atalanta* L., *N. io* L., and *A. urticae* L., and *A. urticae* L., were photographed on this flower.

Interesting as these numbers are by themselves, I have also found a number of forms of the species during this sudden increase (from 1968). It seems to be a recurring phenomena, that variation increases with a sudden population rise (cf. E. B. Ford 1964). To illustrate this the following might be of interest:—

In 1952, J. A. Thompson stated of *P. c-album* that, 'The var. *hutchinsoni* (Robson) is extremely rare (in N. Wales), although the nominotypical form is now one of the commonest butterflies in the district . . .'. This tallies with Gordon Ellis's aforementioned remarks—I mean the abundance of the insect in the 1940-1950 period. Yet, though var. *hutchinsoni* R. was indeed rare, it was found, and this is important, for there is no indication of earlier discoveries nor for that matter later ones until recently. I include the records known to me here:

- (1) Rhuddlan, *Flints*. (1950) E.S.L.
- (2) Ial, *Denbs*. (1950) R.E.V.R.
- (3) Mickle Trafford, *Cheshire* (1947) C.H.

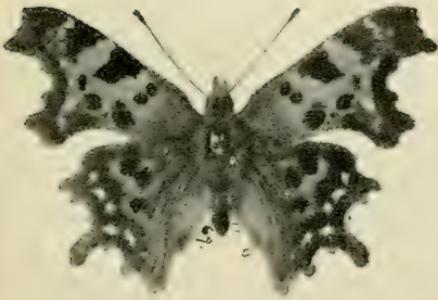
In 1969/70, the insect suddenly became very abundant on the Creuddyn Peninsula compared with 1968. It was in 1970, (8.vii.70) that I recorded (R. L. H. Dennis collection) 2 var. *Hutchinsoni* R. from Dolgarrog in the Conway Valley.

Also, in the early 1940's (1943), Mr G. Ellis took the very rare form, f. *nigrocaria* (authority?) at Bryn Pydew (Creuddyn P.). I am not acquainted with the nomens of *P. c-album* forms, but one of two that I obtained at Gloddaeth (Cr. P.) last year (9.viii.70) fitted his description perfectly (large black blotches on the wings—in this specimen especially on the hindwings). So, in many ways we have a parallelism obtaining of similar occurrences in different periods, and I strongly believe this is not due to chance—except the captures, of course, which are 'random'. It seems as if these forms are rare in N. Wales, but when the environmental conditions favour the insect, they appear occasionally in the population. This exemplifies the case of variation, that with a sudden increase in numbers, more genetic variability is provided by the random recombination of more numerous genetic loci. In terms of genetic theory, 'if conditions favour an organism it may become commoner; it will do so because some aspects of selection are then relaxed. This will result in greater variability, since genetic variation is in equilibrium between mutation and recombination on the one hand and selection on the other' (E. B. Ford 1964, p. 12).

So in brief, there have been two recent known 'peak' periods for *P. c-album* in N. Wales—1940 to 1950, and 1969-70 (+?). However, the earlier of these may have been more extensive, and there are indications from the 1920's that there was a 'peak' period about then (plentiful at Portmadoc and Abergele). The earlier 1930's do not appear to have been particularly rewarding for *P. c-album*, but a record of Gordon Smith's very own, 1938 Newmarket, *Flints*. indicates that the 'peak' period may have begun then or earlier. However, we are totally ignorant of the conditions that have led to these 'periods of abundance', but the first one seems to have been climatic, and this is substantiated by the S. Yorkshire records. (J. H.-Seago, 1959). The recent period may be highly localized, but at least including the Creuddyn Peninsula and the Lower Conway valley region to Colwyn Bay. In 1952, Mr J. A. Thompson mentions that the second brood of *P. c-album* is very seldom seen in N. Wales, and that this is the result of the rare occurrence only of var. *hutchinsoni* R. Yet, in 1969 and 1970, there was a definite emergence in early and mid-September on the Creuddyn Peninsula, and I could have easily overlooked var. *hutchinsoni* R. since most of my attention was drawn towards *E. semele* Hübn. and *P. argus* L., at just the time when var. *hutchinsoni* would have been on the wing.

As a final comment, this again points to the remarkable

PLATE X



environmental conditions on the Creuddyn Peninsula and in the Dulas valley (on Carboniferous limestone); a facet of N. Wales that I have now been able to accumulate an abundance of evidence to substantiate. A localized peak there and in the near vicinity for *P. c-album* would then give me no great surprise.

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Note.—All abbreviated initials are extracted from the above references, where they can be found.

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APATURA IRIS L. IN SURREY.—After having visited Alice Holt Wood over four years without result, I found my first *iris* on 8th August, in fact, I very nearly trod on it. One more step and I would have done so. I stood and stared, hardly believing my luck. After some time without movement on either side. I decided to nudge it gently with my newspaper, beyond opening its wings, allowing me to see that it was a female and a fine specimen, she refused to budge. After more nudging, I got her on to my paper and continued my walk carrying *Madame iris* contentedly settled on my paper. After some time I decided to transfer her to a willow bush: she was loth to move, but eventually clung to a leaf. For several more minutes I was able to admire her in position, occasionally opening and shutting her wings. Finally, a gust of wind swayed her too much, and she lazily flew a few yards and settled on a birch tree. For a further half hour she remained in this position before departing, when my back was turned. In all we kept company for a good 45 minutes; is this behaviour characteristic of the species? If so, they must be easy to catch. — G. GARTON, 37 Waldegrave Gardens, Strawberry Hill, Middlesex. 15.viii.1971.

STAG BEETLES AT LIGHT.—On the morning of July 5th 1971, I was surprised to find two huge male *Lucanus cervus* L. (Stag Beetle) in my trap here. I have only once before had them at light in my twenty years here. — C. G. M. de WORMS, Three Oaks,, Woking. 20.viii.1971.

The Systematics of the Charaxidae (Lepidoptera: Nymphaloidea)

By A. H. B. RYDON, F.R.E.S.

(Continued from p 287)

(5) Subfamily PREPONINAE *subfam. n.*

(Type-genus: *Prepona* Boisduval, 1836, *Hist. nat. Ins.*, Spec. gén. Lépid. vol. 1, pl. 7 (=pl. 3b); type-species: *Nymphalis demodice* Godart, 1824.)

This subfamily consists of *Prepona*, *Agrias*, *Archaeoprepona* and *Anaemorpha*, as well as a new genus that I am erecting here for *Nymphalis* (*Prepona*) *chromus* Guérin-Méneville. The wing-venation of the Preponinae is quite close to that of the Charaxinae, the subcostal veins in the forewing running free, with veins 7 and 8 being longer than the common stalk, and with vein 8 curving downwards near its termination at the outer margin of the forewing below the apex. The palps are also somewhat *Charaxes*-like, but are erect, not S-shaped, and are densely squamose, with a dorsal tuft of hair-like scales at the end of the middle segment, and are light-coloured below. The middle segment of the palp in *Archaeoprepona* is about the same length as in *Charaxes* (i.e. about four times the length of the basal segment), but in *Prepona* and *Agrias* the middle segment of the palp is shorter, approximating more to that of *Euxanthe*, being about three times the length of the basal segment. The basal sensory patch of the palps (Reuter's "Basalfleck"), as already noted, is somewhat similar to that of *Charaxes* (i.e. somewhat elongate, conical in shape, and extending distad from the base of the basal segment). The tarsus of the forelegs of the males of *Prepona* is almost as long as the tibia, whereas in *Charaxes* the tarsus is always noticeably shorter than the tibia. In *Agrias* and *Prepona* the femur, tibia and tarsus of the hindlegs are about the same length, while in *Archaeoprepona* these structures

EXPLANATION OF PLATES

- Fig. 7. *Prepona demophon* (L.); 7, larva; 7a, pupa. (British Guiana, 1931).
 Fig. 8. *Zaretis itylus* (West.); 8, larva; 8a, pupa. (British Guiana, 1931).
 Fig. 9. *Siderone marthesia* (Cr.); 9, larva; 9a, pupa. (Trinidad, 1937).
 Fig. 10. *Siderone nemesia* (Illiger); 10, larva; 10a, pupa. (Cuba, 1931).
 Fig. 11. *Anaea phidile* Geyer; 11, larva; 11a, pupa. (Rio de Janeiro, 1929).
 Fig. 12. *Cymatogramma verticordia* (Hbn.); 12, larva; 12a, pupa. (St. Lucia, 1928).
 Fig. 13. *Memphis porphyrio* (Bates); 13, larva (Belem, Brazil, 1929).
 Fig. 14. *Memphis morvus* (F.); 14, larva; 14a, pupa. (Rio de Janeiro, 1928).

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PLATE XI



Larvae and pupae of Neotropical Charaxidae

are unequal in size. The forewing of *Agrias* is relatively short and broad, and is triangular in shape, being right-angled at the tornus; while in *Prepona* and *Archaeoprepona* the forewing is more elongate and falcate in appearance; so that, if one divides the length of the antenna of the latter two genera by the length of the forewing, one finds that the antennawing ratio (A/W ratio) in the males of *Agrias* is greater than that of the two last-mentioned genera. For example, the A/W ratio in *Agria claudina* Godart is 0.585, compared with that of 0.5 in *Prepona omphale* Hübner. In *Agrias narcissus* Staudinger the A/W ratio is as much as 0.635. As already noted *Agrias* and *Prepona* have, in the males, a prominent light-coloured (yellowish) hair-tuft near the base of the anal fold on the upperside of the hindwing, while in *Archaeoprepona* the hair-tuft is dark in colour. In *Agrias* and *Prepona* the antenna have light red tips; in *Archaeoprepona* the tips are black. If one were to go solely by the wing pattern of *Prepona* and *Agrias*, one would not hesitate to separate *Agrias* (with its resplendent rainbow colours and its distinctive upperside and underside patterns) from *Prepona* (with its relatively austere greenish-blue median band on a deep purple or black background), but as the early stages of the two genera (c.f. figs. 25, 26, 19, 24) and the male genitalia (cf. figs. 33, 34) are closely similar, one must conclude that these two genera are, in fact, closely related, the blue-banded *Prepona* species being but mimics of the similarly coloured *Archaeoprepona* species, and *Agrias* mimicking some species of the Eunicid genera, *Catagramma* and *Callithea*. These are examples of "simple" or "primitive" mimicry, a subject that has been dealt with by van Somers and Jackson (1960). With regard to *Agrias*, Fruhstorfer (1916) stated that "as to their exterior the *Agrias* (species) are to be divided into two groups; the species with a red upper surface, and those with a variegated upper surface being beneath spotted preponderantly with yellow or green. Both the groups are united by *A. amydon* with partly reddish, partly yellowish, coloured females". Two species of Fruhstorfer's genus *Archaeoprepona*, namely *Nymphalis (prepona) chromus* and *Prepona priene* Hewitson, however, differ from nominate *demophon* in certain morphological respects; hence they should, in my opinion, be placed in a separate genus of their own, namely

NOREPPA *genus n.*

(Type-species : *Nymphalis (Prepona) chromus* Guérin-Ménéville, 1844, *Icon. Règne. Cuvier*, 7 Ins. p. 478).

Noreppa differs from *Archaeoprepona* (and *Prepona*) in having the eyes hairy; the palps not uniformly smooth but with some long brown hairs projecting from the lateroventral surface, thus giving them a darker appearance below than in *Archaeoprepona*; the mid and hind tibiae and tarsi spined above and below; the male genitalia with the valves more elongate, and with a shorter aedeagus, and a pair of longer subuncal projections ending in heavily

sclerotized unciform structures that converge medially below the uncus (cf. figs. 31, 32). *N. chromus* also differs from *Archaeoprepona* (as typified by *Papilio demophon*) in having the uppersides of the forewing unicolorous black, without a blue median band, and the hindwing with a quadrate greenish-blue patch in the discal area, not extending above vein seven, and with a submarginal row of black subpupillated spots, partially outlined with light brown, in cellules 1c-6 and the underside of the wings crossed by an almost straight transverse submedial dark line composed partly of discontinuous black lines and outlined proximally with some lighter coloration.

To the above genus also belongs *Prepona priene* in which there is a blue median band in the forewing, which, however, is discontinuous with the blue discal patch of the hindwing.

The egg of *N. chromus* is globular and smooth, being about 1.8 mm in diameter. The newly hatched larva has a head which is much wider than the body, being without horns on the head, or long caudal appendages. (There is an egg-shell of *chormus*, with its newly hatched larva, in the Rothschild collection of the British Museum (Natural History)).

The last member of this subfamily still needing to be discussed here is *Anaeomorpha* which Rothschild (1894) considered stood midway between *Anaea* and *Prepona*. The genus, however, was placed with the Preponinae by Fruhstorfer (1916), which I think is the correct place for it, since unlike the *Anaeinae*, *Anaeomorpha splendida* Rothschild (type-species of the genus) is a powerfully built butterfly, with a large deep thorax and a short conical abdomen, and has long stout antennae, although the pattern of the underside of the wings, with the median dark line crossing both wings, and the outer third of both wings being speckled with light, silvery scales, is somewhat reminiscent of certain members of the *Anaeinae*. However, it differs in a number of respects from the other members of the Preponinae too. The eyes are naked, as in *Archaeoprepona* and *Prepona*, but the mid and hind tibiae and tarsi are spined above and below as in *Noreppa*. The hindwing cell is open, whereas it is closed in all the other Neotropical Charaxids. The antennae are dark red, a character that was used by Fruhstorfer (1916) in his subdivision of the *Prepona* group of species. The palps are somewhat *Charaxes*-like, being S-shaped and porrect. The basal sensory patch of the palps is broad and elongated, which places *Anaeomorpha* somewhat between *Prepona* and *Polygrapha* (the latter being treated here as a member of the *Anaeinae*); but the specialized scales, near the base of the underside of the dorsum of the forewing, do not extend into space 1b as they do in most of the *Anaeinae*, so that *Anaeomorpha*, in this respect, should be placed among the Preponinae rather than the *Anaeinae*. *Anaeomorpha* has a strongly falcate forewing, and the hindwing is produced at the

anal angle. It also differs from the other members of the Preponinae in having a light metallic greenish basal patch in the discal area of the forewing above. The male genitalia of *Anaeomorpha* are quite distinctive. The short stout uncus is terminally hooked, and is slightly shorter than the broad and strong tegumen; the thick valves are short and somewhat triangular in shape (like those of *A. demophon*), being broad at the base and narrow at the denticulated apex. The gnathos consists of a pair of small, thin, discrete plates below the uncus there being no subuncal projections as are found in *Prepona*, *Agrias* and *Archaeoprepona*; the aedeagus is relatively short, strong, rod-like and pointed distally; the juxta is quite long and solid, somewhat *Charaxes*-like in appearance, but without a terminal ventral hook.

On the preceding characters the Preponinae can be divided into the following tribes:—

- (1) Shaft of antenna black; hindwing not produced at anal angle; cell of hindwing closed 2
 — Shaft of antenna dark red; hindwing produced at anal angle; cell of hindwing open

tribe ANAEOMORPHINI *tribus n.*

(type-genus: *Anaeomorpha* Rothschild, 1894, *Novit zool.*, vol. 1, p. 687; type-species: *A. splendida* Rothschild, 1894).

This is a monotypic tribe

- (2) Eyes hairy; palps with long brown hairs on the latero-ventral surface; mid and hind tibiae and tarsi spined above and below; male genitalia distinctive (see fig. 32 ...

tribe NOREPPINI *tribus n.*

(Type-genus: *Noreppa* Rydon; type-species: *Nymphalis (Prepona) chromus* Guérin-Méneville, 1844). This small

tribe contains also *N. priene*.

- Eyes naked; palps light-coloured below, without dark hairs; mid and hind tibiae and tarsi spined below only ... 3

- (3) Antennae black at the tip; hair-tufts in hindwings of males dark; male genitalia distinctive (see fig. 31)

tribe ARCHAEOPREPONINI *tribus n.*

(Type-genus *Archaeoprepona* Fruhstorfer, 1916, in Seitz, *Macrolepidoptera of the World*, vol. 5, p. 553, type-species:

Papilio demophon L., 1758). This tribe contains some 7-odd species which can be subdivided into several groups on differences in the underside pattern of the wings and the male genitalia. More knowledge of the early stages of this tribe is needed to elucidate the true relationships of the species comprising it.

- Antennae red at the tip; hair-tufts on hindwings of males light-coloured (yellowish); male genitalia distinctive (see figs. 33, 34). tribe PREPONINI *tribus n.*

(Type-genus: *Prepona* Boisduval; type-species: *P. demodice* (Godart). This tribe, which includes *Agrias*, can be subdivided into two subtribes, using the key below:

- (1) Forewings elongate, somewhat falcate; upperside pattern of wings normally with a blue median band on a darker

blue, or black, background in the males; antenna about half the length of the forewing in the males

subtribe PREPONINA *subtribus n.*

(Type-genus: *Prepona* Boisduval). This subtribe consists of some 23 species, according to Stichel and Bryk (1939), which, on the pattern of the upperside and underside of the wings, can be subdivided into a number of distinct groups; hence this group is not particularly homogeneous.

- (2) Forewing broad and triangular, right-angled at the torus, with the outer margin straight; upperside pattern of wings variegated; antenna normally more than half the length of the forewing in the males

subtribe AGRIASINA *subtribus n.*

(Type-genus: *Agrias* Doubleday, 1844, *List. Spec. lep. Ins. Brit. Mus.*, vol. 1, p. 106; type-species: *A. claudina* Godart, 1824 (not *Papilio claudia* Schulze; *vide* Cowan, 1970, p. 40)). Stichel and Bryk (1939) list eight species of *Agrias* with numerous subspecies. As noted above, *Agrias* can also be subdivided on the pattern of the upperside and the underside of the wings into several distinct groups.

(6) Subfamily ZARETIDINAE *subfam. n.*

(Type-genus: *Zaretis* Hübner, 1819, *Verz. bekannt. Schmett.*, vol. 4, p. 49; type-species: *Papilio isidora* Cramer, 1779.)

This subfamily consists of the brown *Zaretis*, the red and black *Siderone*, and possibly also the large fulvous *Coenophlebia*, with its markedly acuminate forewings. The Zaretidinae appear to be intermediate between the Preponinae and the Anaeinae (*q.v.*) They differ from the former in the shape and pattern of the wings, the wing venation, and also in the male genitalia which are closer to the Anaeinae (see Comstock, 1961, for figures of the genitalia); but the palps of *Zaretis*, *Siderone* and *Coenophlebia* are strong, porrect, whitish in colour below, and in these respects are more like those of the Preponinae. The specialized scales near the base of the underside of the forewing, in the members of this subfamily, do not extend beyond vein 1 into space 1b as they do in most of the Anaeinae. Reuter (1896), on an examination of the basal sensory patch of the palps, concluded that *Zaretis* and *Siderone* were more closely related to the Preponinae than to the Anaeinae. In *Zaretis* and *Siderone* the sensory basal patch is elongate and conical in shape, but in *Coenophlebia* it is relatively small and triangular in structure, being pulled out in its full length as in *Anaea*, although the palp itself is strong and somewhat S-shaped terminally, and is thus nearer in appearance to *Zaretis* and *Siderone* than to *Anaea*. *Coenophlebia* also differs from *Zaretis* and *Siderone* in having veins 5 and 6 of the forewing arising from a common stalk, some distance from the apex of the cell—an arrangement of the veins that is approximated to a lesser degree in *Polygrapha*

cyanea Salvin and Godman which is treated here as a member of the Anaeinae (*q.v.*). It is thus possible that *Coenophlebia* really belong to the Anaeinae rather than to the Zaretidinae, but this matter will only be resolved when the early stages become known. The members of the Zaretidinae, as already noted, were placed by Comstock (1961) in his omnibus genus "*Anaea*", but *Zaretis* and *Siderone* do not, in my opinion, belong with the Anaeinae, since, apart from morphological differences in the adults, they also differ in the early stages—the larvae, for example, (figs 8, 9, 10) being closer in appearance to those of the Preponinae (figs. 7, 25, 26), than to those of the Anaeinae (figs. 11-14, 29, 29a), although the pupae (figs. 8a, 9a, 10a) are more like those of the Anaeinae (figs. 11a, 12a, 14a, 29b), thus indicating (as Schatz and Röber (1892), and others have suggested) that the Zaretidinae are intermediate between the Preponinae and Anaeinae. Schatz and Röber (1892, p. 169), in fact, separated *Zaretis*, *Siderone* and *Coenophlebia* from the *Anaea* group on the basis of the early stages, placing them with *Charaxes* and *Prepona* in their "*Nymphalis*" group. As previously noted, Comstock (1961) drew attention to a peculiarity found in the Anaeinae, namely the tubular, vein-like structure which arises from the third axillary sclerite and extends distad for a short distance along the inner margin of the hindwing, which he considered might be an ambient vein. This "ambient vein" is only vestigially present in the Zaretidinae, but is absent in the Preponinae. The Zaretidinae can be subdivided into three tribes, using the following key:

- (1) Imagos large in size; apex of forewing strongly produced; hindwing rounded, not produced at the anal angle; veins 5 and 6 of the forewing arising from a long common stalk tribe COENOPHLEBIINI *tribus n.*
(Type-genus: *Coenophlebia* Felder and Felder, 1862, *Wien. ent. Monats.*, vol. 6, p. 422 *nota.*; type-species *Siderone archidona* Hewitson, 1860.)
This tribe contains only the one genus of which there are two recognized geographical races.
- Imagos medium-sized; apex of forewing not so strongly produced; hindwing produced at the anal angle; veins 5 and 6 of the forewing arising separately from the apex of the cell 2
- (2) Forewing somewhat falcate, with the inner margin emarginate at the tornus; the fourth subcostal vein (V. 8) of the forewing ending in the costa, basad of the apex; forewing often with a hyaline macule at the base of cellules 2 and 3 respectively; colouring of upperside of both wings typically tawny tribe ZARETIDINI *tribus n.*
(Type-genus: *Zaretis* Hübner, 1819)
In the genus *Zaretis*, Comstock (1961) included *Siderone syene* Hewitson and *Nymphalis callidryas* Felder. It is doubtful, however, whether these last two taxa are in fact congeneric with the type-species *Z. isidora* (Cramer),

although *syene* is closer to *isidora* than to *callidryas*, the latter differing from the previous two species in having the first three subcostal veins of the forewing anastomosing with the costal vein, and also in the female having a tail at vein 4 of the hindwing.

- Forewing with the outer margin broadly convex before a slight emargination at the apex; the fourth subcostal vein of the forewing ending in the apex; colouring of wings upperside velvety black with red markings

tribe SIDERONINI *tribus n.*

(Type-genus: *Siderone* Hübner, 1823, *Samml. exot. Schm.* vol. 2, pl. 56; type-species: *S. ide* Hübner, 1823). This tribe consists of only one genus which contains several good species, although Comstock (1961, p. 27), contrary to Röber (1916), said *Siderone* "only includes one highly variable species".

(To be continued)

A Review of the Butterflies in the Bristol Area

(Continued from p 240)

By A. D. R. Brown

Callophrys rubi Linn. (Green Hairstreak)

We have records from thirteen localities, but no doubt many more exist owing to the fact that this species is easily overlooked. Where it does occur it is rarely plentiful, and in some places it is on the decline. One of these is Priddy in the Mendip Hills where it was quite common at one time, but the effects of the Forestry Commission are beginning to be felt. At Wetmoor in West Gloucestershire it is protected along with many other species, and small numbers are seen there each year. The Green Hairstreak is often observed at Goblin Combe but only in ones and twos. Many fresh discoveries of colonies in the Cotswolds have recently been made, as well as others in the Mendip Hills.

Strymon w-album Knoch (White Letter Hairstreak)

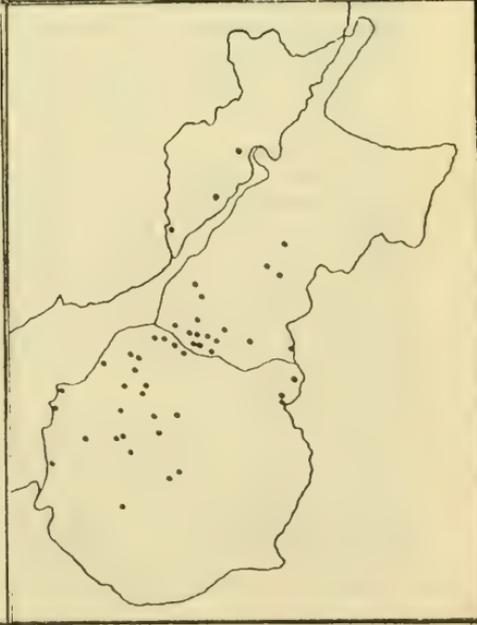
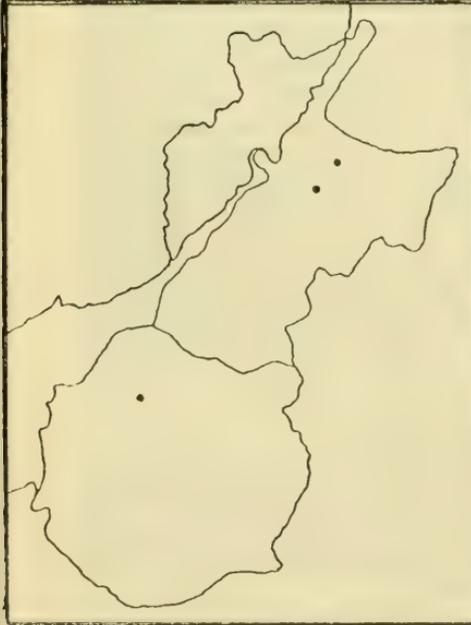
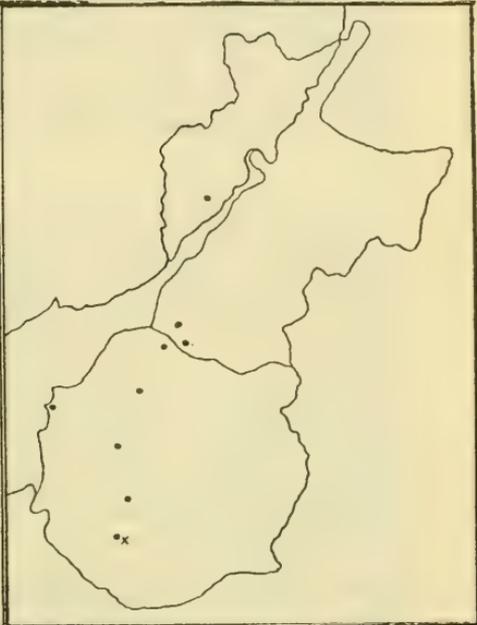
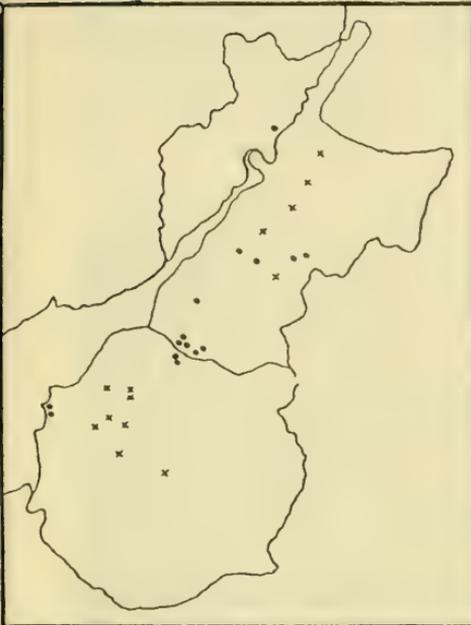
This butterfly has recently been discovered in several places within Bristol itself, which is a very good sign. On either side of the Avon Gorge, this species has been seen from time to time, but mostly high up in the Wych Elm trees. In 1966, a larva was beaten from a low branch of one of these trees, and later on a butterfly was seen on some nearby bramble blossom. To the north of Bristol not far from Henbury, specimens have been noted much more frequently, and various evidence points to the fact that it may be on the increase. At Whorlebury Hill near Weston-super-Mare, single specimens have been found occasionally, not only as adults but also as larvae, and once a pupa. However, it often appears to be absent from this locality.

● *Strymon w-album* Knoch.
(White letter hairstreak)

× *Callophrys rubi* L.
(Green hairstreak)

● *Thecla quercus* L.
(Purple hairstreak)

× *Thecla betulae* L.
(Brown hairstreak)



Hamearis lucina L.
(Duke of Bergundy fritillary)

Anthocharis cardamines L.
(Orange tip)

In West Gloucestershire, the White Letter Hairstreak has recently been found in many new localities in the Cotswold Hills as well as in some of the unspoilt areas between there and the Severn Estuary. Further north near Gloucester City, larvae have sometimes been collected from small Wych Elm trees on the side of a railway bank. It undoubtedly flourishes at many places in the Forest of Dean, but these have yet to be discovered. From all the material we have gathered it is quite clear that this species is well established in the Bristol area, and is at present in no kind of danger.

Thecla quercus Linn. (Purple Hairstreak)

The Purple Hairstreak is quite scarce in the Bristol district as opposed to the previous species, not only in its distribution but also in its numbers. Perhaps the best locality for it is in the Polden Hills, situated south of the Somerset moors. On the southern sides of these hills are extensive oak woodlands, which merge with open grassland towards the top, and it is in this region that the Purple Hairstreak has been found. We have no records of adult butterflies on the wing, only of larvae which have been beaten from the smaller oak trees. From time to time this species has turned up in considerable numbers near Goblin Combe, but none have been noted in recent years. In 1964, a single specimen was seen in some woods near Weston-super-Mare, but none have appeared since that time. Up to 1965, larvae and adults were occasionally found in Leigh Woods on the Somerset side of the Avon Gorge, and it is likely that this species still occurs there. The opening of a nature reserve was recently announced for this area.

As far as West Gloucestershire is concerned, we have very little information to work on. In 1965, the author dislodged a solitary larva in an oak wood near Lydney in the Forest of Dean, but despite that being the only record that we have, it is highly probable that it occurs elsewhere in that region, perhaps quite commonly. Observations from two places near the Bristol boundary have been received, but its prospects of survival look pretty grim. The chief problem with this attractive little butterfly, in the Bristol district at any rate, is the availability of suitable habitats, which are rapidly being reduced in number.

Thecla betulae Linn. (Brown Hairstreak)

The only locality that we know of where this butterfly occurs, is also in the Polden Hills in North Somerset. Here, from time to time, the larvae have been beaten from the small Blackthorn bushes, sometimes in considerable numbers, but no adults have ever been recorded.

There are many likely looking haunts all over the two vice-counties, but despite regular searches no discoveries have been made.

PIERIDAE

Pieris brassicae Linn. (Large White)

This butterfly is usually common in both broods, and remains on the wing until late in October. The peak emergence of the first generation occurs in early June, but in 1964, this took place in mid-May. Likewise, the second generation reaches its peak in September, but during that year it occurred in late July. On 3rd June of this year (1970) no fewer than fifty specimens were observed moving east for Sand Point on the North Somerset coast.

Pieris rapae Linn. (Small White)

The Small White is much more common than the previous species, and generally stays on the wing longer during the second brood. The butterflies are on the wing in nearly every month between April and October, and the various generations are difficult to distinguish owing to this fact.

Pieris napi Linn. (Green-Veined White)

Unlike the two species just described the Green-veined White is more limited in its distribution, since it usually requires damp conditions in which to breed. Up until 1964, this butterfly was very common in most suitable areas, but numbers were down the following year. In 1966, it had regained strength and during the second generation, hundreds of specimens were noted around the marshy areas near Priddy in the Mendip Hills. A similar situation occurred again in 1969.

In central West Gloucestershire, the first brood exhibits some superb female examples, in which the typical black markings on the tips of the forewings merge into a soft grey hue on the inside, and the veins on the upperside are also grey in colour.

Anthocharis cardamines Linn. (Orange Tip)

This species is widely distributed all over the two vice-counties, and can even be found within Bristol itself. Our records point to the fact that the Orange Tip is on the increase, particularly since 1968, and the reason for this may be the restraint in using weedkillers along roadside verges where its foodplant abounds. In 1968, the emerging period was cut in half by a prolonged cold spell, and it was thought that this would have adverse effects on the resulting generation, but this proved not to be the case. Earlier, in 1967, a superb gynandrous specimen (mostly female) was captured near Wickwar in West Gloucestershire by the late D. G. Gibb.

The prospects for the Orange Tip in the Bristol district look quite good at the present time, and we hope that the situation will improve even further.

Leptidea sinapis Linn. (Wood White)

Although no actual recordings have been sent in to us, we know for certain that this rare and local butterfly exists in

reasonable numbers at a remote locality in the Forest of Dean. The chances are that it occurs in many other places too, but as yet we have no knowledge of these.

Colias croceus Fourc. (Clouded Yellow)

The West of England does not appear to get its fair share of the Clouded Yellow, as do the South and East. The majority of our records are from North Somerset only, and even then just isolated specimens have been noted on the wing. Of these, most are of the second generation. In 1964, this species was far more numerous in the Bristol area, particularly during August and September, when up to three butterflies would be seen in any one day. In June of 1967, the author caught a very battered female specimen at Wetmoor in Gloucestershire, from which over one hundred ova were obtained. The larvae were successfully reared and the adult butterflies started emerging in August, with a substantial number of *ab. helice*. Single specimens were observed at regular intervals during October 1969 at Sand Bay near Weston-super-Mare in Somerset, the last of which was noted on 17th October. So far, we only have one record for 1970, and that is from the same locality.

Gonepteryx rhamni Linn. (Brimstone)

The Brimstone is widely distributed all over the Bristol area, but is rarely common. Only on very seldom occasions do we hear of more than about eight butterflies having been seen on a particular day. Its foodplant, the Buckthorn, is quite scarce and to this may be attributed the small numbers of butterflies in the district. Nevertheless, we receive sufficient reports each year, showing that this species is not yet in a critical situation. The earliest observation over the past nine years is of a male butterfly seen on the Bristol side of the Avon Gorge on the 11th March 1965, while the latest was one observed on the 17th October 1969 at Sand Point in Somerset.

HESPERIIDAE

Erynnis tages Linn. (Dingy Skipper)

There is little to say about this somewhat drab and 'overlooked' butterfly. It appears to be holding its own in both vice-counties, being quite abundant in some places; we have records of eight localities in W. Glos. and sixteen in N. Somerset. In May 1965, the author captured an unusual variety of this species, with broad radiations across the forewings—(*Entomologist's Record*, **82**: 253.).

Pyrgus malvae Linn. (Grizzled Skipper)

The Grizzled Skipper is much more sparsely distributed in the Bristol area than the previous species. It has only been observed in ones and twos, with the exception of a few special haunts; in 1965 it was quite common in Michael Wood, West Gloucestershire, but as mentioned earlier this locality has been

largely destroyed by motorway development. At nearby Wetmoor, where the habitat is being protected, it can still be seen in reasonable numbers every year. At Priddy in Somerset, which is one of the old lead mining villages, the butterfly was seen flying in strength along the semi-overgrown tracks through the Forestry Commission's pine plantations, although this strength has depreciated in more recent times. Once again, Goblin Combe appears to be the metropolis for this species in North Somerset, where it is common every year. A few years ago, a systematic search was made here for examples of *ab. taras* Meigen, but none were forthcoming.

Thymelicus sylvestris Poda (Small Skipper)

This species occurs in almost any suitable habitat throughout West Gloucestershire and North Somerset, including several localities within Bristol City itself. It is nearly always common wherever it is found, and is frequently quite abundant.

Ochlodes venata Br. & Grey (Large Skipper)

The Large Skipper is widely distributed like its cousin the Small Skipper (*Thymelicus sylvestris* Poda), but is not usually so common. During 1968, butterflies stayed on the wing later than is normally the case, and were still abundant at a locality in Bristol on 23rd August.

Conclusions

From the foregoing report it is clear that we have a fair selection of butterfly species in the Bristol area, but that many of the strongest colonies are severely threatened, not by collectors, but by various types of commercial and agricultural development. In a few instances tourism could be the cause of population reductions, but by and large it is the destruction of natural habitats. Fortunately, some of the areas mentioned now form nature reserves, where the rarer species are protected.

Looking from a more optimistic point of view, much work has yet to be done in relatively unexplored regions, such as the Forest of Dean, where there is great potential for the keen entomologist and conservationist. Without doubt, many local colonies remain undiscovered, and it is our duty to guard and protect any newly-found 'gems' from the ravaging hunger and greed of industrial enterprises. Let us wake up to this critical situation and do something about it before it is too late.

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A Note on the existence of Temporal Isolation in Satyrid Butterflies

By JOHN H. MASTERS

George Thomson's article (*Ent. Record*, **83**: 87-90, 1971) concerning the possibility of temporal sub-speciation in *Maniola jurtina* (Linnaeus) brings to mind one known example of temporal isolation of two subspecies in the same locality and is related in kind with some studies that I have had underway for a number of years with populations of certain North American satyrid butterflies.

At Churchill, Manitoba, two subspecies of *Oeneis jutta* (Hübner) ostensibly occur together with temporal isolation. *Oeneis jutta* is one of several species of the genera *Oeneis* and *Erebia* which have biennial life-cycles and fly only in alternate years. Churchill is located right at the northern limit of the tree line and I have observed that *Oeneis jutta ridingiana* Chermock & Chermock is found here, principally in the taiga zone in even-numbered years, and that *Oeneis jutta alaskensis* (Holland) is also found here, principally on the open tundra (*Eriophorum* associations) in odd-numbered years. This cannot be construed as a case of temporal isolation having led to sub-speciation but instead is a case of temporal isolation maintaining two subspecies in otherwise geographic sympatric situations. It should be further noted that the temporal isolation of these two subspecies at Churchill is not complete for a certain degree of intergradation is noticeable in specimens from there.

Thomson's observations deal with a univoltine species (*M. jurtina*) which has a very long emergence and flight period of up to seven months in some areas. It is his contention that butterflies emerging at the opposite ends of this long flight period are temporarily isolated from each other and in the case of *M. jurtina* we are possibly seeing the very early stages in the formation of temporal subspecies. These observations with *M. jurtina* may be more closely related to studies that have been underway by Charles Remington, Arthur Shapiro, Harry Clench and other workers with another North American satyrid, *Euptychia cymela* (Cramer), which is univoltine, but in some localities exhibits a distinct 2nd brood. The 2nd brood emerges after the earlier brood has waned, but altogether too

soon to allow for the development of a second generation. Those persons working with this situation are studying it on the premise that two sibling species are involved, but have been unable to find any morphological characteristics that would serve to separate the two.

My personal work has dealt with those species having biennial life-cycles such as *Oeneis macounii* (Edwards), which flies only in odd-numbered years west of the Lake Winnipeg-Red River Valley area of Manitoba and only in even numbered years to the east of it. In 1966 and 1967 John Sorensen and I were so impressed with the possibility of these two temporally (and geographically) isolated blocks of populations having developed distinct subspeciation that we spent a great deal of time collecting long series of the species in eastern Manitoba (1966) and western Manitoba (1967). We were unable to distinguish morphological characters suitable for separating the two populations, but we did gain considerable knowledge of the habits and habitats of the species that became the basis of several papers (e.g. Blue Jay, 26: 38-40, 1968; Jour. Lepid. Soc., 21: 258-260, 1968 and 23: 129-132, 1970).

While *Oeneis macounii* is remarkably uniform over a wide range in North America, *Oeneis jutta* displays a great deal of geographic variation and those subspecies presently defined correspond quite well to the regions of temporal alternation. In Manitoba for instance, subspecies *alaskensis* appears predominately in odd-numbered years in the tundra regions near Hudson's Bay; subspecies *ridingiana* appears in even-numbered years in the northern and western parts of the province; and subspecies *ascerta* Masters & Sorensen appears in odd-numbered years to the east of Lake Winnipeg and the Red River. Interestingly in areas where the ranges of *Oeneis macounii* and *O. jutta* overlap they fly in alternative years; in Minnesota, for instance, *O. jutta* flies in odd-numbered years and *O. macounii* in even-numbered ones with the opposite situation being true west of Manitoba. It would be interesting to speculate that interspecific competition is involved here except for the fact that the butterflies have distinctly different habitats. *Oeneis jutta* is restricted to wet black spruce/sphagnum moss bogs while *O. macounii* occurs in dry, sandy jack pine areas.

In Wisconsin and areas to the east, *Oeneis macounii* is no longer found and an off-season flight of *O. jutta ascerta* sometimes occurs, although never in as great numbers as in odd-numbered years. It must be assumed that Wisconsin *jutta*, like Manitoba and Minnesota *jutta*, has a biennial life-cycle. Therefore those adults emerging in odd-numbered years are temporally isolated from adults emerging in even-numbered years, allowing an excellent potential for the eventual evolution of temporal subspecies.

P.O. Box 7511, Eastern Heights, St Paul, Minnesota, U.S.A.

Notes and Observations

SOME EARLY AND LATE RECORDS OF THE FIRST LEPIDOPTERA IN 1971.—I have thought it of interest to record some unusually early and also late appearances during the first four and a half months of 1971, caused, no doubt, by the vagaries of the British climate, though the remarkably fine spells at the end of April and in the first half of May may have been responsible for some of the precocious emergences. Some early dates are:—

March 14	<i>Eupithecia abbreviata</i> Stephens	Virginia Water.
April 5	<i>Cycnia mendica</i> Clerck	Horsell.
April 15	<i>Chaonia ruficornis</i> Hufn.	Kendal.
April 20	<i>Rheumaptera cervinalis</i> Scop.	Horsell.
May 9	<i>Plusia gamma</i> L.	Horsell.
May 10	<i>Harpyia furcula</i> Clerck	Horsell.
May 11	<i>Semiothisa liturata</i> Clerck	Horsell.

while later dates include:—

March 15	<i>Erannis leucophaearia</i> Schiff.	Horsell.
March 24	<i>Phigalia pedaria</i> Fabr.	Chobham.
May 11	<i>Conistra vaccinii</i> L.	Chobham.
May 12	<i>Xylocampa areola</i> Esp.	Horsell.

—C. G. M. de WORMS, Three Oaks, Woking. 16.v.1971.

TETHEA FLUCTUOSA HÜBN: A MELANIC EXAMPLE IN KENT.—I was in the well-known Hamstreet Woods on June 21, 1971 when, among a not very prolific number of visitors to light, I took a remarkable form of the Satin Lutestring with the forewings very dark with no pale band showing, while the hindwings were dark grey and the body was also melanic. Mr Chalmers-Hunt in his *Lepidoptera of Kent* mentions a similar form taken in the same locality by Mr George Youden in 1955. I am not aware of another of this rare form being taken in the interval. Another unexpected visitor there was *Spilosoma urticae* Esp. (Water Ermine). — C. G. M. de WORMS, Three Oaks, Woking. 20.viii.1971.

A BUTTERFLY DAY IN AUGUST.—On an ideal day for warmth and sunshine I paid a visit on 17th August 1971, to the Chiddingfold and Petworth areas with the Rev. Anthony Harbottle and his two young sons. In our walks through several woods, we saw in all twenty species of butterflies which included the following: *Pieris brassicae* L., *P. rapae* L., *P. napi* L., *Leptidea sinapis* L., *Gonepteryx rhammi* L., *Vanessa io* L., *Polygonia c-album* L., *Apatura iris* L., *Limenitis camilla* L., *Argynnis paphia* L., *Coenonympha pamphilus* L., *Maniola jurtina* L. M. *tithonus* L., *Pararge aegeria* L., *Polyommatus icarus* Rott., *Heodes phlaeas* L., *Celastrina argiolus* L., *Thecla quercus* L., and *Thymelicus sylvestric* Poda; altogether a remarkable total.—C. G. M. de WORMS, Three Oaks, Woking. 20.viii.1971.

TOADFLAX BROCADE IN SURREY. — Whilst belatedly examining some moths caught in a mercury vapour trap at Bookham in Surrey on 13th July 1970, I came across a single specimen of the Toadflax Brocade, *Calophasia lunula* Hufn. — P. A. SOKOLOFF, 26 Pinchbeck Road, Green Street Green, Orpington, Kent. 28.viii.1971.

RECENT CAPTURES. — A single male *Enargia paleacea* Esp. came to our mercury vapour light in Tilgate Forest on 16th July 1971, an unusually early date and an unusual locality for this species. The specimen was taken by Miss J. E. Marshall. A male *Sterrrha vulpinaria* H.-S. came to Miss Marshall's light in her garden at Waddon (South Croydon). This is not far from the old course of the River Wandle, and may indicate spread westwards, or it could indicate an old isolated colony. Among the more interesting visitors to my light trap in my garden at Selsdon have been *Harpyia bicuspis* Borkh. 1♂ June 1970; *Hadena compta* Schiff. 1♂ 1.viii.1971, 1♂ 8.vii.1971; and *Polia nitans* Haw., 4 in July, the first I have seen in this area in forty years. I took a specimen of *Nola albula* Schiff. at Winspit in Dorset on 1.viii.1971.—E. H. WILD, 112 Foxearth Road, Selsdon, Surrey CR2 8EF. 28.viii.1971.

CLOSSIANA SELENE (SCHIFF.): A SECOND BROOD SPECIMEN. — As second brood examples of this species are unusual in Britain, it is worth recording the capture of a very fresh female in a wood near Plaistow, north west Sussex, on 27th August 1971. It differs greatly from females of the first brood, which were abundant in the same area in June: much smaller (40 mms against 45/50 mms), the ground colour darker brown, the black markings stronger and more extended, the row of marginal spots pale cream and very prominent by contrast. "South", plate 66, fig. 6, shows a male of the second brood; but this, though small, is paler, not darker, than males of the first brood.—R. F. BRETHERTON, Folly Hill, Birtley Green, Bramley, Surrey. 28.viii.71.

HAPALOTIS VENUSTULA HUBN. (LEP. NOCTUIDAE) IN N. W. KENT.—The attraction of five specimens of this local insect to lights at Dartford in 1970 was reported in *Ent. Rec.* 82: 332. This year over two dozen have appeared in the trap in my garden on 7th and 8th June, and from 22nd June to 10th July, with a maximum of five on 26th June, indicating a flourishing breeding colony in the adjacent Joyden's Wood, Bexley.

In the 1930s this was largely dense deciduous woodland and would not have afforded a suitable habitat for *H. venustula*. At present much of it is in a transition stage between this and coniferous plantation, with young conifers already planted by the Forestry Commission.

The colony should flourish for a number of years, but subsequent decline must be inevitable. — B. K. WEST, 36 Briar Road, Bexley, Kent. 11.viii.1971.

LAMPIDES BOETICUS L. AND THECLA BETULAE L. IN SURREY.—On the very warm afternoon of 4th September 1971, I saw in the gardens of the Royal Horticultural Society at Wisley a female *Lampides boeticus* (Long-tailed Blue). It was settled on a flower in the Long Border, and its characteristic underside caught my eye. It then took off with the swift, jerky flight with which I am familiar on the Continent and, after a brief circuit, disappeared over the hedge. It was probably an immigrant, having perhaps the same origin as the *Rhodometra sacraria* L., of which I understand several have been seen in Devon, and one in Surrey, during the past week. Other butterflies were much in evidence at Wisley: the buddleias were smothered by well over a hundred *Aglais-urticae* L., with a few *Inachis io* L., and a single *Vanessa atalanta* L., and a *Celastrina argiolus* L. was also seen. When I returned at about 5.30 p.m. to my own garden in Bramley, I found a very battered female *Thecla betulae* (Brown Hairstreak) feeding on the buddleia. Though I have found eggs of this species in the Durfold Woods a few miles away, and have several times bred the butterfly from larvae collected elsewhere, I had never before seen it in the wild in Britain. After more than forty years of collecting, it was quite an experience to see *two* kinds of butterflies for the first time in Britain in a single afternoon!—R. F. BRETHERTON, Folly Hill, Birtley Green, Bramley Surrey. 6.ix.71.

Current Literature

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Chapter V111 is headed "Snake-bite — its Prevention and Treatment" in which the author gives practical advice from all angles, and very wisely does his best to allay the fear experienced by most patients, which often has more adverse effect on the victim than the snake's venom has.—S.N.A.J.



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THE PROFESSOR HERING MEMORIAL RESEARCH FUND

The British Entomological and Natural History Society announces that, as a result of applications received by 30th September 1971, awards have been made to Miss J. M. Ruse, Department of Zoology, University of Manchester, to help her research into the biology of leaf miners and their parasites on *Sorbus aucuparia* and related host plants; and to Mr P. R. Cobb, Editor of the Proceedings of the Heacham and West Norfolk Natural History Society, for continuation of his work on the life-cycle and distribution in Britain of the gall-wasp *Andricus quercuscalicis* (Burgsdorff).

Further applications are invited for awards to be made after 31st March 1972, for the promotion of entomological research with particular emphasis on:—

- (a) Leaf miners
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- (c) Lepidoptera, particularly Micro-Lepidoptera
- (d) General Entomology

in the above order of preference, having regard to the suitability of the candidates and of the plan of work proposed.

It is envisaged that awards would be made to assist travelling and other expenses, necessary for field work, for the study of collections, for attendance at conferences, or for exceptional costs of publication of finished work. In total they are not likely to exceed about £120 in 1972.

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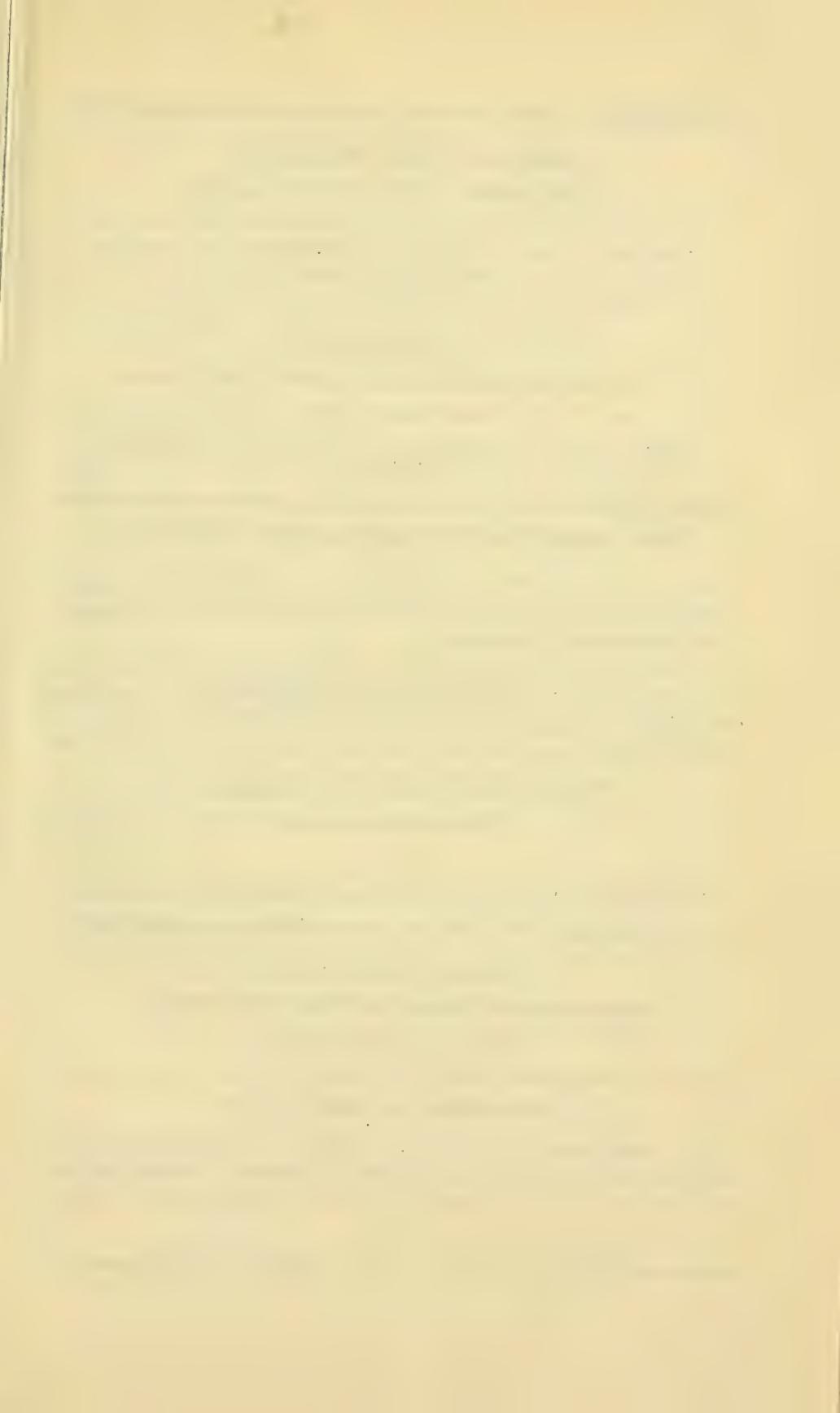
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S. N. A. 1987
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THE ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

Edited by S. N. A. JACOBS, F.R.E.S.

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FEB 7 1972

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Butterflies in the Island of Rhodes, May 1971

By R. F. BRETHERTON, C.B., M.A., F.R.E.S.

My wife and I began our fifth visit to Greek territory with six days on the island of Rhodes, from 16th to early on 22nd May. For the first three days we were accompanied by Mr John Coutsis and his mother, who joined us from Athens. We wished to see some of the endemic sub-species of Rhopalocera which had been described from Rhodes, and perhaps to add to the rather short list of species known to occur there. We had only limited success, probably because we were between seasons; owing to a forward spring followed by a prolonged check in April, the early butterflies had quite disappeared, while most of the later species which we had hoped to see were not yet out, although the weather during our stay was fine and warm except for cloud and showers on the mountains on the second day. Nevertheless, as little has been published in English on the subject, a record of our experience may be of interest.

The islands of Rhodes is 48 miles long by 22 miles broad, with an area of 540 sq. miles. In shape, and in its north east to south west orientation, it is rather like the Isle of Man; but it is about half as big again. At its northern tip only seven miles of sea separate it from the Turkish mainland of Asia. A mountain chain which reaches 1,215 m. at its highest point runs down the western side and is quite well wooded; the more level ground on the eastern side is hotter and drier, but irrigation nourishes large groves of orange, lemon and other fruit trees. In May the vegetation, except very near the coast, showed little sign of dessication and there was an abundance of wild flowers, though unfortunately singularly few butterflies. Nearly half the resident population, and almost all the innumerable visitors, are concentrated in Rhodes city on the extreme northern tip; the rest of the beautiful island has nothing bigger than villages, linked by roads which are good round the coast but indifferent or impassable where they cross the mountain spine.

Several descriptions and lists of the lepidoptera of Rhodes have been published, notably by Rebel (1916, 1924, 1936), Turati and Fiori (1929, 1930), and Hartig (1940); and in 1963 Bender incorporated these with the results on his own visits in 1939 and 1958, listing 45 species of Rhopalocera and 104 of other macro-lepidoptera. Eight of these are sub-species which are supposed to be endemic, either in Rhodes alone, or in the Dodecanese. But there seems to have been no collecting by residents, and it is unlikely that Bender's list is complete even for the Rhopalocera. There have also been pictures and discussions in various journals of the extraordinary swarming of the Tiger moth, *Callimorpha quadripunctaria* Poda, in the "Valley of the Butterflies" (Petaloudes), which has become one of the regular tourist attractions. This swarming we did not see, being at least a month too early.

On our first day, 16th May, we made a late start because of the need to sleep off our night flight from London and to pick up our hired car. But about 11 a.m. we started with Mr and Mrs Coutsis along the west coast and then turned inland to spend the middle of the day on the mountain Profitis Ilias (798 m.), which is largely covered by a forest of Aleppo Pine (*Pinus halepensis* Miller). Just below the forest we found a bank where *Maniola telmessia ornata* Turati & Fiori and *Aporia crataegi fert* Turati were common and in good condition, with two or three *Iphiclides podalirius* L. But the forest and bare places on the ridge of the mountain yielded very little except a couple of *Nymphalis polychloros* L., which we failed to catch, a few *Lycaena phloea* L. and some of the Geometrid moth *Rhodometra calabra* Petagna. When in the afternoon we turned down to the coast and visited the ancient Greek site at Kamiros the same absence of butterflies was apparent, except for the ubiquitous *M. telmessia*.

On the second day we started again along the west coast road, but crossed by a high pass to the village of Aghia Isidoros, which nestles under the bare eastern slopes of Mt. Ataviros (1,215 m.), where the Blue *Plebejus loewii robusta* Turati has been recorded in early June. But cloud on the mountain prevented proper exploration of this locality, which anyhow did not seem promising; so we descended some way on the road to Lindos to a flowery meadow where we were able to eat our sandwiches in a sunny interval but could still find very few butterflies. Continuing towards Lindos, we caught a fine *Nymphalis polychloros* but were again beset by cloud and showers as we drove through a fine forest of *Arbutus unedo*, which might have given us a sight of *Charaxes jasius* L. if conditions had been better. After spending a couple of hours viewing the charming white-washed villages of Lindos and the combined classical temple and mediaeval castle on the rock above it, we drove back to Rhodes in the late afternoon, catching on the way a single *Hipparchia syriaca ghigii* Turati. The method of its capture was curious. Mrs Coutsis saw a large Satyrid fly into a fir tree below the road, presumably to settle down for the night. After some random stone-throwing had failed to dislodge it, it was spotted at rest on the trunk about twenty feet away and quite out of reach. John Coutsis threw another stone. This hit it fair and square and brought it to the ground. This was a fairly heavy day, with much sight-seeing though little successful collecting.

On the third day we drove first to the hill of Filerimos (400 m.), about 15 kms. out of Rhodes, where there are the remains of another classical temple and a Byzantine church now used as a monastery. The lower slopes yielded no butterflies of interest, but on the rough ground in front of the monastery we saw more species and greater numbers than anywhere else in Rhodes. They included several *Kirinia roxelana* Cramer and *Lampides boeticus* L. and a single *Vanessa atalanta* L., though only *M. telmessia*, *Thymelicus actaeon* Rott., and *Colias*

croceus Fourc. were common. Later we went on hopefully to the "Valley of the Butterflies"; a well-watered glen in a fine deciduous forest. But we found literally *no* lepidoptera there except a few *M. telmessia*, so we could only console ourselves by eating the special dish of macaroni offered by the little restaurant. A case on its wall contained a score of faded *Callimorpha quadripunctaria* and a battered *Charaxes jasius*. Beside a stream lower down we caught a very large *Euchloe ausonia* Hübn. and singles of *K. roxelana* and *L. boeticus*, and a water-course by the sea on the coast road gave us a couple of worn female *Thersamonia thersamon* Esp., a *Carcharodus alceae* Esp., and more *T. actaeon*, as well as a view of a number of interesting birds, including Hoopoe (*Upupa epops*), Glossy Ibis (*Plegadis falcinellus*) and some waders which we could not identify with certainty. Mr and Mrs Coutsis unfortunately had to fly back to Athens that evening.

After a day given to sight-seeing in Rhodes city, on 20th May my wife and I paid another visit to the east coast. After exploring the attractive little spa at Kalithea, beside the sea 10 kms out of Rhodes, we turned to the main road to Lindos and then diverged to the Epta Pighes (Seven Springs), where there is a small lake in a wooded valley rather like that of the Petaloudes. Later, with several stops on the way, we spent an hour in a promising looking river bed some miles short of Lindos, before returning to Rhodes in the early afternoon. But in all these places there was a dearth of lepidoptera. The only interesting things seen were a few fresh and very active *Gonepteryx*; but all those which I could get near enough to identify were *G. farinosa* Zell. and not the endemic race of *G. cleopatra* L. which I was looking for. A disappointing day, despite good weather and good looking country.

On our last day we made another tour on the west coast and in mountains, driving first to Embona, high on the north western side of Mt. Ataviros, below which there is a fine fir forest, and then descending to the coast via Kritinia for lunch and a refreshing bath at Kamiros. We saw nothing new in the mountains except some fresh *Polyommatus icarus* Rott., but near Kamiros an uncut corner of a crop of vetch had attracted an abundance of *T. actaeon* of both sexes, and also yielded *S. orbifer* and a fine female *Lampides boeticus* L. We left Rhodes by an early plane to Athens on 22nd May.

Rhodes is a beautiful island, and its history and archaeology are fascinating; but at this season at least its butterflies were disappointing. We had expected a limited island fauna, but not the general scarcity of every species except *M. telmessia* and, in a very few places, *A. crataegi*, *T. actaeon* and *C. croceus*. This was in striking contrast to my experience in Cyprus at the same time in 1954 and in Crete in early June 1969: in both, though the number of species was also small, most of them were widespread and abundant. To judge from the negligible attendance at lights round Rhodes City, Heterocera were equally scarce. Probably our timing was wrong. We

did see altogether just half of the 46 species of *Rhopalocera* listed by Bender, but added none. Some, however, deserve comment.

Maniola telmessia ornata Turati entirely replaces *M. jurtina* in Rhodes, but is a very different-looking species. Bender gives an excellent black and white photograph of nine examples. The males are little bigger than those of *Pyronia tithonus* L., and, with large orange patches on their forewings, look rather like them. The females, however, are as big as those of British *M. jurtina*. With their pale mauve undersides they resemble *M. cypricola* Graves, which is peculiar to Cyprus; but in that the males are much larger and have little or no orange on the upperside. The well-developed spots are another feature of *ornata*. In my series of 19 males and 9 females, on the upper side of the forewings the apical spot is more or less extended, and in five males and seven females it has *two* white pupils. On the underside of the forewings this feature is even more marked in both sexes, but on the hindwings the males alone are heavily spotted: all of mine have two large black rings with white centres, and all but four have up to three more small ones, mostly with white points in them. In the females the spots are few and hardly discernible. The spots on the undersides of the male hindwings are very prominent when the insects are at rest. It has been suggested that they are repellent to lizards and other predators, or, alternatively, that they are repellent to lizards and other predators, or, alternatively, that they attract attention to parts of the butterfly's anatomy where a bite will do least harm. As we saw several with bite marks on the hindwings, the latter seems more plausible. But if these spots really have protective value, it is curious that they should be more developed in the males than in the females, for whom protection is more important for the survival of the species. However this may be, *M. telmessia ornata*, is clearly a successful species in Rhodes. Heavy spotting on the male hindwings, though without white centres, is characteristic also of *M. jurtina* on the Greek mainland and in Crete; but it appears to be quite absent in *M. cypricola* in Cyprus.

M. telmessia has also been recorded from Karpathos (Rebel 1938), which is half way from Rhodes to Crete; and further north Mr Coutsis has found it on Lesbos, but in a form in which the males have little orange on the forewing upperside and slightly different genitalia. But in other Aegean islands all the records of which I am aware refer only to *M. jurtina*, from Lemnos in the north through the Sporades and Cyclades to Crete in the south; and in Cyprus only *M. cypricola* occurs. In Asia Minor Higgins (1966) and Thomson (1969) give a wide distribution to both *M. telmessia* and *M. jurtina*: the latter seems to occur more in north east Turkey, the former in the south west, but both have been reported from the provinces of Ankara and Adana. There seems, however, to be no reliable evidence that they are anywhere sympatric. They are so different, both structurally and in appearance, that it seems

right to regard them as good species which, perhaps because they fill the same ecological niche, manage somehow to exclude each other from their respective territories. There are some fascinating possibilities for research here.

Hipparchia syriaca ghigi was described by Turati (1929) from Rhodes and other islands of the Dodecanese as a new sub-species of *Satyrus hermione* L., and his description was followed, except for the substitution of the prior name *fagi* Scop. for *hermione*, in the Supplement to Seitz (1929-32). But in their list Turati & Fiori (1930) mentioned only one specimen from Rhodes, a male taken at Aghia Isidoros on 6th May 1928; and Hartig (1940) and Bender did not refer to further specimens or localities. As described above, John Coutsis secured another male beside the road from Lindos to Rhodes on 18th May. His dissection of the mangled wreck shows with certainty, from the form of the Jullien organ, that it belongs to *H. syriaca* Stdgr. The previous lists therefore need to be corrected accordingly. Though the two species are sympatric in the Peloponnese and possibly elsewhere in mainland Greece, *H. fagi* is not known from any of the islands. We had expected that, if we saw a specimen of this group on Rhodes, it would be *H. syriaca*. It was good to have this confirmed, albeit by a specimen which can hardly stand in the cabinet!

Thymelicus actaeon Rott. This species is recorded from Rhodes by Bender and earlier authors without special comment. But the Rhodian specimens in fact differ very considerably from those found on the Greek mainland and further west in Europe. On the uppersides the colour is a much brighter fulvous, though in the males the androconial brand is in most examples surrounded by a suffusion of dark scaling. On the undersides also the colour is brighter, partly owing to the absence of the wedges of grey scales on the hindwings which are usual in the type form. The fine black marginal line is more sharply defined, and the venation also stands out more clearly. The brighter colour and absence of grey scaling is also characteristic of the series I have from Crete and Cyprus, but these specimens are on average rather larger than those from Rhodes.

The difference between the Rhodian form and that of the mainland are such that we thought that it might belong to a different species, possibly to *T. hamza* Oberthur, which Higgins (1970) records from Asia Minor and Cyprus. Dissection has, however, not confirmed this. But it is probable that the island forms should, because of their superficial differences from those of the European mainland, be regarded as one or more good sub-species of *T. actaeon*. Whether the island forms of this and other species also occur on the coast of Asia Minor is uncertain, as there is almost no information about the Rhopalocera of the part of the Turkish coast which faces Rhodes and Cyprus.

RHOPALOCERA NOTED IN RHODES, 22nd-26th May 1971

- PAPILIONIDAE. *Iphiclides podalirius* L. Profitis Ilias, several; widespread elsewhere, mostly singly.
- PIERIDAE. *Pieris brassicae* L. Widespread but few; large, gen. II. *Pieris rapae* L. Widespread, very few; gen. II. *Pontia daplidice* L. Filerimos, several. *Aporia crataegi fert* Turati & Fiori. Profitis Ilias, Embona, locally common; some elsewhere in the mountains; very large, with heavy black scaling on the venation and undersides, females almost translucent, brownish tinged. *Euchloe ausonia* Hübn. below Petaloudes, one very large female of the summer form. *Colias croceus* Fourc. Filerimos, common, with many f. *helice* females; casually elsewhere. *Gonepteryx farinosa* Zell. Filerimos, Epta Pighes, near Lindos, fresh males, singly.
- NYPHALIDAE. *Limenitis reducta* Stdgr. Above Salakos, one seen. *Nymphalis polychloros* L. Profitis Ilias, two, below Ag. Isidoros, one; in fair condition, but apparently hibernated examples. *Vanessa atalanta* L. Profitis Ilias, Filerimos, singly. *V. cardui* L. Singly in many places, worn.
- SATYRIDAE. *Hipparchia syriaca ghigii* Turati. Near Afandou, one male, identified by Jullien Organ. *Maniola telmessia ornata* Turati & Fiori. Profitis Ilias and elsewhere; common in many places in the mountains and near the coast. *Pararge roxelana* Cramer. Rhodes City in gardens, Filerimos, below Petaloudes, a few fresh males. *P. megera* L. Profitis Ilias, few, worn.
- LYCEALIDAE. *Lycaena phloea* L. Profitis Ilias, two, of the spring form. *Thersamonia thersamon* Esp. Near Paradhissi, in a stream-bed, two worn females of the spring form. *Lampides boeticus* L. Filerimos, below Petaloudes, Kamiros, fresh specimens, singly. *Polyommatus icarus* Rott. near Paradhissi, one very worn, Embona, several fresh males.
- HESPERIDAE. *Spialia orbifer* Hübn. Ag. Isidoros, Kamiros, singly, worn. *Thymelicus actaeon* Rott. Filerimos, Kamiros, locally common, and a few elsewhere: probably an undescribed sub-species. *Carcharodus alceae* Esp., near Paradhissi, one worn.

23 species.

Folly Hill, Birtley Green, Bramley, Surrey. ix.71.





From the original watercolour drawing by A. D. A. RUSSWURM

Erebia aethiops Esper

Figs. 1 and 2. ab. *infasciata* Warren

Figs. 3 and 4. ab. *infasciata* + ab. *ochrea* Moseley

From the original watercolour drawing by A. D. A. RUSSWURM

Erebia aethiops Esper

Figs. 1 and 2. ab. *infasciata* Warren

Figs. 3 and 4. ab. *infasciata* + ab. *ochracea* Moseley

Erebia aethiops Esp. ab. *infasciata* Warren
(Lep. Satyridae)

By A. D. A. RUSSWURM

On 8th August 1967, while collecting in Westmorland with my friend and co-collector Mr H. G. M. Middleton I had the good fortune to capture the rare and striking aberration of *Erebia aethiops* Esp. known as ab. *infasciata* Warren. In this aberration all markings on the underside of the hind wings are obsolete, on the fore wings the orange area is greatly extended.

The female of this species appears in two colour forms on the underside, in the typical form the hind wings are banded in shades of blue-grey, in the other, known as ab. *ochracea* Mosley, these bands are of buff or ochreous. It is to this form that the above mentioned aberration belongs. It immediately became my desire to have it in the beautiful blue-grey form.

We did not visit the area during the next two years, but in August 1970 the search for this aberration was resumed. We were not successful this year except that I captured the halved gynandromorph, this specimen is figured in "The Entomologist's Record" for October 1970. Then on the last day of our third visit, 3rd August 1971, a beautiful freshly emerged specimen of this much desired aberration was captured by Mr Middleton. We now have the aberration in both colour forms and the two specimens, showing both upper and underside, are figured on Plate XII.

One is not likely to forget the view from our collecting ground with the soft colouring of the estuary in the foreground and the mountains of the Lake District laid out in panorama beyond, nor the perfect hotel accommodation we have enjoyed during our three visits.

Coridon, Ober Road, Brockenhurst, Hants

Maniola jurtina Linn : A Breeding Experiment

By Major General C. G. LIPSCOMB

In early August 1969 I captured a ♀ *M. Jurtina* Linn ab *atrescens*. This fine variety has coal black undersides to the hind wings in both sexes and in the ♀ often with broad black margins to the undersides of the forewings. It is a striking and rare variety about which little is known and, as in this case the butterfly was in poor condition and not fit for the Cabinet, I determined to breed from it.

I assumed, not unreasonably, that it was very probably a recessive form and so should reappear in the F2 generation. I would add that in this case the butterfly had ab *excessa* characteristics with additional spotting on the underside of the forewings.

I knew nothing about breeding this butterfly and so consulted Alan Collier who remarked that he had had little

success with it and that it was quite the most difficult butterfly he had ever bred and that he couldn't think why it was so common.

This was hardly an encouraging start but at least it was a challenge and I determined to continue with my efforts. I placed the ♀ in a 15" x 12" cage the sides of which were of black nylon netting. She was supplied daily with fresh tufts of grass and flowers and fed on sugar and water on alternative days.

For several days nothing happened and then she suddenly made up her mind to lay and continued to do so for the next fortnight.

In all about 100 eggs were deposited and with the exception of a few laid on the actual woodwork of the cage all the rest were on the nylon netting; not one was laid on the grass so carefully provided.

This, of course, meant that the cage had virtually to be destroyed so that the eggs still attached to the netting and bits of wood could be placed on potted growing grass.

Because of the minute size of the young larvae the grass was enclosed in very fine muslin netting supported on a wire frame.

In mid October the pots were examined by holding them upside down supporting the contents with the fingers of one hand and gently agitating the grass with the fingers of the other. In this way the larvae, still very minute, readily dropped out and some 30 were collected and all placed in one pot. They passed the winter in a cold greenhouse with the door permanently open. Whether they continued to feed during the winter months I was unable to determine but I couldn't detect any evidence of either feeding or growth on the part of the larvae.

Mould on the grass was the great worry during this time and I constantly found myself having to remove affected stems with scissors and forceps. With the advantage of hindsight I think the better course would have been to change the food plant as soon as mould appeared because one can never eradicate it.

On 1st April the pot with its larvae was brought indoors into a cold room when the survivors at once started to feed and produced 17 pupae in late May and early June.

Some three weeks were spent in the pupal state and the first six butterflies to emerge were all ♂♂ followed by a mixture of both sexes.

The ♂♂ were placed under old fashioned wire gauze food covers in full sunlight on the lawn where a plentiful supply of white clover was growing. As the ♀♀ emerged they were slipped under the covers and mating invariably took place within 24 hours; on one occasion a pair was found in cop at 8.30 B.S.T. in the morning. All the butterflies to emerge were quite normal in appearance.

The ♀♀, once mated, were placed in three separate con-

tainers, the first a repaired edition of the previous year's cage, the second a 12" pot of grass enclosed in a butterfly net supported on a wire frame and lastly a cylindrical celluloid cage containing growing grass and with two large windows cut in its sides and covered with nylon netting for additional ventilation. No eggs were laid by any of the ♀♀ till they were at least a week old but in the end a large number were produced and again the vast majority were laid on the netting so that my bill at the end of this period was two breeding cages and a butterfly net destroyed and the netting on the cylinder requiring replacement. I began to see the point of A.C.'s remarks quoted earlier in this account. All the eggs coloured up, proving they were fertile but it was noticed later on, after they had been distributed amongst a number of pots of grass, that a high proportion had failed to hatch.

However, in spite of this I started the 1970/71 winter with some 70 larvae. They were kept under the same conditions as previously and the battle against mould was rejoined. By the end of May this year I had 33 pupae and two larvae still feeding up.

All these pupae hatched towards the end of June and all produced ♀ butterflies, about a quarter of which were *Excessa* forms in varying degrees. There were no ♀♀ and no sign of *ab. atrescens*. The two larvae that failed to pupate at the same time as the rest of the brood eventually died. In desperation I tried to get a mating with the last two ♂♂ to emerge, using wild ♂♂ but I was unsuccessful as no observed pairing took place although the conditions were exactly the same as for the previous summer..

Although the result of this breeding experiment was not what I had hoped for at least it has shown that, whatever else it may be, the aberation *atrescens* is not a recessive and that it produces a gene in the F_2 generation that is 100% lethal to the ♂♂ probably in the egg stage. As a by-product it has shown that the aberation *excessa* is a recessive. It has been suggested to me that as *ab. atrescens* occurs in both sexes, and in fact is more frequent in the ♂ than the ♀, it may prove to be environmental. This may well be so but why then should it produce the lethal gene? I just don't know, and would welcome suggestions.

SECOND BROOD *STERRHA TRIGEMINATA* HAW.—It is not difficult to obtain a second brood of this species in captivity, but I have not seen it in the wild until this morning, when I found two very fresh males in my m.v. trap. No doubt the fine warm weather which we have experienced during the past month has induced a few larvae to forego hibernation, and it will be interesting to see whether any other species of this family follow suit.—D. O'KEEFFE, 51 Parkhill Road, Bexley, Kent. 24.ix.1971.

The Systematics of the Charaxidae (Lepidoptera: Nymphaloidea)

By A. H. B. RYDON, F.R.E.S.

(Continued from p. 316)

(7) Subfamily ANAEINAE

Anaeidi (Reuter, 1896).

(Type-genus: *Anaea* Hübner 1819, *Verz. bekannt. Schmett.*, pt. 3, p. 48; type-species: *Papilio troglodyta* Fabricius, 1775).

The Anaeinae to date comprise the following genera: *Anaea*, *Hypna*, *Polygrapha*, *Consul*, *Memphis*, *Cymatogramma*, and a new genus to be described later, all of which Comstock (1961), as we have seen, lumped together as subgenera of his omnibus genus "Anaea", together with *Siderone*, *Zaretis*, and *Coenophlebia*; but the last three genera I have placed in a subfamily of their own (the Zaretidinae) for reasons already stated. As pointed out by Comstock (1961, p. 5), the genera comprising the Anaeinae can be subdivided into two main sections on the basis of the wing-venation, i.e. in *Anaea* and *Hypna* the third subcostal vein (V.9) of the forewing arises from the common stalk basad of the fifth subcostal vein (V.7), whereas in *Polygrapha*, *Memphis*, *Cymatogramma* and *Consul* the third subcostal vein arises distad of the fifth. In *Anaea*, moreover, the fourth and fifth subcostal veins (Vs. 8, 7) of the forewing are much shorter than their common stalk; while in *Hypna* and the others these two veins are as long as, or much longer than, their common stalk, and the fourth subcostal vein (V. 8) tends to end in a downward curve in the costa, or in the apex of the forewing. As in the Ethiopian Euxanthinae, there is a marked tendency among the Anaeinae for some of the subcostal veins of the forewing to anastomose with the costal vein, or the first subcostal vein to be atrophied or absent. In *Anaea troglodyta*, for example, the first subcostal vein is usually absent, while in *A. aidea* it is vestigial. In *Cymatogramma echemus* the first subcostal vein is usually absent too, but in several species of the latter genus, i.e. *C. morena* (Hall) and *C. artacaena* (Hewitson), the first subcostal vein arises from the second subcostal vein near its base, joining the costal vein as a very short cross-veinlet. In nearly all the Anaeinae the first three subcostal veins anastomose with, and reinforce, the costal vein (V.12) which thus gives the appearance of continuing in its course almost as far as the apex of the wing, sending off several short veinlets to the costa on its way. In the atypical *Polygrapha cyanea*, however, the subcostal veins do not anastomose with the costal but run free, the third subcostal vein terminating at the apex of the wing, and the fourth ending with a downward curve in the outer margin below the apex as in *Charaxes* and *Prepona*. In addition, in *P. cyanea*, veins 5 and 6 of the forewing arise from a

common stalk beyond the apex of the cell, and in this respect resemble to a certain degree the aberrant venation of *Coenophlebia*. The wing-venation and the male genitalia of almost all the species of the Anaeinae have been figured by Comstock (1961), from an examination of which one can see that the Anaeinae are not a particularly homogeneous subfamily.

The genera comprising the Anaeinae will now be dealt with one by one, beginning with *Hypna*. The latter genus has been grouped with *Anaea* and its allies by various authors since the days of Westwood (1850-2). Comstock (1961) considered it to be but one seasonally dimorphic, polytypic species; but Röber (1916) divided the genus into three distinct species, i.e., *clytemnestra* Cramer, *rufescens* Butler, and *iphigenia* Herrich-Schäffer. The male genitalia of *clytemnestra* have been figured by Comstock (1961, fig. 122); the genital armature is distinctive, the tegumen being relatively short, the uncus heavily sclerotized and broad at its base (as in *Cymatogramma*), with the gnathos produced ventrad and medially bridged by a lightly sclerotized lobe. The valve is short and rounded at its apex, and the aedeagus is somewhat stout and irregularly toothed terminally. The saccus is relatively long and slender. If one compares the male genitalia of, say, *corumbaensis* Talbot with that of *iphigenia* or *clytemnestra* one can see some marked differences in them, the aedeagus in *corumbaensis* being shorter and stouter than in *iphigenia* or *clytemnestra*, the gnathos being broader and longer than in the latter two species, and the valve more slender and less broad at the apex. From the foregoing, it would seem that *Hypna* consists of a number of good species, not just one polytypic species. The early stages (already described above) and the imago of this genus are sufficiently distinct from the other members of the Anaeinae to warrant my giving the group a tribe of its own, i.e. *Hypnini tribus n.*

Next, the genus *Consul*. Comstock (1961) placed in this genus (which is based on *Papilio fabius*) *Anaea pandrosa* Niepelt, "*Paphia*" *panariste* Hewitson, "*P*" *jansoni* Salvin, "*P*" *electra* Westwood, and "*P*" *excellens* Bates, mainly on the distinctive bifurcate gnathos that is present in the males of these species. The butterflies of this genus are relatively large in size, with the outer and inner margins of the forewing straight, and with the apex of the wing produced (except in the type-species *fabius* in which the wing is produced at vein 4), the hindwing being somewhat angular and strongly tailed at vein 4 in both sexes. In *pandrosa*, *panariste*, *jansoni*, *electra*, and in *excellens* (but not markedly so in *fabius*), the hindwing is also produced into a lobe at the anal angle. In *fabius*, and in *excellens*, the mid and hind tibiae and tarsi are heavily spined above and below; the tarsus of the foreleg of the females of some species of this genus (e.g. *fabius*) has a single claw; the palps typically are markedly porrect; and in addition, the special triangular scales near the base of the underside of the forewing are delimited by vein 1, not extend-

ing into space 1b as they do in *Anaea*, *Cymatogramma*, *Memphis* and *Polygrapha*. (In *Hypna* these specialized scales are also limited mainly to space 1a, but a few scales are found in space 1b, so that *Hypna* in this respect is closer to *Consul* than to the other genera.)

Of the genera comprising the *Anaeinae*, Comstock (1961) considered *Anaea* itself to be the most specialized one. He stated, on p. 38, that the genus, which is not a dominant one, was possibly of very ancient origin, and "the highly specialized gnathos somewhat suggests a relationship to the genus *Prepona*". As already stated above, Comstock resurrected the genus *Memphis* (which included *Cymatogramma*) for a large section of the *Anaeinae*, dividing the former into eight main groups, with a number of subgroups, on differences chiefly in the shape, colour and venation of the wings. He stated on page 56 that, "Judged by the facies only of the considerable number of species included in the subgenus *Memphis*, it could be suggested that there are a number of diverse elements lumped in an omnibus subgenus"; but he was of the opinion that the diversity of appearance of this genus was not supported by important structural differences. However, I myself think there are, in fact, sufficient anatomical differences by which it is possible to split *Memphis* into several genera. For example, in *Cymatogramma echemus* Doubleday the male genitalia (see Comstock, 1961, fig. 167) are more specialized than in *Memphis*, in that the aedeagus is relatively short and spindle-shaped, the uncus having its base expanded on either side into a pair of alae, and the gnathos with heavily sclerotized terminalia, and the valves relatively long and narrow. The venation of the forewing of *Cymatogramma* differs from *Memphis* too, in having the first subcostal vein of the forewing absent or vestigial; and the shape of the wing of *Cymatogramma* also differs from *Memphis* in having the inner margin more or less straight, not so markedly emarginate or hooked at the tornus as it is in *M. odilia*. In addition, *C. echemus* differs from *M. odilia* in having the the mid and hind tibiae and tarsi spined above and below, whereas in *Memphis* these structures are only spined below. There is also a difference in the forelegs of the males of *Cymatogramma* and *Memphis*, as well as in *Anaea*. The tarsus of the foreleg of *Anaea troglodyta*, for example, is small, stubby, densely hairy, less than half the length of the tibia, and is bluntly conical in shape; while in *C. echemus* the tarsus is longer than in *Anaea*, being less hairy and more slender, and tapers to a point, and is only slightly shorter than the tibia; and in *M. odilia*, although the tarsus is also slightly shorter than the tibia, it is obtusely rounded at the end, the foreleg as a whole being a larger, stronger structure than in the last two genera. There is also a marked difference in the larvae of these three genera, as has already been noted. So, with one eye to the butterfly and the other to the larva, it seems expedient here to separate the latter genera from one another, and also the red

species of Comstock's "*Memphis*" (centred around *Anaea phidile* Geyer) from the blue ones (centred around *M. odilia*).

(It should be mentioned, in passing, that the genus *Euschatzia*, which Grote (1898, p. 39) invented as a replacement name for Schatz's (1892) invalid genus "*Anaea*", is being treated here as a synonym of *Memphis*.)

For the red *Anaea phidile* I propose to erect the following genus, namely:—

FOUNTAINEA *genus n.*

(Type-species: *Anaea phidile* Geyer, 1834-7, *Zuträge Samml. exot. Schm.*, vol. 5, p. 27, No. 453, figs. 905, 906). This genus is named in memory of Miss M. E. Fontaine, some of whose drawings of the early stages of Neotropical Charaxids are reproduced in this paper.

Fontainea differs from *Memphis* (based on *Papilio odilia* Stoll) in having the inner margin of the forewing straight, not emarginate at the tornus; the third subcostal vein (V.9) arising relatively more basad than in *Memphis*; the palpus not unicolorous below, but with alternate dark and light longitudinal stripes, with the basal sensory patch triangular in shape, not somewhat quadrate as in *M. odilia*; the foreleg of the males shorter and more slender than in *Memphis*, with the tarsus tapering to a point, not obtusely rounded at the end as it is in *Memphis*; the male genitalia with a shorter tegumen and uncus, and the valves relatively longer and narrower than in *M. odilia*, and the sacculus with an apical hook; the larva (see fig. 11) being naked and papillated, not hairy or bristly as in *Memphis porphyrio* (fig. 13) or *M. morvus* (fig. 14).

The *Anaeinae* can be subdivided into a number of tribes as follows:—

- (1) The third subcostal vein (V.9) of the forewing arising basad of the fifth subcostal vein (V.7) 2
- The third subcostal vein (V.9) of the forewing arising distad of the fifth subcostal vein (V.7) 3
- (2) All subcostal veins of the forewing present; the first and second subcostal veins anastomosing with the costal; the third, fourth, and fifth subcostal veins long and running free; palps somewhat porrect; basal triangular scales on underside of forewing mainly below vein 1; the butterflies being large in size, with a broad pale yellow transverse discal band on a dark brown, or rufous, background on the upperside of the forewing; underside of wings with silver spots tribe HYPNINI *tribus n.*
(Type-genus: *Hypna* Hübner, 1819, *Verz. bekannt. Schm.*, pt. 4, p. 56; type-species: *Papilio clytemnestra* Cramer, 1777).
- First subcostal vein (V.11) absent or vestigial; second and third subcostal veins (Vs. 10, 9) anastomosing with the costal vein; fourth and fifth subcostal veins (Vs. 8, 7) shorter than the common stalk; the palps relatively short,

erect; basal triangular scales on underside of forewing extending into space 1b; the butterflies being smaller than in the previous tribe, coloured mainly red or brown on the upperside, without a transverse yellow band in the forewing nor silver spots on the underside

tribe ANAEINI

(ANAEIDI Reuter, 1896, type-genus: *Anaea* Hübner, 1819).

- (3) Subcostal veins of forewing typically not anastomosing but running free, with veins 5 and 6 typically arising from a short common stalk tribe POLYGRAPHINI *tribus n.* (Type-genus: *Polygrapha* Staudinger, 1887, in Staudinger & Schatz, *Exot. Schmett.*, vol. 1, p. 182; type-species: *Paphia cyanea* Salvin and Godman, 1868).

Comstock (1961) included in his subgenus "*Polygrapha*" the following taxa: *Anaea suprema* Schaus, "*Paphia tyrianthina* Salvin and Godman, and "*P.*" *xenocrates* Westwood; but if one examines the wing-venation, the basal sensory patch of the palps, and the male genitalia of these species (as figured in Comstock, 1961), it will be seen that they are not congeneric with *Polygrapha cyanea*; hence, if these taxa are to be lumped together, they must represent at least a tribe of the *Anaeinae* and not just a single genus.

- Some of the subcostal veins of the forewing always anastomosing with the costal vein (V. 12), with veins 5 and 6 not having a common stalk

- (4) Palps typically somewhat porrect, with a light longitudinal stripe below; the basal triangular scales on underside of forewing delimited by vein 1, not extending into space 1b tribe CONSULINI *tribus n.* (Type-genus: *Consul* Hübner, 1807, *Samml. exot. Schmett.*, vol. 1, pl. 148; type-species: *Papilio fabius* Cramer, 1776.)

- Palps short, erect (hardly extending above the head), dark below, or with dark and light alternating longitudinal stripes below; the basal triangular scales on the underside of the forewing extending into space 1b

- (5) First subcostal vein (V. 11) in forewing typically absent; the palps typically with some long setae on the latero-ventral surface; mid and hind tibiae and tarsi typically spined above and below

tribe CYMATOGRAMMINI *tribus n.*

(Type-genus: *Cymatogramma* Doubleday, 1849, *Gen. diurn. Lep.*, vol. 2, pl. 49, fig. 4; type-species: *C. echemus* Doubleday, 1849.)

This group has been incorporated by many authors in the genus *Anaea* (or "*Paphia*") since the days of Doubleday, but it can be distinguished from *Anaea* on the characters already mentioned elsewhere in this paper, such as the differences in the foreleg of the males, in the palps, and in the male genitalia, as well as in the larva (see fig. 12) which is nearer to that of *Consul fabius*

(as figured by Stoll, 1791, pl. 2) than to *Anaea* (see fig. 29, 29a). In addition, the deformed pupa (fig. 12a), which is humped dorsally, is somewhat reminiscent of that of *Hypna*. Westwood (1850) was of the opinion that *Cymatogramma* served as a link between *Consul* and *Hypna* on the one hand, and his "Paphia" on the other (the latter genus including species of *Anaea* as well as *Memphis*). The Cymatogrammini appear to comprise the "verticordia" group of Comstock's (1961) subgenus *Memphis*", and possibly some members of his "halice" and "arginussa" groups too; but this will only be known for sure when the early stages of these last two groups become known.

— The first subcostal vein (V. 11) present in the forewing, arising basad of, and free of, the second subcostal vein (V. 10); the palps without long setae on the latero-ventral surface; the mid and hind tibiae and tarsi spined below only 6

(6) The third subcostal vein (V. 9) arising relatively more basad than in the tribe below; the palps typically with alternate dark and light longitudinal stripes below; foreleg of males short, slender, and tapering to a point; the colour of the wings on the upperside red; the inner margin of the forewing straight; the mature larva being naked, without hairs or bristles (see fig. 11)

tribe FOUNTAINEINI *tribus n.*

(Type-genus: *Fountainea* Rydon; type-species: *Anaea phidile* Geyer, 1834-7.)

This tribe, judging by the external anatomy of the adults alone, appears to consist of the "ryphea" and "glycerium" groups of Comstock's (1961) subgenus "Memphis".

— The third subcostal vein arising more distad than in the preceding tribe; the palps typically uniformly dark below, with a scattering of light-coloured scales; foreleg of the males longer and stronger, with the tarsus obtusely rounded at the end; upperside colouring of both wings black with blue basal areas, with the inner margin of the forewing emarginate and hooked at the tornus; mature larva covered with hairs or bristles (see figs. 13, 14

tribe MEMPHIDINI *tribus n.*

(Type-genus: *Memphis* Hübner, 1819, *Verz. bekannt. Schmett.*, pt. 3, p. 48; type-species: *Papilio odilia* Stoll, 1780.)

In this tribe I am, for the present, placing the rest of Comstock's (1961) subgenus "Memphis"; but when the early stages of the members of this tribe become better known, it may turn out that some of them do not really belong to it.

(to be concluded)

Infurcitinea argentimaculella Staint.
(Lep. Tineidae) in Herts.

By E. S. BRADFORD

On Sunday the 18th of July I paid a visit to a private lake and grounds in the Elstree area of Herts with Mr P. A. Goddard. This is managed by a local angling society, and last year I was granted permission to visit and study the entomology of the area whenever I wished. I had visited the grounds several times before, but on this particular day, after a walk round the boundary of the main lake, and proving our Bona fide to a water bailiff, I suggested we have a look round a smaller side-water I had not previously inspected. About half way round we came to a place where rocks covered a raised structure, opening on to the lake, and which forms a boat-house. Around this we found patches of lichen. I was struck by the similarity between this area and the one in Folkestone, Kent, where I had found and bred *I argentimaculella* Staint., in 1964. A closer inspection of the lichen showed that the surface had been nibbled away leaving whitish patches and I remarked that it was the type of place where one would be likely to find the moth, never thinking at that moment, that it was there, right under our noses. I looked at the lichen again and saw the thin meandering tubes the larvae make on the surface, and then found a moth, and a little later one more specimen.

I paid another brief visit to the lake several days later and found six moths resting on the lichen and on the moss growing around and with it, the same as it does in Folkestone. The moths are much more difficult to see when resting on the moss.

The question occurred as to the origin of the rocks and I subsequently made enquiries about them. It appears that they were transported from Devon about eighty years ago and that the lake was dug and constructed during the 1914-18 war by P.O.W.'s. The rocks were incorporated in the structure of the boat-house, at the edges of the lake, and as stepping stones at various places. Whether the lichen and the moths were in situ when brought from Devon will have to remain speculative.

The lichen which forms the pabulum of *I. argentimaculella* Staint. is *Lepraria incana* (L.) Ach. (*Lepraria* (*Crocynia*) *aeruginosa* auct.)

At the time of writing I know of no other record of its occurrence in Hertfordshire so presume this to be new to the county. I would be pleased to hear if anyone has any notes on its being taken in any other localities.

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Dingle, 1971

By H. C. HUGGINS, F.R.E.S.

I first visited Dingle in 1961, in the company of my wife and Mr E. S. A. Baynes, and I have been there every year since, except for 1965, when I met with a severe accident and went to hospital instead.

The idea of these visits originated with Mr Baynes. In 1953 a party of bird-ringers visited Inishvickilaun, the farthest of the Blaskets, and Mr J. E. Flynn, the well-known Irish sportsman and naturalist was one of them. Mr Baynes had the inspiration that *Euphyia bilineata* s.sp. *isolata* Kane might be on Inishvickilaun and as its only hitherto known habitat, the Tearaght, is now unworkable, gave Mr Flynn a description of the moth, and on the return of the party, which spent eight days there, was rewarded with three specimens.

We therefore decided to stay at Dingle and visit Inishvickilaun by motor-boat, and to cut matters short, in a number of visits I have seen 20 *isolata* and captured nine, a very good percentage if the dangerous places it inhabits are considered.

In the ten years I have visited Dingle, a fair number of changes have taken place, mostly beneficial to the tourist and visitor, but not so pleasing to the lepidopterist. A good many of the buildings have had a face-lift; the old lichenous cement has been cleaned off and clean paint substituted, with a bad effect on the unique local race of *Cryphia muralis* Forst.

The high hedge round which the two very late specimens of *Celastrina argiolus* L. were flying on August 24th 1970 has been cut to ground level to make more light for a bungalow built in the field behind it, giving a fine view at times of the family washing.

A more serious loss, however, is the bohireen on the right hand side of the road leading to the Connor. It was only a couple of hundred yards long, but it was here my wife found the first authenticated Irish specimen of *Platyptilia calodactyla* Hübn. I have since turned up the moth in several other places, but usually rarely, but in this one, on a warm afternoon, a dozen or so might be seen. I refrained from netting any in the past three years as this was so obviously its best locality, but when I went there this year, a farm building had been erected at the end, the hedges cut down, and the banks levelled and the road roughly paved. At one corner a bit of hedge and bank had been left, and here I disturbed 3 *calodactyla*, which of course I left.

Finally Coomenoole, a delightful sandy beach near Slea Head, surrounded by high cliffs, has become an ideal bathing and surfing station. When Mr Baynes, my wife and myself visited this place in 1961 it was difficult of access, as the only way down was by a track for horses and cattle which, as water was scarce on the high ground, came down to a spring at the foot. At the foot of the cliffs was one of the two best places I know for *bilineata* s.sp. *hibernica* Prout; it had in the past

been worked by both Donovan and Dr Kettlewell. Our party in 1961 visited it five days running. On three we saw no one else, and on the other two, the same girls who had come over from Dunquin for a bathe.

In 1964 the authorities made a motor road to the shore so that today in fine weather at least fifty cars may be expected on the road. The *bilineata* localities accessible were two; one was a fissure in the cliff, well covered with grass, kidney vetch and other plants, the other a series of hollows and shallow caves at ground level. I used to climb up the fissure and Mr Baynes to rattle in the hollows and chase the moths as they flew out over the sand.

Today the hollows are in almost universal occupation by girls undressing to bathe, so any investigation of their recesses for *bilineata* might provoke unworthy suspicions, and my fissure has been entirely cleared of all vegetation by the film company producing "Ryan's Daughter" who wished to make the place more dramatic. No doubt there are still plenty of *bilineata* high up on the cliffs, but these cannot be reached from above because of the overhang, and the choughs that formerly nested in the holes below this have gone elsewhere.

I went to Dingle a little later than usual in 1971; the weather on the whole was good, but I am now beginning to find that the more distant localities are getting beyond me, and have to rely to a large extent on the Robinson trap.

Immigrants were the scarcest I have ever known in Dingle; *Plusia gamma* L. appeared most nights, but except for 23 on August 9th, I never saw more than half a dozen on any occasion, and all other migrants were confined to two *Nomophila noctuella* Schiff. It was most disappointing as two days after I got home (September 12th) my garden was full of *gamma*, so I set the trap and and caught about 40, and also a worn female *Margaronia unionalis* Hübn. As I have twice bred this lovely creature I did not wish to bother again, and released her in the jasmine. I have since heard from Mr Baynes that *gamma* and *atalanta* were common at the end of September at Glandore Co. Cork, so undoubtedly I came home too soon.

I made a few observations on other insects that may be of interest.

Pieris napi L. It was a very good year for the second brood. I kept two, one by far the largest female I have ever seen. It was the ab. *vidua* Donovan, in which the black spots are enlarged and the veins outlined in black. This is a common form in the second brood in Ireland; oddly enough, the underside is usually less heavily marked than more typical ones. The other insect I kept had the forewings white and the hindwings yellowish cream.

Argynnis aglaia L. On August 10th, a very hot sunny day, I saw a male *aglaia* on the old road at the back of the creameries. I have not seen *aglaia* at Dingle before except on the higher Tralee road about four miles from the town. In

very hot weather Irish *aglaia* seem to wander a good deal; I saw four at Glengarriff in the heatwave of 1952, the only ones I have ever seen there. These Glengarriff ones were all males.

Nymphalis io L. was commoner again after last year's scarcity. I took one in the trap on August 12th.

Eumenia semele L. s.sp. *hibernica* Howarth. In all the years I have worked Dingle, I have never met with this butterfly, but Mr C. Edwards of the Marine Biological Station at Oban, who was also staying there, found it on the high ground above the road at both Slea Head and Clogher. He kindly called to tell me so and gave me four from Slea Head. Two days later, friends kindly gave me a lift to both places; I could only afford half an hour at each, but saw over a dozen in each place, and caught half a dozen. The insects were all of the Irish type defined by Mr Howarth, the Clogher ones seem a bit redder than the Slea Head ones, but I have not enough of either to be certain. One female at Clogher had an extra spot on the forewings; this seems commoner amongst Irish than chalk down specimens, as I have troubled to catch very few in Ireland, and took one with two extra spots in the Burren. These two Dingle localities are both barren stony slopes, which accounts for my missing the butterfly in the past, as there is nothing else on them except *Maniola jurtina* L., and at Glengarriff *semele* occurs everywhere. In the Coomerkane valley there it is common on the peat swamps, and when catching it there in 1950, I had often to run round a pool in pursuit.

Cryphia muralis Forst. becomes more and more localised and uncommon. I was not lucky enough to get a *nigra* Huggins this year, but caught one of the deep greenish-black form that is so near to it.

Polia nebulosa Hufn. was commoner than usual; I saw half a dozen in the trap, and needless to say they were all *ab. pallida* Tutt.

Mamestra brassicae L. The curious little Dingle form continues to turn up with the type. I have never seen this elsewhere in Ireland.

Hadena cucubali Fuessl. I took one of the blackish form of which Kane took one in the Blaskets (Donovan 49). This is only a rare aberration as I have bred the moth from the Blaskets and also from an islet off Adrigole, Co. Cork, and all were typical. My specimen was in the trap in Dingle town.

Cerapteryx graminis L. I found one in the trap in which the antler mark covers more than half the forewing. Irish *graminis* seem to vary more than our Essex ones. It is common in my garden trap, but I have never had an extreme aberration, whereas four years ago at Inch I took one with the forewings uniform pale drab without markings.

Luperina nickerlii Frey s.sp. *knilli* Boursin. I took 3 in the trap in 1971; the first was on the night of July 31st-1st

August, and even then not quite fresh, so its early emergence as suggested by the one on August 9th, 1969 is confirmed. Now that it has been taken on Inishmore in the Aran Islands I have no doubt it will be found in all suitable places in the south-west of Ireland, i.e. at the foot of sea cliffs where there is a quantity of detritus and vegetation. I have now taken 9 in all at Dingle; every year that I have stayed after the second week in August except 1970. Dingle ones, with one exception have been as black as *Aporophila nigra* Haw., but they begin to turn browner in a year or so.

Plusia festucae L. Very common in the trap almost every night, still no *gracilis* Lempke.

Schrankia costastrigalis Steph. One, not fresh, in the trap on July 20th. Apart from the Killarney area, this seems to be the first Kerry record. I have no doubt that it would be found not uncommonly by working the damp lanes at early dusk, as I did at Glengarriff.

Sterrha subsericeata Haw. There were three in the trap on August 20/21st. I have not noticed the second brood mentioned in Irish papers; these were the usual small type like the English second brood specimens.

Xanthorrhoe montanata Schiff. On July 8th I got a lift to the Connor and managed to climb to about 2,800 feet in the Brandon range. I took half a dozen of the mountain *montanata*. Two of these were exactly like my ab. *shetlandica* Weir from Unst, with the central band reduced to two smeary lines, except that they were slightly larger. These agree with Kane, and not with Donovan (76).

One other, a female, was exactly like a sea-level specimen except that the band was a little darker. I have never found a typical one at this height before.

Crambus selasellus Hübn. I am glad to say that on July 10th I captured another specimen of ab. *brunnea* Huggins. This aberration seems decidedly rare; I must have seen at least 50 of the typical form since I took the first in 1966.

The Collared dove has now become very common. I counted eleven feeding together at a stable, and one uttered its monotonous note on the araucaria in the garden at Benzers every morning I went to look at the trap. I also saw a turtle dove near Ballyferiter. This bird seems to be coming more frequently to western Ireland. The Irish Dipper at the water-splash on the road to Slea Head was in good form in 1971; he posed for several minutes on two occasions for friends to whom I had given him an introduction.

BUTTERFLIES IN THE CITY OF LONDON.—During a single week in August this year I saw specimens of *Pieris brassicae* L., *P. rapae* L., *Aglais urticae* L., *Nymphalis io* L., within one hundred yards of the Mansion House, while a beautifully fresh *Lycaena phlaeas* L. sunned itself on Mappin & Webb's window in Cheap-side, as oblivious to the crowds as they were to it.—J. A. C. GREENWOOD. 8.x.1971.

A Holiday in the East Pyrenees, June-July 1970, with Notes on the Lepidoptera observed

By E. P. WILTSHIRE

(Concluded from p. 277)

Observations and Explanations of List of Species

In the following list, I follow Higgins & Riley for the nomenclature of the Rhopalocera, but in a few cases have followed Dufay for the name of the local race. For the moths I have followed Boursin, Dufay and Herbalot. Pyralidae and Micro-Lepidoptera are not listed, though a few were taken. Identifications were in nearly every case based on specimens taken and studied during the following months, genitalia examinations being made where appropriate; a few exceptions, well-known species seen, but of which no specimen was retained, are listed in [] brackets.

Localities are abbreviated as follows: the name is followed by the altitude in metres and the date on which visited:—

- Ang.=Les Angles, 1600, 3.vii.
 Bou.=Lac des Bouillouses, 1900-2100, 1-13.vii.
 Can.=Canigou, Les Cortalets, 1800-2200, 26.vi.
 Car.=Pic Carlit, lower eastern slopes, 2200, 5.vii.
 Cas.=Casteil, nr. Vernet-les-Bains, 700, 17-30.vi.
 Cat.=Cattlar, near Prades, 500, 18 and 28.vi.
 Est.=Estagel, Corbières, 200, 17.vi, 15.vii.
 Eyn.=Val d'Eyne, Cerdagne, 1500, 10 and 13.vii.
 Jou.=Col de Jou above Casteil, 900-1200, 21, 23 and 29.vi.
 Lag.=La Llagone, between Mont Louis and Col de la Quillane, 1700, 3.vi.
 Lou.=Mont Louis: Forêt de Barrès, 1650, 1.vii., or slopes below town, 1400, 22.vi., or near Planes, 1570, 7.vii.
 Mat.=Matamale Barrage, 1500, or M. village, 1450, 3.vii.
 Mil.=Millas, 150, 17.vi.
 Rom.=Font Romeu, forest above town, 1800, 2.vii.
 Ver.=Vernet-les Bains, Crêtes de Fully, 600, 19.vi.
 Vil.=Villefranche de Conflent, Cady valley, 450, 17.vi.
Other abbreviations used which need explaining are:—
 det. B=determined by C. Boursin.
 det. H.=determined by C. Herbalot.
 d.g.Pr.=determination by self after genitalia study, serial number of Preparation given.
 l.b.=larva bred, imago otherwise not seen.
 l.s.—=larva seen but not bred, imago not seen.

List

PAPILIONIDAE

- Iphiclides podalirius* (L.) ssp. *feisthameli* Dup. Ver.
Parnassius apollo (L.) ssp. *chrysophorus* Fruhst. Cas.; ssp. (?) *portensis* Ruet. Eyn.
Parnassius mnemosyne (L.) subsp. *vernetanus* Fruhst. Bou.

PIERIDAE

- Aporia crataegi* (L.) ssp. *hyalina* Roeb. Cas. Jou.
Pieris brassicae (L.) Bou.
Pieris napi (L.) Can.
Pieris rapae (L.) Jou. Bou. Car.
Pieris manni Mayer ssp. *hemiandegava* Verity Cat.
Euchloe ausonia Hübn. Rom. [Bou.]
Anthocharis cardamines (L.) Cas. [Lou.]
Anthocharis belia (L.) ssp. *euphenoides* Stgr. Jou.
Colias crocea Geoff. Ver.
Colias australis Verity Est. Eyn.
 [Gonepteryx *rhamni* (L.) Can.]
Leptidea sinapis (L.) Est. Cat. Mil. Ver. Cas. Jou. Lou.

NYMPHALIDAE

- Limenitis reducta* Stgr. Vil. Cas. Eyn.
Limenitis camilla (L.) Cas.
Nymphalis polychloros (L.) Can.
 [Vanessa *cardui* (L.) Can. Jou. not before 23.vi.]
 [Aglais *urticae* (L.) Jou. from 21.vi. Can.]
Polygonia c-album (L.) Cas. Jou.
 [Argynnis *paphia* (L.) Ver. Cas.]
Mesoacidalia aglaja (L.) ssp. *locupleta* Verity Cas. Jou.
Fabriciana adippe D. & S. Jou.
Issoria lathonia (L.) ssp. *attenuata* Sag. Jou. Can. Eyn.
Brenthis daphne D. & S. Cas.
Brenthis ino Rott. Eyn. Lou.
Clossiana selene D. & S. Cas. d.g.Pr. 1631, Jou. Eyn. d.g.Pr. 1634, Lou. Lag.
Clossiana euphrosyne (L.) Jou. Bou. Lou.
Melitaea cinxia (L.) Jou. Eyn.
Melitaea phoebe D. & S. Cas. Jou.
Mellicta athalia ssp. *celadussa* Fruhst. Cas. Jou. Eyn.
Mellicta parthenoides Kef. Cas. Jou. Rom. Lou. Bou.
Euphydryas aurinia ssp. *debilis* Ob. Ang. Mat. Bou. Car.

SATYRIDAE

- Melanargia galathea* (L.) ssp. *lachesis* Hübn. Esp. Ver. Cat. Mil. Eyn.
Hipparchia alcyone D. & S. Est.
Satyrus ferula F. ssp. *cordula* Scop. Eyn.
Erebia epiphron Knoch. ssp. *fauveaui* de Lesse Bou.
Erebia triaria de Prun. ssp. *granjana* Ob. Bou. Ang. Car. d.g.Pr. 1640, Rom.
Erebia oeme Hübn. ssp. *pacula* Fruhst. Rom. Eyn. d.g.Pr. 1632, Lou. Ang. Bou.
Erebia meolans de Prun. ssp. *almanda* Fruh. Jou. d.g.Pr. 1633.
Maniola jurtina (L.) Vil. Cas.
Aphantopus hyperanthus (L.) Cas.
Pyronia bathseba F. ssp. *pardilloi* Sag. Mil. Cat.
Coenonympha pamphilus (L.) Rom. Bou.
Coenonympha arcania (L.) ssp. *cephalus* Geoffr. Cas. Jou. Lou. Eyn.
Coenonympha glycerion Bork. Eyn.

Pararge aegeria (L.) Vil.

Lasiommata maera (L.) ssp. *adrasta* Ill. Vil. Jou. Eyn.

NEMEOBIIDAE

Hamearis lucina (L.) Bou.

LYCAENIDAE

Nordmannia ilicis Esp. Cat. Cas. Ver.

Strymonidia spini D. & S. Cat.

Callophrys rubi (L.) Jou. Lou. Bou.

Lycaena helle D. & S. ssp. *deslandesii* Hemm. Bou.

Lycaena phloea (L.) Jou.

Heodes virgaureae (L.) ssp. *pyrenaeicola* Graves Cas. Eyn.

H. alciphron Rott. ssp. *veronius* Fruh. Ver.

Palaeochrysophanus hippothoe (L.) ssp. *mirus* Verity Mat. Eyn.

Lampides boeticus (L.) Ver.

Everes alcetas Hoff. Vil.

Cupido minimus Fuessl. Vil. Jou. Lou.

Glaucopsyche alexis Poda Cas.

Scolitantides orion Pall. Cas.

Plebejus argus (L.) Vil. Cat. Rom. Lag. Eyn.

Cyaniris semiargus Rott. Cas. Jou. Lou. Mat. Room, Eyn.

Plebicula dorylas D. & S. (= *argester* Berg. Eyn.

Plebicula amanda Schneid. (= *icarius* Esp.) ssp. *pyrenaeorum*
Verity Mat. Eyn.

Lysandra coridon Poda subsp. *ruscinonis* Verity Eyn.

Lysandra bellargus Rott. Ver. Jou.

Polyommatus icarus Rott. Est. Cat. Cas. Ver. Jou. Bou.

HESPERIIDAE

Pyrgus malvoides El. & Ed. Cas. d.g.Pr. 1635. Jou. Bou. d.g.Pr.
1630.

Pyrgus probably *serratulae* Ramb. Jou. 1♀ Pr. 1636.

Spialia sertorius Hoff. ssp. *hibiscae* Hübn. Jou. d.g.Pr. 1639.

Thymelicus acteon Rott. ssp. *virescens* Ag. Cat. Cas.

Thymelicus lineola Ochs. Eyn.

Thymelicus sylvestris Poda Ver. Cas. Jou. Eyn.

Ochlodes venatus Brem. & G. ssp. *esperi* Verity Cas. Lou.

SPHINGIDAE

Celerio lineata F. ssp. *livornica* Esp. Bou.

Pergesa porcellus (L.) Cas. Bou.

LASIOCAMPIDAE

Lasiocampa quercus (L.) ssp. ? Bou.

Macrothylacia rubi (L.) Bou.

NOTODONTIDAE

Cerura vinula (L.) Cas.

Hoplitis milhauseri F. Cas.

Notodonta phoebe Siebert Cas.

Spatalia argentina D. & S. Cas.

Pterostoma palpina (L.) Cas.

Phalera bucephala (L.) Jou.

LYMANTRIIDAE

[*Lymantria dispar* (L.) Cat. l.s., Ver. l.s.]

ARCTIIDAE

- Eilema caniola* Hübner Cas. (det. H. de Toulgoët).
Euprepia striata (L.) Cas.
Diacrisia sannio (L.) Cas. Jou.
Spilosoma lubricipeda (L.) Cas.
Epicallia villica (L.) Cas.
Eucharia casta Esp. Bou.

CYMATOPHORIDAE

- Tethea ocularis* (L.) Cas.
Tethea or F. Cas.

NOCTUIDAE

- Agrotis simplonia* Geyer Bou. d.g.Pr. 1606.
Agrotis ipsilon (Hufn.) Cas. Bou.
Agrotis exclamationis (L.) Ver. Cas.
Ochropleura plecta (L.) Cas.
Noctua pronuba L. Cas. Bou.
Lycophotia porphyrea D. & S. (= *strigula* Thun.) Bou.
Amathes c-nigrum (L.) Cas.
Amathes triangulum Hufn. Cas.
Heliophobus reticulata Goeze Bou.
Polia hepatica Clerck (= *tincta* Brahm.) Cas.
Mamestra contigua D. & S. Cas. Vil.
Mamestra pisi (L.) Bou.
Mamestra bi-ren Goeze (= *glauca* Kleem.) Bou.
Mamestra bicolorata Hufn. ssp. *obscura* Str. det. B. Bou. d.g.Pr. 1649, 1655.
Hadena ruetimeyeri Boursin det. B. Bou.
Hadena compta D. & S. det. B. Cas.
Hadena confusa Hufn. (= *conspersa* D. & S.) det. B. Cas.
Hadena caesia D. & S. det. B. d.g.Pr. 1621 Cas. Bou.
Hadena tephroleuca Boisd. det. B. Bou.
Lasionycta nana Hufn. (= *dentina* D. & S.) Bou.
Mythimna unipuncta Haw. Cas.
Mythimna comma (L.) Bou.
Metopoceras canteneri Dup. det. B. Ver.
Blepharita adusta Esper Bou.
 [*Cucullia verbasci* (L.) l.s. Jou. Ver. Lou.]
Apatele aceris (L.) Cas.
Apatele auricoma D. & S. Bou.
Apatele euphorbiae D. & S. Bou.
Apamea crenata Hufn. (= *rurea* F.) Cas.
Mesapamea secalis (L.) Bou.
Oligia latruncula D. & S. Cas. d.g.Pr. 1618.
Caradrina selini Boisd. det. B. Ver.
Caradrina flavirena Guenee det. B. Ver.
Caradrina clavipalpis Scop. det. B. Cas.
Caradrina aspersa Ramb. det. B. Cas. d.g.Pr. 1622.
Hoplodrina ambigua D. & S. det. B. Ver.
Synthymia fixa F. Cat.
Hapalotis venustula Hübn. Cas.
Axilia putris (L.) Cas.

Pseudoips bicolorana Fuessly Ver.
Plusia chrysitis (L.) Cas.
Autographa iota (L.) Cas.
 [*Autographa gamma* (L.) Cas. Bou.]
Callistege mi Clerck Cas. Rom.
Ectypa glyphica (L.) Jou.
Phytomera viridaria Clerck Bou.
Rivula sericealis Scop. Ver.
Hypena proboscidalis (L.) Cas.

GEOMETRIDAE

Asthena albulata Hufn.
Hydrelia flammeolaria Hufn.
Spargania luctuata D. & S. Bou.
Minoa murinata Scop. Cas. Jou.
Calostigia pectinataria Knoch. Cas.
Lampropteryx suffumata D. & S. Cas. Bou.
Lyncometra ocellata (L.) Cas.
Coenotephria tophaceata D. & S. Cas.
Coenotephria nebulata (Tr.) Bou. d.g.Pr. 1643.
Chloroclysta truncata Hufn. Cas.
Cidaria fulvata Thunb. Cas.
Hydriomena furcata Thunb. Cas.
Hydriomena coeruleata F. d.g.Pr. 1648 Cas. Bou.
Horisme vitalbata D. & S. Cas.
Eupithecia haworthiata Doub. Cas. det. H.
Eupithecia linariata F. Bou.
Eupithecia vulgata Haw. Bou. Cas. det. H.
Eupithecia castigata Hübn. Cas. det. H.
Perizoma alchemillata (L.) Can. Bou.
Perizoma albulata D. & S. Cas. Jou.
Euphyia picata Hübn. Cas.
Xanthorhoe spadicearia D. & S. Bou.
Xanthorhoe montanata D. & S. Cas. Bou.
Xanthorhoe fluctuata (L.) Cas.
Scotopteryx coarctaria D. & S. det. H. Cas.
Scotopteryx mucronata Scop. Ver. Cas. d.g.Pr. 1627.
Epirrhoe tristata (L.) Bou. d.g.Pr. 1641, Ang. Car.
Epirrhoe galiata D. & S. Cas.
Epirrhoe molluginata Hübn. Bou. d.g. 1644.
Campto gramma bilineata (L.) Vil.
Chesias rufata F. Bou.
Anaitis praeformata Hübn. Lou. Lag. Bou.
Odezia atrata (L.) Cas. Mat.
Sterrha ochrata Scop. Cat. d.g.Pr. 1653.
Sterrha luteolaria Const. Eyn. d.g.Pr. 1651.
Sterrha circuitaria Hübn. l.b. Cat.
Sterrha eburnata Wocke Cas.
Cyclophora annulata Schulze Cas.
Cyclophora puppillaria Hübn. Cas.
Scopula immorata (L.) Cas. Mat.
Scopula ornata Scop. Vil. Cas.
Scopula imitaria Hübn. Ver.

- Scopula lactata* Haw. Cas.
Rhodostrophia calabra Pat. Cas. d.g. Pr. 1623.
Rhodostrophia vibicaria Clerck Cas. d.g.Pr. 1626.
Lomaspilis marginata (L.) Cas.
Ligdia adustata D. & S. Cas.
Semiothisa notata (L.) Cas. d.g.Pr. 1656.
Semiothisa clathrata (L.) Vil. Jou. Lou.
Isturgia roraria F. subsp. *limbaria* F. Jou. Can. Bou.
Rhoptria asperaria Hübn. Cas. d.g.Pr. 1647
Petrophora chlorosata Scop. Cas.
Opisthograptis luteolata (L.) Cas.
Pseudopanthera macularia (L.) Cas.
Selenia lunaria D. & S. Cas.
Selenia bilunaria Esp. Bou.
Biston betularia (L.) Cas.
Peribatodes rhomboidaria D. & S. Cas.
Alcis repandata (L.) Cas.
Boarmia punctinalis Scop. Cas.
Ematurga atomaria (L.) Vil. Jou. [Lou. Bou.]
Bupalus piniaria (L.) Lou.
Cabera pusaria (L.) Cas.
Gnophos myrtillatus Thunb. f. *obfuscatus* Hübn.
Gnophos ambiguatus Dup. Bou. d.g.Pr. 1624.
Gnophos mucidarius Hübn. Cas. d.g.Pr. 1617.
Siona lineata Scop. Cas. Jou.
Chlorissa pulmentaria Guen. Ver.
Chlorissa cloraria Hübn. Jou. d.g.Pr. 1654.

ZYGAENIDAE

- Procris geryon* Hübn. Cas. d.g.Pr. 1620.
Procris statices (L.) Cas.
Zygaena purpuralis Brunn. Cas.
Zygaena trifolii Esp. ab. *orobi* Hübn. Jou.

Acknowledgments

Various colleagues have most kindly assisted me both with advice before the trip and with determinations or other help after it. I should like to express my particular gratitude to Messrs J. Bourgogne, C. Boursin, C. Dufay, C. Herbulot and Dr Charles Tavoillot.

References

A fuller list of English articles on collecting in this region appeared in paragraph 1 of de Worms 1966. That article however omitted mention of Dufay's comprehensive Macrolepidoptera list (1961), a very thorough compilation rather than a report on a single season's visit, and on that account far more useful. It also gives a good bibliography. De Worms' articles, 1966 and 1971, dealt with visits, the latter a very short one, made a month later in the year than my own. In 1952 Bretherton, Ellison and Manley reported their three weeks' visit at roughly the same season as my own. I add a few recent French works which will be of interest, and are mentioned by me above, as well as check-lists, etc., referred to. But for the fuller list of earlier works reference to Dufay is recommended:

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Applied Ecology used against a Fly Pest Problem in Australia

Australian research entomologists are rebuilding an ecological chain in an attempt to overcome a fly-pest problem. Their aim is to introduce from abroad dung beetles which, in spite of their small size, are extremely efficient in getting rid of cattle dung where the bushfly (*Musca vetustissima*) and the buffalo fly of the north (*Haematobia exigua*) breed.

In most parts of the world the dung beetle to disperse the cattle dung is a native species, but not in Australia, for the local dung beetles have developed specialised characteristics. They work well in the hard round dung of Australian marsupials, but show little interest in the soft cattle dung because cattle are not Australian natives. The cattle imported from Asia brought the buffalo fly with them, and on the other hand, cattle brought from Europe left that pest's enemy at home. It will be seen that the buffalo fly is a misfit and does not legitimately belong to Australia.

As a result, cattle dung has been lying virtually undisturbed all over Australia, covering an estimated total area of 3,000,000 acres, with the serious disadvantages this can bring. The major effect has been the prevalence of the buffalo fly in northern Australia, where it has created a serious economic hazard for the cattle industry; the blood-sucking fly irritates the beasts to a point where they cannot eat, thus seriously affecting the

production of meat. Pesticides have been of little use for although they kill the fly, they leave a residue in the meat which is not acceptable to overseas markets. Many cattle owners also have difficulty in mustering their stock often enough for treatment.

The situation was put before the Australian Commonwealth Scientific and Industrial Research Organisation (CSIRO) and Dr. G. F. Bornemissza of its Division of Entomology took up the study. Dr. Bornemissza, who has been studying dung beetles for some fifteen years, went to Fiji and Hawaii to assess how useful they could be for Australia.

Eight promising species, *Onthophagus gazella*, *Liatongus militaris*, *Copris incertus*, *Hister caffer*, *H. chinensis*, *H. nomas* from Africa and *Canthon humectus* from Hawaii, were introduced into the CSIRO laboratories in Canberra from elaborate breeding tests in quarantine, special precautions being taken to ensure that no unwanted pests or germs could slip under the country's strict quarantine guard. This took time, of course, and none of the beetles was able to leave the quarantine area for two years.

In 1967 the first beetles went into the field and within four years, over 300,000 of them from seven different species had been distributed in a wide belt across northern Australia, they bred well, and one species, *O. gazella*, established itself in an area 250 miles long and 50 miles deep, extending at the rate of 25 miles in all directions each year. It has become so numerous that cattle pads are disappearing in one or two days, giving a fair degree of control of the buffalo fly.

There are also other benefits: because the beetle works quickly, the dung is buried in the soil before it begins to break down and lose its nitrogen, and it thus becomes a very effective fertiliser. Further, by removing the cattle pads, the beetles are opening up more pasture land. If the pad simply remains on the ground, the grass beneath is lost, and the surrounding grass becomes rank and unattractive to cattle.

Continued research is going on to provide the best possible coverage of the buffalo fly breeding areas by the introduction of other dung beetle species to ensure, where possible, that all soil and climatic conditions have a suitable beetle. This research is locating new species to suit specific climatic, soil and vegetable types, and thus give an even greater coverage.

Following the success of the buffalo fly campaign, the CSIRO has now turned to the bushfly, which poses a significant economic problem to the tourist industry as well as a nuisance problem to residents. Shortly it will release dung beetles suited to a temperate climate in the south-coast area of New South Wales.

Collecting the various species has been a long and complex task; to help achieve the aim of getting a suitable dung beetle for each of Australia's wide range of climatic and vegetational regions, Dr. Bornemissza has been operating from a special research station in Africa. From this station he hopes to select

and transport some 120 species of dung beetles from many parts of Africa south of the Sahara. He describes this project as "probably unique in the history of applied ecology." (AIS).

* * *

I am indebted for this article to The Australian News and Information Bureau, which went to some trouble on my account to comply with my request for the names of the beetle species and also of the flies concerned.—Ed.

A variety of *Syrphus albostriatus* Fallén (Diptera: Syrphidae)

A. J. BROWN, F.R.E.S.

Coe (1953) states this species has tergites 3 and 4 with a pair of straight yellow bars, almost or quite touching the anterior margin of the tergites on the median line, where they are usually narrowly connected, and sloping down towards the side-margins. He also states that in some examples the yellow markings of the tergites are reduced.

I have now examined several specimens of this insect, and have come to the conclusion that there is a definite case for the naming of a separate variety, since the differences between the two apparent forms are much greater than suggested by Coe.

The normal form, which agrees with Coe's description, has the following characteristics:—

- (1) Legs entirely yellow/orange except for the distal tarsi on the hind legs, and a dark band on the centre of the hind femora of the male.
- (2) Scutellum yellow, with only faint dark markings.
- (3) Eyes with short hairs.
- (4) Thorax with distinct yellow side-markings at front.
- (5) Yellow markings on tergites 3 and 4 touching at the centre for a distance equal at least to half the depth of the yellow markings, and touching the base of the tergites on the median line.

The variety has the following characteristics:—

- (1) All femora and tarsi black, and the centre of the hind tibia is also black.
- (2) Scutellum with a distinct dark centre.
- (3) Eyes distinctly hairy.
- (4) Thorax with very faint or no side-markings.
- (5) Yellow markings on tergites 3 and 4 not connected at middle, and not touching base of tergites on median line.

The above description apply equally to males and females of both form.

I have records of the normal form from the Bristol area and various parts of Dorset, and of the variety from South and East Dorset.

This does not appear to be a melanic, as melanics of various *Syrphus* species occur, and these are invariably entirely black.

Also, the melanics usually occur, alongside normal forms, whereas, from information available to date, it appears that the form of *S. albostriatus* found seems to depend on the locality, as I have no records of both forms occurring together. Also, I have not examined any specimens which appear intermediate between the two forms.

Having stated the case for the existence of a variety, I should like to suggest the name:

Syrphus albostriatus Fallén var. *nigrum*.

I would naturally be more than pleased to hear from any person who has any comments or observations to make on this matter.

I am indebted to Mr C. Searle for allowing me to examine specimens of *S. albostriatus* in his collection.

Reference

Coe. R. L. Royal Entomological Society Handbooks for the Identification of British Insects. Vol. X. Part I. (London 1953).

64 Strouden Ave., Charminster, Bournemouth.

Notes and Observations

PLUSIA GAMMA L. AND NOMOPHILA NOCTUUELLA SCHIFF. IN SOUTH DEVON.—Totals recorded in my mercury vapour light trap during the period 12th May to 15th September 1971 are as under, the 1970 figures being shown in brackets:

Plusia gamma L. The May total was 11 (17); June 23 (33); July 47 (121); August 1451 (473) with peaks of 43 on 8th, 91 on 12th, 105 on 16th, 86 on 17th, 181 on 19th, 295 on 20th, 101 on 21st, 103 on 24th and 115 on 26th September, for 15 nights, showed a total of say 1500 (23) with peaks of 60 on 5th, 76 on 6th, 80 on 9th, 187 on 11th, 105 on 12th, 61 on 13th, 73 on 14th and 205 on 15th.

Nomophila noctuella Schiff. May 0 (2), June 0 (18), July 4 (114), August 111 (311) with peaks of 10 on 17th, 15 on 19th, 10 on 20th, 8 on 24th, 9 on 25th and 10 on 27th. The September total for 15 nights was 13 (97).—H. L. O'HEFFERNAN, c/o 12 Firth Road, Rondebosch, C.P., South Africa. 16.ix.1971.

CURIOUS BEHAVIOUR OF LARVA OF ACHERONTIA ATROPOS L.—To these notes some years ago I detailed unusual behaviour of the brown coloured form of the larva. In Cape Town last February I captured one evening a brown larva, feeding on *Tecomaria eupensis*. It was parasitized by a Tachinid fly.

It fed all night after capture and was still eating at 8.30 a.m. next day. By 1 p.m. it was completely buried in the earth provided. It emerged again at 7.45 p.m. and was eating within ten minutes: large quantities of the food plant were consumed during the night and at 9.45 a.m. next day it was still resting

head downwards on the foodplant, but by 1 p.m. it was again completely buried in the earth. It emerged at 7.30 p.m. and commenced eating immediately, continuing to do so all night. It buried itself next day at 8.45 a.m. and emerged again at 8.10 p.m. It rested all night, taking no food, and buried itself for the last time at 9.15 a.m. and pupated, but, of course, only the Tachinid flies emerged.—H. L. O'HEFFERNAN. 29.viii.1971.

LARVAE OF PHAULERNIS DENTELLA ZELLER (LEP.: TINEINA) IN SUFFOLK.—On 31st July, I collected some seedheads of *Chaerophyllum temulum* into a bag at Thorpeness, at the spot where Col. Emmet had taken the moth of *Phaulernis dentella* Zeller in 1966 (cf. Wakely, *Ent. Rec.*, 79: 3). On looking into the bag a few days later, I saw with much pleasure that it contained many *dentella* larvae which were feeding on the seeds; also, two late larvae of *Depressaria chaerophylli* Zeller, from which the moths have since materialised.—J. M. CHALMERS-HUNT, 6.x.1971.

NEPTICULA DECENTELLA H.-S. (LEP.: TINEINA) IN KENT.—I took a single specimen of a rather strikingly marked 'Nep' here in my m.v. trap on 11th July, which Col. Emmet kindly determined as *Nepticula decentella* H.-S. and a species apparently hard to come by. For a figure of the moth and an account of its discovery in Britain (in 1931) cf. Adkin, *Entomologist*, 66: 25-27, plt. 1, fig. 1.—J. M. CHALMERS-HUNT, 6.x.1971.

NOTES ON SOME BRECONSHIRE LEPIDOPTERA.—At Trebanog near Hirwaun, close to the Glamorganshire border, is a lush marshy field where the Globe Flower (*Trollius europaeus* L.) and other local plants flourish. On 23rd June, a warm sunny day, both sexes of *Euphydryas aurinia* Rott. were flying there, and numerous specimens of the pretty *Eustrotia uncula* Clerck rose at my feet. Also noted, were single examples of *Orthonama lignata* Hübn. = *vittata* Borkh., *Stenoptilia bipunctadactyla* Scop. and *Catoptria margaritella* D. & S., of which the latter is new to Breconshire. The previous day, on the high ground above Ystradfellte, Dr. Neil Horton and I visited some boggy ground sloping down to the river Llia, where amongst other species, we saw *Argynnis selene* D. & S. and *Epirrhoe tristata* L. and a single ♂ *Lampropteryx otregiata* Metcalf which he captured flying in the sun. Nearby, on the moors, I took a larva on grass (awaiting determination), which spun a neat white cocoon in the leaf fold, and produced a specimen of *Ochsenheimeria birdella* Curtis on 14th July. Both *L. otregiata* and *O. birdella* are new to Breconshire.—J. M. CHALMERS-HUNT, 1 Hardcourts Close, West Wickham, Kent, BR4 95G. 6.x.1971.

NEPTICULA FILIPENDULAE WOCKE (LEP.: TINEINA) IN SUSSEX.—As I can find no mention in the literature of any recent occurrence of *Nepticula filipendulae* Wocke, it may be of interest to state that while on the downs near Eastbourne on 25th August, I found several empty mines of this local moth on *Spiraea filipendula*. The species is included in Robert Adkin's *The Moths of Eastbourne*, 2: 91: which was published in 1931.—J. M. CHALMERS-HUNT. 6.x.1971.

LYSANDRA BELLARGUS IN KENT.—On 4th September 1971, at Queen Down Warren (a reserve of the Kent Naturalists' Trust) *Lysandra bellargus* Rott. was quite common. Some individuals were very tame and could be persuaded to walk on one's hand from the scabious blooms. One, indeed, transferred its attention to my nose, where it sat for several minutes, unperturbed by the hilarity of my companions. I was later to regret this liberty when we came across four male specimens regaling themselves on some dog excrement! I have not previously observed this behaviour in butterflies although the partiality of certain species for carrion is well known.—E. F. HANCOCK, Abbotsford, Belmont, Ulverston, Lancs. 23.ix.1971.

STENOPTILIA SAXIFRAGAE FLETCHER IN YORKSHIRE.—Tony Harman's first English specimen of this species drew keen attention when it was shown last November at the Derbyshire Entomological Society's annual exhibition. As a result of viewing this specimen, a colony of the species was discovered in the garden of a council house at Sheffield on 7th August 1971.

My sons aged 9 and 11, drew my attention to a small brown plume moth resting on herbage in an overgrown rockery where saxifrages grew freely, and having previously seen T. W. Harmon's specimen, told me they thought it was *S. saxifragae*. On closer examination of the site and disturbance of the vegetation, a number of moths, possibly a dozen, took flight and, despite having no net, we managed to box five specimens in a couple of pill boxes.

I showed these specimens to Tony Harman, who was certain that they were *S. saxifragae*, and this was later confirmed by Lieut. Col. A. M. Emmet, to whom I showed the specimens at the Amateur Entomologists' Society's exhibition.

This is, I believe, the first Yorkshire record, and the second English county record for the species.—F. HARRISON, 24 Church Street, Holloway, nr. Matlock, Derbyshire. 28.ix.1971.

PURPLE EMPEROR IN SURREY.—It is generally believed that the purple emperor is a difficult butterfly to catch. This is apparently not so if you live in a house with purple paintwork, some touches of violet in the upholstery and carpeting, a tall oak nearby, and keep your windows open on fine days in July and August. Seriously, between 18th July and 16th August of this year, a friend of mine who lives in Surrey found three male

Apatura iris L. inside his house, while a female spent some time sitting on the outside of a window.—J. A. C. GREENWOOD, The Thatches, Forest Road, Pyrford, Woking, Surrey. 8.x.1971.

POSSIBLE OCCURRENCE OF ARGYNNIS CYDIPPE IN KINTYRE.—I read Mr Showler's letter (*antea* 217) with interest, being a native of the district in question: a minor point, the district is Knapdale, not Lintyre. As a boy I collected there *Pararge aegeria* L. (then very rare: my only capture was on 11th August 1919), *Erebia aethiops* Esp., *Aglaia urticae* L., *Lycaena phlaeas* L. and also *Thecla quercus* L. The purple hairstreak was considered the greatest prize.

I have no specimen of *Argynnis aglaia* L. from Knapdale, nor record of seeing it in those days, though as it is at its strongest in July and the school holidays did not begin until August, it could have been missed. However, *aglaia* is so widespread in the isles (I have seen or caught it in Skye, Rum, Canna, and Barra) that a large fritillary seen in July or August is likely to be of this species.

The presence of *cydippe* in southern Argyllshire, however, calls for investigation, as this was reported from Islay by Mr R. L. Wilks (*Entomologist*, 78: 86) the capture being made on 8.vii.1941.—J. L. CAMPBELL, Isle of Canna. 25.ix.1971.

(Mr N. D. Riley has pointed out to me that "*cydippe*" should be referred to as *Argynnis adippe* L. in both notes. Ed.)

Current Literature

Life Histories of the South African Lycaenid Butterflies by Gowan C. Clark and Charles G. C. Dickson. Small 4to; xvi+272 pp. including 108 coloured plates: Purnell, Cape Town, R.15.00.

We have been given a foretaste of the painstaking work of the late Gowan Clark, published by the British Museum (Natural History) under the title of "*The Aloeides thyra Complex*," by G. E. Tite and C. G. C. Dickson, and this must have whetted the appetites of those who have seen it, to enjoy the feast of the whole collection of Mr Clark's Lycaenid drawings, occasionally supplemented by the work of Mr Dickson and the photographic skill of Mr H. N. Wykeham.

After a foreward by Mr B. Barton-Eckett, there follows a short explanatory note pointing out which plates have been retouched for printing and by whom; other notes on the general set up of the book are also mentioned. Acknowledgements follow, mentioning an impressive list of names.

The text begins with a summary of genera, of which the authors list 40, each with a general account of its history, larval habitats, affinities with other genera etc. A special mention is made of *Lycaena clarki* Dickson, on which Mr Clark had expressed the opinion that the island specimens were specifically different from the coastal *L. orus* (Cramer), the only other *Lycaena* species known from South Africa

On page 20, the main treatise follows under the heading of Life Histories and relevant Observations. In this, the species are numbered to correspond with the plates, and the descriptions follow the same order throughout: first taxon, wing span, food-plants, appearance, distribution, egg, larva, pupa, parasites and remarks. These descriptions certainly give a very good idea of the insect under discussion. In this section, much is saved by the printing of text on the backs of the plates, using a paper which does not allow such printing to show through. In my opinion, this is an innovation which makes the handling of the book much easier, and keeps the letterpress comparatively near to the relative illustrations.

Gowan Clark's drawings are items of both artistic and scientific beauty; their general layout gives a picture of the adult insect, upper and underside at the top of the page, with an enlarged illustration of the egg in plan and side elevation at the top left hand corner. Down the left-hand side are shown enlarged drawings of the various instars of the larva in great detail, and the pupa (usually in dorsal and lateral views) with the rest of the space occupied by greater enlargements of distinctive anatomical details of the early stages. Anyone with experience of such work must marvel at Clark's confidence in drawing so many complicated figures on the one sheet, for only in those plates mentioned by Mr Dickson in his explanatory notes as having been re-touched for printing can

it be seen that separately drawn figures have been added. Here Mr Dickson, being a perfectionist, seems to have copied Clark's style so successfully, that one is left wondering which of these plates have been retouched. The result is not only a very useful set of plates, but also a set of most pleasing works of art, with such delicate colouring.

To finish the book, there is a bibliography of many of the titles mentioned in the text, a systematic index, and an alphabetical index.

The book is beautifully printed on a good heavy art paper throughout, and is well bound in imitation leather boards with gilt lettering on the spine. It is enclosed in a strong paper jacket ornamented by Mr Wykeham's plate of coloured photographs on the front, and a colourful example from the Gowan Clark plates on the back. The inside cover papers show a map of South Africa showing the positions of all the localities mentioned in the text. It is a book which should be very well received in many parts of the world as a must for museum and institution libraries, for professional and amateur lepidopterists interested in the Lycaenidae, and for those naturalists who like to have beautiful books on their shelves. The price is by no means excessive in these days for the value given.—S.N.A.J.

An Illustrated Essay on the Noctuidae of North America with a Colony of Butterflies by A. R. Grote (1882) large 8vo; 100 pp.+4 col. pl. E. W. Classey Ltd., £6.50.

The scarcity of copies of these two papers by Grote has prompted Mr Classey to undertake the printing of this work, and he has taken advantage of the occasion to include an account of Grote's life and work, by that well known student of entomological history and biography, Dr. R. S. Wilkinson. This adds greatly to the interest of the book, for Grote's life was full of ups and downs, and his keen desire to introduce systematic accuracy into the study of North American Lepidoptera did much to stimulate the change from casual to accurate work. Dr. Wilkinson's foreword occupies thirteen pages to which he adds three and a half pages of references.

Coming now to the two papers named in the book title, in his preface of seventeen pages, Grote draws attention to various matters near to his heart from the inadequacy of contemporary study of the North American Noctuidae to the excessive use of Paris green as an insecticide and the detrimental side effects of its use, and he mentions that in many cases the use of the substance has been diverted from insects to humans by some malevolent individuals. Several Noctuid pests are mentioned and the damage caused by them is very reasonably assessed and discussed. He finishes with a list of thanks for assistance with specimens suggestions.

In the next part, headed Structure and Literature, the author mentions the different views of certain authors as to the limits of the Noctuidae; he discusses various criteria given

by them, and gives his own views on the matter. He mentions various papers on the subject and finishes with a list of publications, issued during the previous twenty years, which could be of assistance to students of the North American Noctuidae.

He next gives "Notes on Mr Walker's types of North American Noctuidae in the British Museum" in which he criticises these types and gives his own determinations of the 45 type specimens, finishing with a note of disapproval of Mr Walker's efforts and suggests that as the B.M. had published Walker's catalogues, it should sponsor a more exact study of the material and publish the results.

He then comes to "Specimens of North American Noctuidae" and describes 45 species with coloured figures of each in four plates which are well executed, though one has the impression that Dr. Wilkinson's mention of somewhat vivid coloration is not undeserved.

Finally, in "A Colony of Butterflies" he describes a colony of the Satyrid butterfly *Oeneis semidea* (now known as a subspecies of *O. melissa* Fabricius), which is unique. The colony is on Mount Washington in the White Mountains of New Hampshire, and is seemingly a survival from the ice age.

The book is very well printed on good paper and bound in grey cloth boards with gilt lettering on the spine and cover. Beside its library value in relieving a shortage, the addition to the book of Dr. Wilkinson's biographical note is of great interest, and the book will not be out of place in any lepidopterist's library.—S.N.A.J.

Butterflies by Robert Gooden illustrated by Joyce Bee. 159pp. 8vo. Hamlyn, London, £0.40.

This colourful little paperback is designed to stimulate the interest of the beginner in butterflies from all parts of the world. After a few introductory remarks, the life cycle is described from egg to imago with many coloured illustrations of the various stages. The anatomy is followed through larva, pupa and imago. Migration is mentioned, also colouring, marking, and natural variation. Scientific nomenclature is briefly explained with the example of *Papilio machaon* taken through from Phylum *Arthropoda* to the subspecies *britannicus*. Then there are a few words on breeding butterflies from caterpillars.

The butterfly families of the world are then outlined with coloured illustrations (many enlarged) to illustrate each family. Habits and seasons are then outlined, followed by notes on breeding with the various hazards of parasites and diseases.

The geographical regions are then set out with maps and illustrations of many relevant species on each page. Joyce Bee's illustrations brighten up the book throughout and it is good to see many of the insects shown in the natural postures rather than the conventional "set" display, necessary, of course, for identification in some cases. Finally there is a list of books

to read and of "places to visit" in Britain and Australia, and an index of the species mentioned in the book.—S.N.A.J.

A Butterfly is Born by J. P. vanden Eeckhoudt, Sterling Nature Series, 90 pp. ill. British edition, Ward Lock Ltd., £1.25.

It is a pity that a preface was omitted from this book to indicate for whom it was intended. One would think it best suited for those of a 10-12 years group, but there are some odd differences in treatment. For instance, the whole family of "loopers" is collected under one illustration and is called "The Hylophila": I am all in favour of the use of scientific names but is the circle of readers capable, nowadays, of understanding them? The use of this name follows a commendable practice in use on the continent, and could give the young reader a taste for proper nomenclature instead of the clumsy vernacular names. The text is possibly too juvenile for the 10-12 year group while the illustrations could better be appreciated by an older group, but I know well enough how difficult it is to select a group of readers and confine one's style to that group.

The photographs, by the Author, include a series of 48 enlarged photographs of the life cycle of the Small Tortoiseshell, from the pairing of the parents to the butterfly ready to fly. There are similar, though not so detailed series for the Swallowtail, the Ground Lackey, and "the Burnet Moth", while a few species are illustrated with their larvae and pupae, and a few more as adults only.

The book is printed in large type on good paper and is strongly bound in boards with a coloured illustration of the Peacock Butterfly on the cover.—S.N.A.J.

From Ingvar Svensson I have a separate of his paper **Scandinavian Bucculatrix Z. (Lep. Bucculatricidae)** from Ent. Scand. 2 (1971), 99-109.

The author mentions 17 species from Scandinavia pointing out that this is only a few less than the total number of species recorded from Europe. He first tabulates these species against their foodplants, then he discusses distribution and nomenclature. He then goes through the species mentioning the main characteristics of each, and illustrates these 17 species with 24 photographs of the right hand wings, and showing the range of variation of some species. These photographs are followed by drawings of the male and female genitalia of the species. It will be of interest to note that the author, after consulting Mr W. G. Tremewan of the B.M., sinks *B. merei* Pelham-Clinton in *B. capreella* H. Krogerus.—S.N.A.J.

From Dr Dalibor Povolny I have four separates: **Eine notwendige nomenklatorische Änderung im Rahmen der Gattung *Scrobipalpi* Janse (Lepidoptera, Gelechiidae).** Acta entomologica Bohemoslovaca 68: 207 (1971) Two important changes in the nomenclature of two species of the genus *Scrobipalpa* are necessary: the recently described *Scrobipalpa obrteliana* Pov. is a distinct subspecies of *Scrobipalpa wiltshirei* Povolny, 1966. The new taxonomic status is; *Scrobipalpa wiltshirei obrteliana* stat. nov. To avoid the primary homonymy of the recently published *Scrobipalpa wiltshirei* Povolny, 1971 (nec *S. wiltshirei* Povolny 1966) a new name is applied, viz. *Scrobipalpa walsinghami* nom. nov. These two errors originated in a misunderstanding which took place in a proof.

The paper is in German with the above abstract in English.

Zur Fauna, der Tribus Gnorimoschimini (Lepodptera, Gelechiidae) in Nordwestafrika: Acta ent. bohemoslav 68: 23-44 (1971) describes 9 new species of the genus *Scrobipalpa*, with illustrations of genitalia details. **Bedeutende faunistische und taxonomische Entdeckungen bei den *Scrobipalpa*-Arten (Lep. Gelechiidae) in Mitteleuropa:** Zeitschrift der Wiener Ent. Gesellschaft 54 Jg.: 71-78. mentions five species. with a name change in the case of one. There are male and female genitalia drawings. ***Scrobipalpa* (*Euscrobipalpa*) *delattini* sp. n. eine neue Gelechiidenart (Lep.) aus der Sammlung von Prof. G. de Lattin:** Abhandlungen der Arbeitsgemeinschaft für tierund pflanzengeographische Heimatforschung im Saarland 2: 3-5. describes this new species with a drawing of the adult insect and male and female genitalia.

A joint paper by Dr Povolny, Karel Spaizer and Jaroslav Marek entitled **Nachtrag zur Noctuidenfauna des südbohmisches Hochmoores bei Liborezy nebst Bemerkungen zu einigen Noctuidenfunden auf Hochmooren in Südböhmen** Acta faunistica ent. Musei nat. Pragae 13: 119-122, mentions eight species with a plate illustrating *Hypenodes humidalis* Doubleday enlarged $\times 2$,—S.N.A.J.

Proceedings and Transactions of The British Entomological and Natural History Society, Vol. 4, Part 2, gives accounts of the ordinary meeting on 14.i.1971 and the Annual General Meeting on 28.i.1971, also the ordinary meeting on 11th February, 1971. The President's address is printed in full, the scientific part being on the subject of the study of acar-insecta associations, illustrated by drawings and photographs
S.N.A.J.



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THE PROFESSOR HERING MEMORIAL RESEARCH FUND

The British Entomological and Natural History Society announces that, as a result of applications received by 30th September 1971, awards have been made to Miss J. M. Ruse, Department of Zoology, University of Manchester, to help her research into the biology of leaf miners and their parasites on *Sorbus aucuparia* and related host plants; and to Mr P. R. Cobb, Editor of the Proceedings of the Heacham and West Norfolk Natural History Society, for continuation of his work on the life-cycle and distribution in Britain of the gall-wasp *Andricus quercuscalicis* (Burgsdorff).

Further applications are invited for awards to be made after 31st March 1972, for the promotion of entomological research with particular emphasis on:—

- (a) Leaf miners
- (b) Diptera, particularly Trypetidae and Agromyzidae
- (c) Lepidoptera, particularly Micro-Lepidoptera
- (d) General Entomology

in the above order of preference, having regard to the suitability of the candidates and of the plan of work proposed.

It is envisaged that awards would be made to assist travelling and other expenses, necessary for field work, for the study of collections, for attendance at conferences, or for exceptional costs of publication of finished work. In total they are not likely to exceed about £120 in 1972.

Applicants need not be resident in the United Kingdom, and Research in any part of the world may qualify.

Applicants should send a statement of their qualifications, of their plan of research, and of the precise objects for which an award is sought, to R. F. BRETHERTON, C.B., M.A., F.R.E.S., Hon. Treasurer, Folly Hill, Birtley Green, Bramley, Guildford, Surrey, early in 1972 and in any case not later than 31st March.

THE ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

(Founded by J. W. TUTT on 15th April 1890)

The following gentlemen act as Honorary Consultants to the magazine:

Orthoptera: D. K. Mc. E. KEVAN, Ph.D., B.Sc., F.R.E.S., Coleoptera: A. A. ALLEN, B.Sc.; Diptera: E. C. M. d'ASSIS-FONSECA, F.R.E.S.

TO OUR CONTRIBUTORS

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ILLUSTRATIONS are inserted on condition that the AUTHOR DEFRAYS THE COST.

Contributors are requested not to send us Notes or Articles which they are sending to other magazines.

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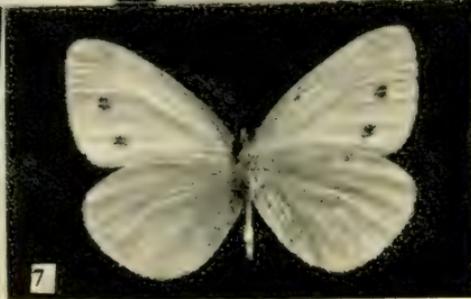
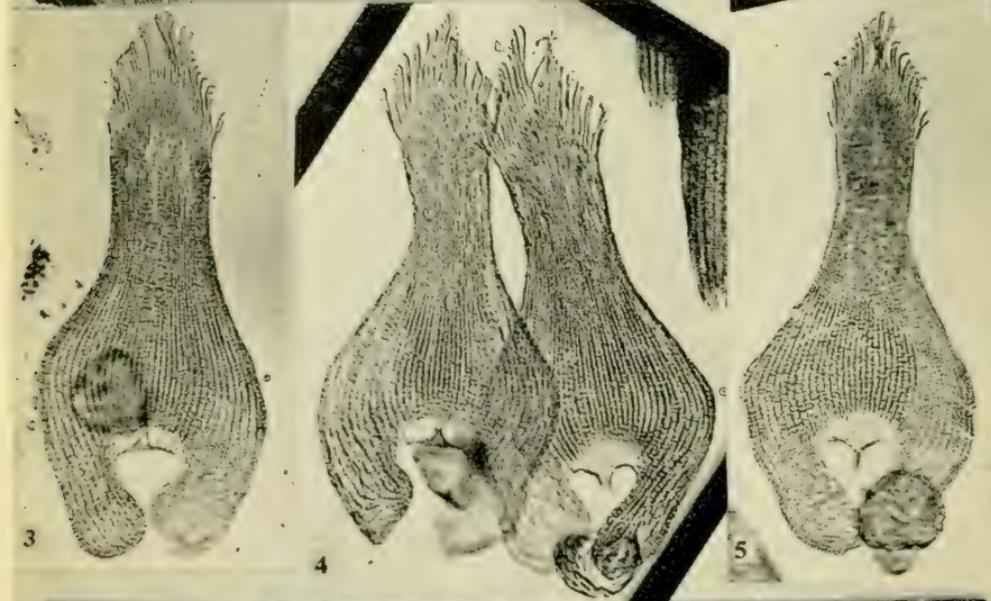
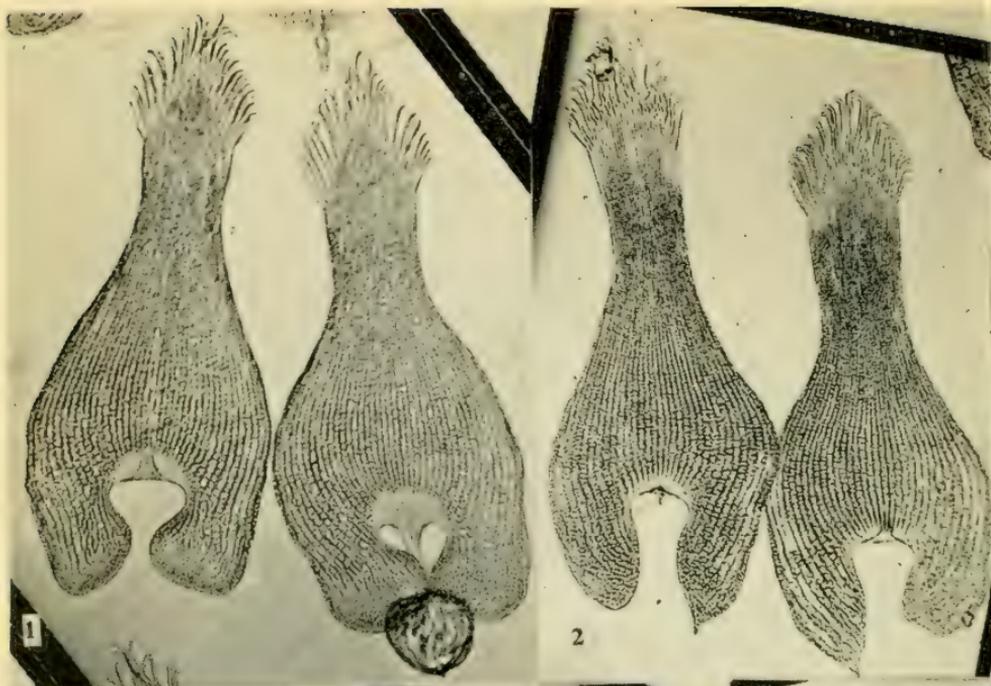


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On the Persian Forms of *Pieris pseudorapae* Vty.

By B. C. S. WARREN, F.R.E.S.

In the summer of 1970 the National Natural History Museum of Czechoslovakia sent an entomological expedition to Persia under the control of Dr Josef Moucha, chief of the department of entomology in that Museum. At his request I have been glad to study the specimens of the *napi*-group they captured. They were all *Pieris pseudorapae*. The species was scarce everywhere. All were taken at altitudes between about 500 and 3,200 m. In past years I had seen a few specimens taken by individual collectors, but as always in such cases if a collector takes a few "whites", he selects the finest examples, and this gives one little information as to what the characters of the local race actually are. It was therefore interesting and instructive to get even short series of the insect from three widely separated localities, between the Zagros Mountains in west Iran and a locality 10 km. south of Gorgan in the north-east area, including some from the Shah Mohammed Reza Wild Life Park about 80 km., east of Gorgan. Here they collected from the 27th to 30th of July. A third locality where they found a few specimens was Rubarak in the Caspian region of north Iran. In addition to these there were a few specimens each from four other localities. In all they collected in the country from 1st July to the middle of August. As noted all they took were of the hybrid race *pseudorapae*, easily recognisable by their appearance and the androconial scales.

There were two sizes of the insect everywhere, a medium one (length of forewing 25-28 mm. from the centre of the thorax to the wing tip), and a small one (length of forewing 21-24 mm). I figure the latter as it might be mistaken for *P. rapae*, both in size and absence of markings on the underside of the hindwings; fig. 7 is a heavily marked specimen. All were of the summer generations, and the same type of markings and the same sizes occurred at every altitude and in every locality. Having seen one of the small examples many years ago from over 10,000 ft. in the Mazanderan region of the Elburz Mts. I had wondered if it was a monogenerational form. But we now have proof that both forms fly together at all altitudes in Iran.

EXPLANATION OF PLATE

1. *P. pseudorapae*, summer generation, large type scale.
2. *P. bryoniae*, monogenerational scale.
3. *P. pseudorapae*, first or spring generation form scale.
4. *P. napi*, first or spring generation form scale.
5. *P. pseudorapae*, summer generation, small type of scale.
6. *P. pseudorapae*, male, first generation.
7. *P. pseudorapae*, summer generation, male of small form.
Butterflies natural size.

In his book on the Lepidoptera of Iraq (1957), Wiltshire states that *pseudorapae* is a mountain species and there are three or four successive generations. In Iran it seems the same is the case. No first generation specimens were found by the expedition even at the highest altitudes. Specimens from overwintering pupae have very broadly spreading markings on the underside of the hindwings, as in fig. 6. The first generation probably flies in May or June at moderate to high levels. In Turkey, at sea level, it is on the wing in March and April. In size the largest form of the insect that I know comes from the Cilician Taurus, but it occurs again in the far east in the Tian Shan. (Length of forewing from centre of thorax 28-31 mm.). The universal presence of two sizes in Persia is remarkable, but even more remarkable is the presence of two types of adroconial scales in specimens of either size. These scale types are obviously connected with the hybrid origin of the insect which in fact they illustrate very strikingly. Doubtless there are some who will not accept these scale characters at their obvious value, and will continue to say *pseudorapae* is a subspecies of *P. napi* and seek to prove this by crossing *pseudorapae* and typical *napi*. I have not the least doubt the two will be found to breed together readily, as *napi* and any other species of the group will, and indeed many species of other groups also will. It is difficult to understand how the fact of fertility, which is known to appear in practically every modern experiment, can be advanced as "proof" that all the insects experimented on must be conspecific. It may be recalled that fertility follows most crossbreeding experiments in the Heterocera as well as Rhopalocera. If such fertility were the true criterion of a species how many of our Hawk moths now called species would become races? One may recall the paper by Denso (*Bull. Soc. Léop. Genève* 1905, Vol. I; 84-97). Here he records fertile crosses between *vespertilio*, *hippophaes*, *galii*, *euphorbiae*, *elpenor* and *porcellus*, and employs at least eight names for hybrid races that have been frequently bred. Of course he was not the only worker interested in such work at that time, and I need scarcely remind readers of the many crosses between *quercus* and *ocellatus* made in this country. Further it is common knowledge that fertility between distinct species occurs not infrequently in wider fields of Zoology also.

The following remarks caught my eye just by chance, but they seem worthy of mention. When looking over Cowards "*Birds of the British Isles*" I noticed he referred to species "breeding together yet remained distinct". Thus the Carrion Crow and the Hooded Crow are said "when their ranges overlap" to cross and are fertile, yet "their striking differences remain distinct" (l.c. Vol. I, p. 23); later with reference to certain "Wagtails", "the birds interbreed and are fertile" (as the two Crows already mentioned) "yet according to the majority these two Crows are specifically distinct" (l.c. Vol. 3, p. 65).

Yet again a year or so ago in an account of the European

and American Bisons, known as *Bison bonasus* (Europe), and *B. bison* (American), I read, "although they cross easily without any loss of fecundity they are today regarded as separate species" (*Oryx*, Vol. 6, p. 18, Augt. 1961).

These are but a couple of chance instances but they show that in the higher branches of Zoology fertility cannot be held to be a faculty limited to conspecific races. Thinking that the frequent references to fertility as "proof" of specific unity must therefore rest on some established facts probably of earlier date, I looked over what Darwin had established on the question. There can have been no past or modern worker who accumulated such extensive data covering so wide a range in Zoology and Botany as he had. One or two notes on his elaborate researches show results that might not have been expected. The following are from the "*Origin of Species*" (6th Edition, Murray's Library, reprinted Feb. 1921).

Here he writes (p. 226), "But the fertility of first crosses is likewise annately variable; for it is not always the same in degree when the same two species are crossed under the same circumstances; it depends in part upon the constitution of the individuals which happen to have been chosen for the experiment". Modern experiments in Lepidoptera certainly support this remark.

A little further on (l.c. p. 227), he writes: "No one has been able to point out what kind or what amount of difference, in any recognisable character, is sufficient to prevent two species crossing. It can be shown that plants most widely different in habit and general appearance, and having strongly marked differences in every part of the flower, even in the pollen, in the fruit, and in the cotyledons, can be crossed. Annual and perennial plants, deciduous and evergreen trees, plants inhabiting different stations and fitted for extremely different climates, can often be crossed with ease".

Still further on (l.c. p. 242), "from these several considerations we may conclude that fertility does not constitute a fundamental distinction between varieties and species when crossed".

It is unquestionable that the result of Darwin's lengthy and wide-ranging studies led him to conclude that the presence or absence of fertility was immaterial, of no particular significance in the separation of species and races. I can only conclude that fertility in crosses is so normal a phenomenon that it is its occasional absence that has given rise to the unproveable assumption that "a degree of fertility" is a "proof".

But we must now return to the development of the androconial scales in *pseudorapae*.

The primary fact is that two recognisable types of these scales exist, and that both are transitional between the scales of *bryoniae* and *napi*. Of these two types fig. 1, shows the larger, and fig. 5, the smaller. It may be well to consider the scales of typical *napi* and *bryoniae* first, as there often seems uncertainty about these in spite of the number of times they

have been figured in the past. In *napi* the body of the scale, or basal part, is roughly more circular in form, and the lines of the sides curve in very abruptly to the constriction of the neck, or terminal shaft of the scale. (See fig. 4).

In *bryoniae* the body is more oval, narrower and longer, and the side lines slant in a more gradual curve into the neck contraction (see fig. 2). The actual portion of the neck in which the two side lines are exactly parallel, is slightly longer in *bryoniae* than in *napi*.

The larger of the *pseudorapae* types of scale is larger than in either *napi* or *bryoniae*, with the body less circular than in *napi* and less evenly oval than in *bryoniae*, and with the sides not infrequently somewhat flattened in places, and the contraction to the neck more as in *bryoniae*. It can be said on the whole that *pseudorapae* scales have the body more as *napi*, but often larger, and the neck more as in *bryoniae*. In the smaller form of scale in *pseudorapae* the body is reduced in size but still of the more circular form, and the neck a reduced *bryoniae* form but long (see fig. 5). The two types of the *pseudorapae* scale are obviously different from each other in development and outline, and neither could be mistaken for the other or for typical *napi* or *bryoniae*. There is of course, as in all androconial scales variation, especially in the hybrid insects and some times distortion and lack of symmetrical perfection. For the plate I have selected symmetrical examples. Both are of the summer generations. Fig 3 is a normal first generation type. I have seen another first generation form which is practically wedge-shaped; there is no contraction between the termination of the scale and the broadest part of the body. This is quite a normal type in *P. oxsenheimeri*, and very likely is a result of some chance connection with that species in the past, for *pseudorapae* has an immense distribution. It spreads from one side of Iran to the other and far to the west to the sea, and further still to the east to the Tian Shan, but for some strange reason is not known in Afghanistan.

The scale forms are common to both sizes of the insect in Iran, which is a remarkable example of how distinctly a hybrid race can reproduce compound formations, once it has crossed. From such developments it follows that fertility is but a phase of growth, it is only restricted in operation by physical limitations. An abnormal cross can only produce abnormal offspring, they must, and do, differ in various respects from either parent; an undeniable proof that the latter are not both the same; but this does not stop them growing.

The proces of growth is predominant, controlling every phase of existence, from the absence of perpetual uniformity to the production of the most extreme variant. For this reason the importance of structural change cannot be overestimated, we have only to look at the wonderful changes of appearance achieved by mimetical causes which leave structural formation entirely unaltered. It is such demonstrations of the unity of structure and specific nature, that give one complete confi-

dence in structural characters as guides to the recognition or separation of species. Structure and specific nature have grown as one, united from the start, and should some deviation have arisen, with growth this can only increase and the two become ever further divided. Two structural forms cannot unite again into one, growth can only increase the difference.

Pieris Specimens for Androconia: the end of the “Hybrid Species”?

By S. R. BOWDEN

Warren (1971) has given an account of events which led him to reject bred specimens for use in his androconial work, and to advise others to do likewise. It will, however, be necessary to go further back, to understand what happened.

I never quite followed Mr Warren in his association of deformed scales with hybridity. I wrote to him (in 1966) that the *bryoniae* × *oleracea* specimens had shown that inter-specific hybrids need not have any deformed scales, so that the precise cause of deformation (when it occurred) was rather obscure. I was at that time unable to begin any systematic study of androconia myself, because although the procedures are simple they do consume some time, which was lacking. Nevertheless, it would have saved us all a great deal of trouble if I had pursued the matter then, and I am sorry that I did not.

The precise criteria by which hybrid-type scales are to be recognised have not been entirely clear. Basal prongs tending to an hour-glass shape, combined generally with asymmetry of the whole scale (Warren 1966: figs. 5,9) would appear to be the most characteristic manifestation, others being subject to intuitive interpretation.

In 1970-71 one of my first tasks was to show that other factors besides hybridity could produce scales distorted in this way. I looked at specimens from broods including also partial cripples, and found what I expected. Some of these were hybrids, and some were of subspecies that Warren graded as “hybrid species.” To prove my point. I had to find deformed scales in undoubted pure species. This I was able to do most easily by looking at long-retarded “spring” emergences of English *napi*, Lapland *adalwinda* and Swiss *bryoniae*. Although the slides that I then sent to Mr Warren showed many grossly abnormal scales, it was generally possible to find normal ones predominating in brother butterflies.

Perhaps the worst conditions for the development of adult *Pieris* are provided by post-diapause temperatures fluctuating just above and just below the minimum required for imaginal development to continue (ca 6°C?). Unfortunately refrigerating systems have their de-frosting periods and even temporary failures. Sharp cooling of pupae after the initiation of development can be very deleterious (Bowden 1955). It is possible

that no abnormalities would be produced even by retardation exceeding six months if the breeder could ensure a temperature continuously near 0°C.

"Summer" (non-diapause) individuals are of course not retarded by the breeder and (unless very late in the season) in nature too suffer fewer development-disturbances than the "spring" butterflies. There is no obvious reason to prefer wild to bred specimens of this emergence, since the difference is likely to be no greater than between two wild samples. One cannot, unfortunately, altogether confine oneself to these "S" individuals, because some populations produce none, and the single brood is certainly not the equivalent of the summer brood, though it might sometimes be convenient if it were.

Many hybrids suffer diapause disturbances, leading in some cases to delayed emergence or to the death of one sex before eclosion (Bowden and Easton 1955). In these cases any scale-distortion really is (indirectly) due to hybridity, and if the hybridization took place in the wild distortion would still presumably occur. But such distortion would not suffice as evidence of hybridity. Even in the wild, pupae are often subject to irregular temperature regimes.

Something of this kind may have affected wild-caught specimens on which Warren has erected his "hybrid species." I do not think it necessary to suppose that anything very unusual should have happened to them: the normal variation between adjacent androconia shows that they are sensitive to the slightest of local influences.

Mr Warren says (1971) that he has had specimens from me that gave perfectly developed scales, and he suggests that these were from eggs of wild females. In nearly all cases, I think, they were not. There is no foundation for the supposition that continued captive breeding alters what he calls "specific nature". Of course the recessive lethals and sub-lethals present in most wild *Pieris* stocks cause trouble if continued *in-breeding* is practised.

Warren's identification of the Corsican and certain other "*Pieris napi*" populations as "hybrid species" depended on an androconial comparison with hybrids of mine which he now rejects (for this purpose, rightly). In these specimens the presence of "hybrid" scales was never a direct consequence of hybridity, but of disturbance which could have had many origins, e.g. interrupted imaginal development. Nothing remains to associate any scale abnormality unequivocally with hybrid origin. Warren has examined (1970) some supposed wider hybrids of natural origin and found these to have scales free from deformity, so he cannot be surprised that his criterion has proved illusory. For it would be odd if relatively close hybrids were more severely disturbed than those between remote taxa.

So all the "hybrid species" revert to normal subspecies, which in any particular case may or may not deserve specific rank. In the words of T. H. Huxley, among the greatest tra-

gedies of science is the slaying of beautiful hypotheses by ugly facts.

I must strongly advise those studying androconia for taxonomic purposes to disregard all deformed scales entirely; when many are present on a specimen it will be safest to transfer attention to another individual.

I am still convinced that Pierine androconia, difficult as they may be to interpret, are of high value in the study of relationships. We must be grateful to Mr Warren for taking these attractive structures and squeezing them very hard indeed to get the last drop of information out of them.

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Butterflies in Arctic Scandinavia, 1971

By M. R. SHAW

It has frequently been emphasised in the various entomological journals that collecting butterflies in the European Arctic is always something of a gamble. While it is potentially an immensely rich region, the onset of the entomologically brief summer season regularly varies by as much as two or three weeks from year to year, and in a manner which seems impossible to predict at a usefully early date. Also the weather is so notoriously unstable that several unfortunate would-be collectors making relatively brief trips have had to come back without seeing the sun. This year, my wife and I were able to take a complete month's holiday, which we felt would best be used in fulfilling a long-standing ambition to collect in the Arctic. With a whole month we were sure we would see something of at least the commoner butterflies, and we tried to arrange our dates so as to arrive in time for the early flying species, yet still be there when the later species started to emerge. From a survey of the literature it seemed to me that Abisko was on the whole a little later than the northern Norwegian fjords, and thus it should be possible to arrive at Abisko and collect "early" species for a while, then to move northwards towards the remains of the Gulf Stream at lower altitudes and find the "late" species flying perhaps a couple of weeks earlier than they would at Abisko.

Our collecting was confined to only two areas: Abisko (22.6.71-1.7.71 and 15/16.7.71) at 68° 23' N. in Swedish Lapland, and Gargia (4.7.71-12.7.71) at 69° 48' N. just south of Alta in the Norwegian province of Finmark. Even though we had no car, we were able to see something of all the exclusively Arctic butterflies as well as most of the boreal races of the more widely distributed species inhabiting the region. Our luck in this stemmed from several factors. Firstly, we had exceptionally warm and sunny weather and of the 25 days we spent in the Arctic we had only six wholly useless days, three of which were in any case to be spent in travelling between Abisko and Gargia, and really it was not until our last few days at Gargia that the weather stimulated bad language at all. Secondly the weather in the "Far North" had been better than average for the previous two summers, which had probably had a beneficial effect on butterfly populations since insects increase in numbers faster than their predators when conditions are good. Thirdly, at Abisko an early warm spring had been followed by a colder spell just before we arrived; this appeared to have the effect of condensing the season since pupae due to emerge during the poor weather were retarded, while the species which had still a few weeks before emergence seemed to be more influenced by the subsequent good weather (and perhaps by the prolonged warmth of spring), and so still emerged early. Lastly we met some very kind and helpful people—in particular Herr. Schlüter from Denmark and his family, whom we met towards the end of our first stay at Abisko. The Schlüters have specialised over the past decade in collecting Arctic butterflies, and we benefited enormously from their expert advice and knowledge. It was the Schlüter family who suggested that we abandon our rather vague and ill-defined plans to explore the Laxefjord (on reflection this would have been idiotic without a car) and visit Gargia instead, where we did extremely well. They also showed us a small but teeming locality in the hills behind Bjorkliden where we spent a most enjoyable and profitable day collecting together.

We arrived at Abisko on 22.6.71, and stayed in the Tourist-station (ca. 350 m.) until 2.7.71. Abisko is sufficiently well-known to need no further description, and much has been said about the inconvenience of the National Park (by some considered to be even more of a bane than the Arctic mosquitos), though in fact most of the really good collecting ground in the general area lies outside the Park. Mt. Nuolja is certainly a serious loss to the collector, but better high ground exists over the lake (where there is a mountain hut with bunks and cooking facilities) since *Clossiana polaris* Bdv., *C. chariclea* Schneider and *C. improba improbula* Bryk. all occur here, while only the last is found on Nuolja. As for the low ground, we found no need to go further than Abisko Östra about a mile from the hotel and just outside the Park, where a lot of easily accessible, varied and marshy ground is well popu-

lated with butterflies. Apart from the three trips to more specialised biotypes outlined below, we did all our collecting at Abisko in that direction, and did not find it necessary to cover large distances.

The mosses at Stordalen were visited on 23.6.71 and we were fortunate in finding *Erebia disa* Thnbg. in much better numbers than appear to have been noted previously. We saw the first few at about 10.00 a.m. in blazing sunshine, keeping very much to the wet and inaccessible parts of this large and wild expanse of marsh, moss and lakes, where they were almost impossible to catch. As the day wore on, but not until we were wet through, they flew freely all over the moss, and since both sexes were fresh and fully out we had no trouble in selecting an adequate series. We probably could have caught a couple of hundred had we so wished, and it was our first indication that we were lucky both with the season and with our timing to see this usually scarce insect in such profusion. It hazed over and became very humid at about 2.30 p.m., and although butterflies continued to fly we were driven off by the mosquitos. That, too, was a taste of things to come.

On 28.6.71 we went up Mt. Nuolja (by chair-lift to 900 m.) in rather uncertain weather, arriving at about midday. *C. improba* was quite common and very fresh by the lift-terminal but unfortunately by the time we had got out of the Park the sun had faded out and the wind became more decisive. In spite of these difficulties a short series of *improba* was taken, flying weakly in hazy sunshine but much more vigorously during the few moments of unbroken sun that we had near the edge of the Park. Not much else of interest was taken, though we caught several brief glimpses of various species kicked up into the wind and borne away. On the way up, in the shelter of the birch woods beneath the lift, we saw large numbers of *Erebia pandrose* Borkh., *Colias nastes verdandi* Zett., and *Pieris napi adalwinda* Frhst., all three species extending well above the tree-line, though the last did not quite make 900 m.

Our only other attempt at collecting above the tree-line during this period was made in the company of Herr. Schlüter and his family on 30.6.71, when they showed us their favourite spot in the hills behind Bjorkliden. Small calcareous outcrops at about 550 m. broke a high plateau and supported a good variation of vegetation and insects, but unfortunately we had picked a very windy day, and although the sun shone strongly and continuously we had obviously not seen the locality at its best. A couple of days previously Herr. Schlüter had caught two *Colias hecla sulitelma* Aur. (a very early date for this species at Abisko) and in previous years he had taken *Agriades glandon aquilo* Bdv. here. *Astragalus alpinus* was growing freely, and *C. nastes* was everywhere, apparently unimpeded by the wind. Four or five *C. hecla* were seen, but only two were caught, and Herr. Schlüter was extremely

generous in giving me the only *A. glandon aquilo* taken. *Pyrgus andromedae* Wallgrn. was common and fresh, and I also caught an early *Boloria napaea frigida* Warren.

The birch zone and bogs around Abisko Östra were very productive, and we saw plenty of *P. napi adalwinda*, *C. nastes*, *Clossiana euphrosyne fingal* Herbst., *Clossiana freija* Thnbg., *Proclassiana eunomia ossianus* Herbst., *Euphydryas iduna* Dalman, *Vacciniina optilete cyparissus* Hb., and *E. pandrose*, with smaller numbers of *Pyrgus centaureae* Rambur, *Oeneis norna* Thnbg., and *Clossiana frigga* Thnbg. As we left Abisko, *Colias palaeno* L., *Boloria sifanica* Gr.-Gr., and *Clossiana selene hela* Stdgr. were beginning to emerge. Our second visit to Abisko (15/16.7.71) is referred to later.

The journey by bus to Gargia, about 20 km. south of Alta near the Alta river, took two full days, and we stayed in the small Fjellstue, run by the Larsson family, from 3.7.71 until 12.7.71. Here we were received with great kindness and this phase of our holiday was especially enjoyable. Gargia (ca. 150 m.) is in the birch zone, though less firmly so than Abisko since in some parts quite extensive growths of fir were seen. To the south and within easy walking distance is the large hill Grönnasen (ca. 500 m.); beyond this the road winds away over a high mountain plateau which would probably be well worth exploring. The tree-line on Grönnasen is at about 400 m. and above this the vegetation is complex and varied, some parts being apparently calcarious with *Dryas octopetala* and *Astragalus alpinus* while other areas (mostly gneiss and quartzite) support a tangle of *Betula nana*, dwarf *Salix*, *Vaccinium uliginosum*, and a wide range of related berry-bearing plants (Ericaceae). Sizeable areas of the hillsides are marshy and furnish the usual bog plants and insects at rather lower densities than the lowland marshes, and several sparsely vegetated screes provide useful sun-traps. We confined our attention on the high ground near Gargia to south-facing slopes, and here we were able to find very good concentrations of some of the rarer Arctic specialities. In particular *Colias hecla* was in profusion between 400 and 450 m. when it gave way to even larger numbers of *Clossiana chariclea*. It was a great thrill to see this normally extremely scarce Arctic fritillary so common, but although both sexes were fully out and fresh I could not discover the foodplant by finding females ovipositing. The *Oeneis* species on Grönnasen were also interesting, with *Oe. norna* occurring to about 450 m., being replaced higher up by *Oe. bore* Schneider. The presence of *bore* is often open to doubt when it occurs near populations of *norna* since high level forms of the latter are typically greyer and more thinly scaled than is normal and spotting is considerably reduced and can sometimes be absent. Despite these superficial similarities the two taxa are easily separable by dissection of the male genitalia, and these characters have confirmed the presence of both species on Grönnasen. Other interesting butterflies from this hill include a single moder-

ately fresh female *Colias nastes* caught at 400 m. (just above the tree-line) on 4.7.71. We spent quite a lot of time in roughly the same place on subsequent days but saw no more, and it seems probable that this specimen was a stray. It is just outside the usual range of the species, and I believe the first record for the area.

We met the Larsens, another Danish family collecting butterflies, on 7.7.71 and enjoyed their company for three or four days. Mrs Larsen caught a specimen of *Clossiana polaris* near the roadside about a mile south of Grönnasen, and after a good deal of searching in less than ideal conditions we eventually caught three more between us in the same place. I also caught a deformed male on Grönnasen but the existence of a colony there could not be established, although it seems unlikely that this individual had the flying power to cross the lightly wooded and marshy valley separating it from the proven colony a mile or so away. The superabundance of *C. chariclea* and deteriorating weather spoiled our chances of assessing the strength of the colonies, since *polaris* is notoriously dependent on good weather for its activity. Although this species has not recently been noted from these parts it seems probable that the high mountain plateau south of Gargia supports several colonies. The biotype in the two areas was very similar; very shallow and predominantly dry south facing valleys with a good variation of moorland plants none of which, however, seemed commoner here than elsewhere nearby. In both places *Dryas octopetala* was virtually absent; none at all for a radius of 70 m. on Grönnasen, and for about 200 m. around the colony to the south I could find only eight plants comprising one small patch. This plant, which is commonly but probably erroneously cited as the most likely foodplant for *C. polaris*, was quite abundant in the general area but repeated searches among it failed to produce the butterfly. Most collectors with field experience of *C. polaris* are unconvinced that *Dryas octopetala* is the foodplant, and *Cassiope tetragona* has been mentioned as a possible alternative by some Scandinavian authorities. The distribution of this plant, as far as it is mapped, seems to correlate reasonably well with that of the butterfly.

Three *Erebia* species were found near Gargia, and we were particularly struck with the high degree of zoning between them. *E. disa* was common around the tree-line on Grönnasen, extending over quite a large area, and small colonies existed elsewhere on high moorland and hilly slopes as well as in its more usual marshy habitats. *E. medusa polaris* Stdgr. was found commonly in a small area at 250-300 m. by the roadside on the way to Grönnasen from Gargia, and the ubiquitous *E. pandrose* filled the gaps. However, we did not see much of the latter in areas where another *Erebia* was flying, and it seemed that good numbers of only one species were to be expected on any particular patch of ground.

The low ground near the Fjellstue at Gargia was varied

and very productive. Open mixed fir and birch woodland with large growths of *Viola* afforded *Clossiana thore borealis* Stdgr., *C. selene*, *C. euphrosyne* and the odd *Colias palaeno*, while *Rubus chamaemorus* and *Vaccinium uliginosum* bogs were alive with *P. eunomia*, *C. frigga*, *B. sifanica*, *V. optilete* and smaller numbers of *Oe norna*, *C. euphrosyne* and *C. freija*.

Our departure from Gargia was made a good deal less of a wrench by some rotten weather on our last full day, when the temperature was only 6° C at noon and a strong north wind swirled drizzle around our lingering collecting hopes; but even then it was hard to leave these idyllic surroundings and the excellent hospitality of the Larssons. On our last day we met a Norwegian collector, Herr. Lühr, but the poor weather gave us no chance to collect together, though swapping notes was helpful for the future. As we left Gargia the season was showing the first signs of going over the top, and although everything was still to be found in fresh condition at high levels, some specimens at lower altitudes were becoming a little worn.

We had hoped to be able to compare the state of the season in the two areas when we returned to Abisko on 15.7.71, but unfortunately the weather at Abisko had recently been so poor as to make any comparison futile. There was a little fresh snow persisting above about 800 m., and it had been cold and wet (with some sleet at the Touriststation) for almost a week. The 15th of July was apparently the first warm or sunny day for some time, and we collected around Abisko Öst in the previously explored marshes. We found very little, only *P. napi adalwinda* and *C. palaeno* being in worthwhile condition or numbers, and of the fritillaries even *B. sifanica* was in rags and scarce. It was difficult to say whether the cold spell had actually finished the season or whether it had merely postponed fresh emergences, but in either case it did not seem worth collecting there again on our one remaining day. Instead we revisited the limestone outcrops behind Bjorkliden, and saw a lot more butterflies, many of which seemed to be freshly emerged. In particular *C. hecla* and even *C. nastes* were common and a few *C. palaeno* were caught nearby. *B. napaea* and *B. sifanica* were both plentiful and as soon as we arrived between 10.30 and 11.00 a.m. we caught five fresh specimens of *A. glandon aquilo* in an area of only a few square yards. In spite of concentrating our efforts for this species and continuing good sunshine we saw no more either here or in similar spots nearby; possibly this species is at its most active early in the day.

We saw 29 species of butterfly while we were north of the Arctic Circle, and with both of us working reasonably hard there were times when we were catching useful material faster than we could box it. At one stage we had shade temperatures of around 30°C, and, but for the mosquitoes we could have done without jerseys for most of the time.

In conclusion I would emphasise again that we were exceptionally fortunate this year, — it is said of collecting in the

Arctic that one has to walk many miles to see butterflies; that large areas seem to be wholly without them; that it is in no way comparable with Southern Europe. That we found it in every-way similar to collecting in Southern Europe should not be taken as typical; it merely underlines our great fortune with the all-important good weather.

Species seen in Arctic Scandinavia:

- P. napi adalwinda*: Very common and fresh (22.6.71) around Abisko, especially near human habitation, but up to nearly 900m. on Nuolja. Not seen at Gargia, but still in reasonable condition when returned to Abisko on 15.7.71.
- C. nastes werdandi*: Common around Abisko from 22.6.71; some still fresh at 550m. on 16.7.71. One female taken at Gargia (4.7.71, 400m.) just outside its normal range.
- C. hecla sulitelma*: First seen in the hills behind Bjorkkliden (near Abisko) at 550m. on 27.6.71 by Herr. Schüter and by me three days later; still fresh and very much commoner in the same place on 16.7.71 Common and fresh at Gargia from 4.7.71.
- C. palaeno*: First seen at Abisko by Herr. Schlüter on 1.7.71. At Gargia, single specimens widely distributed throughout our stay. Past its best but common at Abisko on our return (15.7.71).
- A. urticae*: One or two battered examples at Abisko on 22.6.71 and larvae at various stages of growth all the time we were there. My bred series is only slightly darker than is usual for English specimens.
- B. sifanica*: First seen on 29.6.71 at Abisko; common here and at Gargia for the remainder of our stay.
- B. napaea frigida*: One at 550m. in the hills behind Bjorkkliden (near Abisko) on 30.6.71; much commoner and still mostly fresh in the same place on 16.7.71. At Gargia only found in one small area just above the tree-line near Grönnasen.
- P. eunomia ossianus*: Common and widespread in bogs at low levels; first seen on 26.6.71 and hopelessly worn by 15.7.71.
- C. selene hela*; Becoming widespread and abundant in open woodland after 1.7.71.
- C. euphrosyne fingal*: Common at low levels from 22.6.71, becoming worn by about 8.7.71.
- C. thore borealis*: Only seen at Gargia, where it occurred in several territorially small but abundant colonies among *Viola* in the birch zone, but oddly enough only where *Juniper* was also growing. Both sexes fresh.
- C. frigga*: First seen at Abisko on 26.6.71, but few and in only one place. Much more widespread both above and below the tree-line at Gargia, among the densest growth of *Rubus chamaemorus* at the edges of bogs, and mostly fresh throughout our stay.
- C. improba improbula*: Locally common and fresh in several places on Mt. Nuolja at about 900m. (28.6.71).
- C. freija*: Fully out when we arrived at Abisko (22.6.71) and not uncommon. Still fresh on high ground at Gargia, but

worn at lower levels. Probably not a good year for this species; although we found it singly over a great range of terrain we never found it as commonly as others seem to have done in the past.

- C. polaris*: One colony (4 specimens in all) south of Gargia at 500m. first noticed by Frau. Larsen, and a single specimen about a mile away on Grönnasen. The only previous record I can find for the area is a single dot on Nordstrom's distribution map apparently very near Alta.
- C. chariclea*: On Grönnasen and the mountains to the south at 450-550m.; excessively common and fresh from 4.7.71. Females still active in dull weather, but males much more dependant on sunshine.
- E. iduna*: Locally abundant in small pockets in the birch zone at Abisko, typically at the edge of marshy areas. First seen on 26.6.71 when it was universally fresh, but becoming hopelessly worn and much scarcer by 1.7.71. Evidently a species of extremely brief duration, and it is easy to understand why it is so often missed.
- Oe. norna*: Very scarce round Abisko from 26.6.71, but quite well spread at Gargia above and below the tree-line, generally near moisture. Rather variable; some specimens from high altitudes have reduced spotting and are greyer.
- Oe. bore*: At high levels on Grönnasen, above *Oe. norna*. Not very common, and exasperatingly alert and agile on the wing. Fresh from 4.7.71 until our departure. The identification of this species has been checked by dissection.
- E. ligea dovrensis*: Only seen at Narvik on 15.7.71 when it was common and fresh in poor weather.
- E. disa*: Very abundant and fresh at Stordalen (near Abisko) on 23.6.71. Also found commonly around the tree-line on and near Grönnasen at Gargia from 4.7.71 onwards.
- E. medusa polaris*: A locally abundant colony found by the road from Gargia to Grönnasen. Fresh from 5.7.71 onwards.
- E. pandrose*: Commonest on dry ground at all levels, fresh at first but in varying stages of decay by the time we left.
- C. rubi borealis*: One worn female taken by Herr. Schlüter at Abisko on 29.6.71.
- V. optilete cyparissus*: Common and widespread among *Vaccinium uliginosum*, but not seen before 26.6.71.
- A. glandon aquilo*: One taken by Herr. Schlüter on 30.6.71 at 550m. behind Bjorkliden (near Abisko), and five more fresh specimens caught at the same place on 16.7.71.
- P. icarus*: One fresh female taken by Anna Schlüter at Abisko on 29.6.71.
- P. andromedae*: Common at 550m. in the hills behind Bjorkliden (near Abisko) on 29.6.71, and still reasonably fresh on 16.7.71.
- P. centaureae*: One fresh female at Abisko on 1.7.71.

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A Sample of the Lepidoptera of the British Virgin Islands

By J. A. C. GREENWOOD, O.B.E., F.R.E.S. and Mrs D. F. GREENWOOD

Mr and Mrs Percy Chubb of New York most kindly invited us to visit their holiday home on Peter Island from 30th January to 5th February, 1971. The island is $4\frac{1}{2}$ miles from Tortola, the capital of the territory, and is shaped rather like a boomerang. Their estate forms the western one quarter of the island and their 273 acres includes the highest point 387 feet above sea level.

The island is hilly and densely wooded so that, except for a relatively small cultivated area near the house and jetty and a path cut across the saddle back, it is difficult to move except in the area of the beaches. Other parts of the island can only be reached by boat.

The British and U.S. Virgin Islands are intermingled and consist of a large number, the exact total depending on the enumerator's definition of an island, varying in size from little more than a large rock up to many square miles in area. From almost any point at least a dozen other islands can be seen. They are thought to be the surviving tops of mountain ranges which have been almost submerged and heavily abraded. Titled strata are apparent and there are numerous coral reefs.

Just south and very close to Peter Island is Norman's Island which is supposed to be the setting used by R. L. Stevenson for "Treasure Island". Just to the north is Dead Chest Island which is alleged to be the "Dead Man's Chest" of the song. It has no harbour and no fresh water.

The weather during our stay was superb, with day temperatures in the eighties Fahrenheit and nights only a few degrees cooler. Occasional showers kept the vegetation fresh, and frangipanni, hibiscus and oleander flourish.

So far as we could establish few entomologists appear to have visited the islands and we believe that it is unlikely that any collecting at all had been done on Peter Island. On our way home we learnt from a fellow passenger on the little inter-island plane that an American entomologist was studying the genetics of one of the local moths (name not known) which our informant said was such a weak flier that it was unable to cross the sea between the islands and had consequently developed a number of distinct races. We wondered whether this was a species with an apterous female, but could obtain no more information.

Mrs Chubb very kindly replaced the normal yellow electric bulb on the patio by an ordinary tungsten bulb and this attracted many of the moths which we recorded.

Through the kindness of Mr Rowan Roy of Tortola, we were able to spend an afternoon in an excellent area of that island and he caught for us a number of moths which were attracted by his house lights during our stay. He also showed us a magnificent collection of local shells which he had built up over the years.

Birds are very numerous on Peter Island and the bay below the house was the hunting ground for a large number of pelicans and boobies who were enjoying a splendid diet of fresh fish amongst the myriad shoals which were so clearly visible in the water.

Near the house two species of humming bird were constantly visiting the hibiscus and other flowers.

The island has no poisonous snakes, no large wild animals and apart from a few gnats and mosquitoes the only unfriendly things we saw were a scorpion, some paper wasps (the local legend says of these that one species stings only on Fridays and the other all the time) and, of course, every conceivable variety of thorn and prickly, not excluding the bottom of the sea with its crop of graceful, but painful, black sea urchins.

We recorded 22 species of butterfly, a list of which with brief comments on some, follows. Identification of the moths particularly the smaller ones, presents a good deal of difficulty. However we were delighted to find that the British Museum was glad to add quite a large proportion of our catch to the National Collection.

A moth which is sometimes very abundant, but which was not in evidence during our visit, is the large Hawk Moth *Pseudosphinx tetrio* L. whose great and conspicuous larvae almost defoliate the frangipanni trees *Plumiera rubra* and *P. alba*. It is common enough to be a pest. The same remark applies to a red and yellow larva (perhaps that of a big skipper) which does considerable damage to a garden lily. We saw a few of them and obvious evidence of their depredations.

One rather eerie experience when walking amongst undergrowth near the beaches is to stand still for a few seconds when a rustling sound grows louder and louder as the hermit

land crabs, who withdraw into their shells at the noise of one's approach, begin to stretch their legs and start on their endless search for food or new shells of a more comfortable size.

To anyone fortunate enough to be able to visit this area we can only say that, whatever your interests, you will find your stay a constant delight.

Our sincere thanks are due to Baron de Worms and the officials of the British Museum (Natural History) for most invaluable help in identification.

RHOPALOCERA

- Heliconius charitonius* L. The commonest butterfly in shady areas. Sometimes upwards of a dozen resting on a single bush. The yellow and black stripes make them surprisingly elusive. Great variation in size.
- Phoebis eubule* L. A few in the northern part of the island only.
- Agriades vanillae* L. A beautiful, silver spotted fritillary. Plentiful in cleared areas. A very graceful flight.
- Didonis biblis* L. Few seen and all worn.
- Junonia lavinia* L. Very few.
- Eurema lisa* Bois & Leconte. Only one, northernmost point of island.
- Appius drusilla* Cr. The only white we saw. Fairly numerous but usually well out of reach. Males and females very different.
- Dryas julia* Fab. Two seen on Tortola.
- Thecla bubastus* Cr. Only one very worn.
- Thecla acis* Drury. Extremely abundant in a few very confined spots near acacia bushes.
- Thecla columella* Fab. Few seen.
- Hemiargus thomasi* Clench. A large, well marked blue. Only 3 in the same spot on different days.
- Hemiargus hanno* Stoll. Very scarce and local.
- Leptotes cassius* Cr s.sp. Numerous.
- chadwickii*
- Urbanus dorantes* Stoll. A large tailed skipper. Quite common. A very fast flier.
- Urbanus proteus* L. A large skipper without tails. Very plentiful especially on Tortola where it swarmed in the area of a slave graveyard where water erosion has exposed

- bones. This species always seems to rest on the underside of a leaf.
Occasional but widely spread.
- Megasias tripunctatus* Latreille
Pyrgus oileus L. A "black and white" skipper with blue shading. Very common in the hottest places.
- Pyrgus communais* Grote A black and white skipper. Fairly numerous.
- Choranthus vitellius* Fab. A small skipper. Very few seen.
- Polites otho* Smith A very small skipper. Only one near house.
- Polygonus leo* Guelin An orange and black skipper, quite numerous.

HETEROCERA

- Acratodes noctuata* Guen.
Aerolophus sp.
Anticarsia gemmatalis Hub.
Argyria sp near *pusillalis* Hub.
Ascalapha odorata L. One very worn specimen of this huge noctuid to the patio light.
- Azeta versicolor* Fab.
Bendis cinerea Butler
Bendis formularis Hub.
Calidota form of *strigosa* Fab.
Caularis undulans Walker
Composia credula Fab.
Desmia internicalis Guen. ? s.sp. nov.
Desmia sp. near *ufues* Cram.
Diaphania hyalinata L.
Diaphania nitidalis Cram.
Dishogama redtenbacheri Lederer
Drepanodes santiago Guen.
Ecapatheria icasia gualdulpensis Ob.
Epicasia cerata Fab.
Erastria decrepetaria Hub.
Ereta vittata Fab.
Ethmia confusella Wlk.
Eublemma cinnamonnea H-Sch.
Gerespa contorta Guen.
Gerespa familia Guen.
Herpetogramma phaecoapteralis Guen.
Lamprosema indicata Fab.
Lobocleta sp. near *borunta* Schaus.
Murgisca sp near *cervinalis* Wlk. ? sp. nov.
Mythimna polita Wlk.
Paectes obrotunda Guen.
Perigea albigera Guen.
Phurys crucis Fab.
Pilocrosis lauralis Wlk.

- Pilocrosis* sp. near *gastralis* Guen.
Pionia seriopunctalis Hampson.
Pionia sp.
Prodenia ornithogalli Guen.
Protambulix strigilis L. One specimen of this large hawk on Tortola.
Racheospila herbaria Fab.
 ?*Racheospila isolata* Warren ? sp. nov.
Radata cubalis Schaus
Salobrena rubiginea Hampson
Sphacelodes vulneraria Hub.
Sylectra erecata Cram.
Sylepta helcitalis Wlk.
Sylepta internitalis Guen.
Sylepta sp. near *gordialis* Guen.
Synclera jarbusalis Wlk.
Trichoptilus congrualis Wlk. (the only "plume" seen).
Uthethesia ornatrix L.
Xyleutes jamaicensis Schaus.
Xyleutes punctifer Hampson
Xylophanes pluto Fab. A fine hawk moth. One only on Tortola.
Zamagiria sp.

It is interesting to speculate on the results if an M.V. light were used. The low powered tungsten bulb on the patio some distance from the uncultivated area attracted a hundred or more moths in a few hours each night. Electricity for the house is supplied by generator.

Other orders

There are no rivers or permanent fresh water ponds on Peter Island, but near the highest point we saw a few dragon flies which may have bred in casual water in tree stumps or decaying cacti.

Obviously there are many species of *Hymemoptera*. The most interesting species which we saw was one specimen of *Pepsis rubra* Drury. This extraordinary wasp, known as the tarantula hawk, has the head of a wasp, the legs of a beetle and a large very hard black body. In flight the bright red wings give the appearance of a moth. Its main food is stated to be spiders, which are very abundant on the island, so that it was, perhaps, only justice that, when we disturbed the specimen from a sage bush, it flew away at great speed and would certainly have escaped had it not become entangled in a tough spider's web for long enough for us to reach it. The males are smaller with blue-blackwings.

The Systematics of the Charaxidae (Lepidoptera: Nymphalioidea)

By A. H. B. RYDON, F.R.E.S.

(Concluded from p. 341)

Before concluding this paper on the Charaxidae, I think a few notes on the somewhat contentious subject of the phylogeny of the family would not out of place here. As already noted above, Doherty (1886) maintained that a study of the eggs revealed the true "line of descent" of the butterfly families, from which study he placed the Charaxidae between the Nymphalidae and the Limenitididae. Müller (1886), from a comparative examination of the larvae, also considered the Charaxid genera to be ancestrally related to the Limenitids. Reuter (1896, pp. 556-557), chiefly on the basis of the palps, divided the Nymphaloid genera into four families, namely Libytheidae, "Danaididae", Satyridae, and Nymphalidae, to which he gave separate limbs on his family-tree of the Rhopalocera (shown in the chart at the end of his book). His "Nymphalidae" he divided into three branches, i.e. Acraeinae, Heliconiinae, and Nymphalinae (*sensu* Kirby); the latter subfamily, as we have already learned elsewhere, he subdivided into fifteen tribes of which two, i.e. the "Nymphalidi" (based on *Charaxes*) and the Anaeidi (or Anaeinae), occupy separate twigs or branchlets at the top of the same branch on his family-tree, from which the Limenitids are also shown to have sprung. Grote (1898, p. 39), however, in his paper on the specializations of the lepidopterous wing, said the "Nymphalidae proper" appeared to be dichotomous, in that in the first group ("represented by the Argynniinae, running into the Nymphalinae") veins 7 and 8 of the forewing were short (the so-called "short forks"), whereas in the second group these veins were long (the "long forks"). Grote was of the opinion that the Charaxinae (or Charaxidae) represented an "earlier condition of the Nymphalids", and contended that the transformation of the "long forks" into "short forks" was inevitable, giving *Anaea* (in which vein 8 had progressed towards the outer margin of the forewing) as an example of such a transformation. "But," he said, "other characters considered, the existing "long forks" (e.g. *Consul*, *Charaxes*, *Hypna*, *Prepona*, etc., Auct.) seem to hold together on a distinct phylogenetic line." Other venational anomalies found in the Charaxidae have also been treated of by Rothschild and Jordan (1898, pp. 556-557) who pointed out that the position of the lower discocellular vein in the hindwing of certain species of *Charaxes* (e.g. *Ch. protoctlea protoctlea* Feisthamel) was more basad in the female than in the male, which indicated that the female sex was in advance of the male sex. In *Ch. protoctlea azota* Hewitson, however, these authors said the discocellular vein in both sexes was in the same position as the "more advanced" female of the nominate subspecies (i.e.

protoclea), but the pattern of the wings of the male of the latter was more specialized than in *azota*, hence "we have a clear demonstration of the peculiar and very important phenomenon which classifiers should always bear in mind, that one and the same species (*protoclea*) is in one character more specialized and in another more generalized than its ally (*azota*); speaking of a species or family as being more specialized than another does not mean that the higher specialization is found in all organs." This being the case, I can only conclude by saying that the Charaxidae in some respects (e.g. the wing-venation) appear to be generally more primitive than the other Nymphaloid families, but in other respects (e.g. the strong structure of the body, the pattern of the wings, the early stages, and so on) they appear to be on a par with, if not in advance of, those same families.

Postscript. Since writing the above paper, I have been informed by Lt. Col. C. F. Cowan, in a letter to me dated 14.x.71 that the larvae and pupa of *Prothoe franck*, which I said (in the first part of this paper, on p 230) I had not seen figured anywhere in the literature, have in fact been figured by Roepke (1938, *Rhopalocera Jarvanica*, pl. 27, figs 1, 2). I am grateful to Lt. Col. Cowan for this piece of information. I also said, on p. 229 that *Charaxes jasius epijasius* and *Ch. castor* fed on Sorghum (Graminiae), but their caterpillars also fed on certain dicotyledonous plants, i.e. *epijasius* on *Gymnosporia* (Celestraceae) and *Brachystegia* (Caesalpinaceae), and *castor* on *Cranosporia* also, as well as on *Chaetacme microcarca* (Ulmaceae). This information I owe to Dr V. G. L. van Someren and Mr D. G. Sevastopulo.

Mr Sevastopulo has also informed me (*in litt.*, 27.x.71) that the first instar larva of *Euxanthe* (which I said, on p. 228, does not have horns on the head) does in fact have horns like those of *Charaxes*. although van Someren and van Someren (1926, p. 352) said the newly emerged larva of *Euxanthe ansellica* "resembles that of *Charaxes* in having a pale olive body and black head which, under a low magnification, is seen to be covered with fine papillae" (which are not the same as "horns"). Mr Sevastopulo, however, says he has photos to prove his point. It should be noted here, in passing, that the first instar larva of *Charaxes* also has a relatively long bifurcate tail-piece which becomes reduced in size in the later instars—the reverse to what happens in the *Archaeoprepona-Agrias* group of species in which the first instar larva does not have a noticeably long tail-piece, but develops one in the later stages (see figs. 7, 25, 26).

Errata.

- (1). Page 228, 10 lines from the bottom.. "(figs. 19, 24)" should read: (cf. figs. 17, 18, 19, 24).
- (2). Page 310. "Explanation of Fig. 7." should read: *Archaeoprepona demophon* (L.). The author of *Anaea phidile* (fig.

11) is Geyer, not "Geyeer".

Nota.

- (1). Page 219, 12 lines from the bottom. It should be noted that Linnaeus (1758, *Syst. Nat.*, 10th. ed.) used the larva of the Lycaenids (which he stated were "saepius contracta") as the distinguishing character of his phalanx "Plebeji parvi" which he subdivided into "Rurales" (Lycaenidae) and "Urbicolae" (Hesperidae). He also drew attention, in a footnote on p. 463 of the same work, to the larva of the Apollo butterfly having an osmeterium—like many of his "Equites" (or Swallowtails), and hence he thought the former might more correctly belong to the latter group rather than to the "Heliconii" in which phalanx he had originally placed it. It thus seems more than likely that Linnaeus would have used the early stages of the butterflies much more than he did in his system of classification, had he known something about those of the exotic material he had to deal with.
- (2). Page 220, 5 lines from the bottom. Boisduval (1836, Buffon's *Hist. nat. Ins., Spec. gén. Lépid.*, vol. 1, pp. 164-167) also erected three other Nymphaloid families, i.e. "Biblides" (=Eurytelidae), "Brassolides", and (=Eurytelidae "Peridromides" (=Ageroniidae).
- (3). Page 227, 12 lines from the bottom. Müller (1886, not 1866) actually described the egg of *Siderone ide* Hübner. The latter taxon, however, is considered to be synonymous with *S. marthesia nemesis* Illiger (not Bates) by Röber (1916, in Seitz, *Macrolep.*, vol. 5, p. 577), and by Stichel and Bryk (1939, *Lep. Cat.* pt. 93, p. 717).
- (4). Page 315, lines 16-18 from the top. Schatz and Röber (1892 pp. 169, 174) in fact only separated *Siderone* and *Zaretis* from the *Anae* group on the early stages. They separated *Coenophlebia* from the latter group on the morphology of the adults. The early stages of *Coenophlebia* are not yet known, as far as I am aware.

Corrigenda

(1) All citations in this paper of Hübner's *Verzeichniss Bekannter Schmetterlinge* (where they have not already been corrected) should be by "parts", not "volumes" (see Hemming's *Hübner* (1937, p. 488)).

(2). References to *Prothoe franck* Godart, on pp. 230 and 286, should read: *Prothoe franck* Godart (= *franckii* Hübner). Similarly the reference to *Agrias claudina* (Godart), on p. 314, should read *Agrias claudina* (Godart) (= *Papilio claudia* Schulze).

ACKNOWLEDGMENTS

I wish to thank the trustees and staff of the British Museum (Natural History), and of the Castle Museum, Norwich, for allowing me access to the collections in those institutions, and for the loan of material for examination and dissection; Mr

M. Clifton for permitting me to study the collections in the National Museum, Nairobi, Kenya; the librarians of the British Museum (Natural History), and of the Royal Entomological Society of London, for their unfailing help and patience in answering my many enquiries; and the under-mentioned for giving me information about the early stages of certain African Charaxids: Dr V. G. L. van Someren of Karen, Kenya; Mr D. G. Sevastopulo of Mombasa, Kenya; Dr C. H. McCleery of Zomba, Malawi; and Mr C. G. C. Dickson of Cape Town, South Africa. I am also indebted to Lt. Col. C. F. Cowan for directing my attention to articles 27 and 32 (c) (i) of the *International Code of Zoological Nomenclature* with regard to diacritical marks, etc. and to certain bibliographical errors which I have dealt with in the "Corrigenda" above.

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About the *Accentuated List*

By C. F. COWAN

The late Mr Harold Symes's pleasant "thoughts" (*antea*, pp. 249-251) on the origin and derivation of scientific names referred fondly to the *Accentuated List of the British Lepidoptera, with hints on the derivation of the Names*, published anonymously by the entomological societies of Oxford and Cambridge Universities. It contained some new names and emendations and so its authorship and date, about which uncertainly is evident, must be verified.

We need refer to only two publications. The first is H. T. Stainton's contemporary periodical, the *Entomologist's Weekly Intelligencer* (E.W.I.) which appeared, with only one break, each Saturday from April 1856 to September 1861, circulation about 600. The other is H. A. Hagen's well known *Bibliotheca Entomologia*, 2 volumes, 1862-3 (published by W. Engelmann of Leipzig, who himself had just produced his invaluable *Bibl. Hist. Nat.* and *Bibl. Zool.*). Doctor Hagen of Königsberg dedicated his work to Stainton. They had corresponded and

exchanged mutual visits, and the former had contributed, among other items, an account of an entomological trip to Oxford; "I should be carrying owls to Athens were I to commend in England the beauty and peculiarity of Oxford" (E.W. I. 10: 165-168, Aug. 1861).

The purpose of Hagen's entomological tour was, of course, to examine specimens of books. He took nothing for granted. A recent predecessor, Agassiz, had recorded a work by "J. K. Broch" which Hagen could not identify but found had been copied from an earlier bibliography. Eventually he proved that it was in fact a work by Jacques Koechlin, published anonymously under the initials "J. K.", and the first copy noticed had been merely stitched (brochirt), not bound. The error in transcription of the original note of "J. K.", (Broch.) had established a ghost author perpetuated in the literature at least twelve years.

Hagen must have been an engaging character. His occasional letters in E. W. I. are fresh and perceptive. For the opening page of his *Bibl. Ent.* he took two lines from Robert Burns's *Captain Grose*;

A chiel's amang ye taking Notes [Hagen's Capital]
An, faith! he'll prent it.

He records the *Accentuated List* under authors J. W. Dunning and H. A. Pickard, named respectively in the *List* as vice-president of the society at Cambridge and the president of that at Oxford. They are generally accepted as the anonymous authors, and it can be assumed that Hagen had made a definite point of ascertaining their names in 1861. This is stressed because the useful little 1959 catalogue of a mainly entomological library makes the author "J. W. Douglas". Its two compilers were unable to trace the reason for that when I asked them recently, and I am sure it was a simple slip due to the similar initials. Douglas, a leading entomologist of the period, was in fact not in favour of publishing an accentuated list, and said so (E.W.I., 3: 126. 1858).

The title-page of the *Accentuated List* is dated "1858", which proves to be misleading. Although the need for a "Gradus" had been discussed from November 1857 onwards (E.W.I., 3: 43) and the two societies had undertaken to publish one by "early in the summer" of 1858 (*ib.*: 197, 20 March), a letter from the "Hon. Sec. Cam. Ent. Soc." A. F. Sealy, as late as September 1858 (E.W.I., 4: 184) hoped it would "not now be very long". Stainton was still preparing his readers for changes on 8th, 15th January 1859 (E.W.I., 5: 113, 121). Then, in an undated letter published among others written between 15-22 January, Sealy at last wrote ". . . our List is now published", adding that subscribers' copies were about to be sent out (E.W.I., 5: 143). On the next page is the first of repeated advertisements: "Just published, price 5s. *An Accentuated List with Hints* . . . N.B. The *List* (plain) price 3d., is nearly ready".

The earliest copy, traced when I was privileged to examine the Linnean Society of London *Presents Register*, was presented to the Society by the publishers on 13th January 1859. The Entomological Society of London received their copy, as shown in the published minutes of meetings, during the month ending 7th February, and three copies of the *List* (plain) in the following month.

Editorial comments and reviews of the *List with Hints* followed on 26th February and 5th March (E.W.I., 5: 169, 177). On the former date it was noted (p. 170) that "Mr Doubleday's *Catalogue* is not yet published" but on the final page of the same issue came the first of several advertisements for it: "this day published". So Henry Doubleday's *Synonymic List of British Butterflies and Moths* (2nd edition, 1859, 40 pp.) can safely be dated [5 March] 1859, after the editorial was written but on the day it appeared. It contained, through co-operation, mostly the same nomenclature as the *Accentuated List*, but luckily the delay of the latter was insufficient to affect priority. It may for formal purposes be cited as:

[DUNNING, J. W. & PICKARD, H. A.] "1858" [13 Jan. 1859]. *An Accentuated List of the British Lepidoptera, with Hints on the derivation of the Names* ("Oxford & Cambridge"). xlvii + 118 pp. 8°. London.

The Status of *P. c-album* L. in North Wales

By R. L. H. DENNIS

The following paragraph should have been added to this paper prior to the final paragraph on p. 308.

Since the above was written (early July), another var. *Hutchinsoni* R. was taken at Nant-y-Gamar, Creuddyn Peninsula (16.vii.71), a further indication of the above. However, this recent period of abundance of *P. c-album* on the Creuddyn may be highly localized, and it seems almost certain that it is dependent on conditions in the Conway valley, such that the latter is the nodal zone for the species, and that the Creuddyn Peninsula and Colwyn Bay areas are within a frequently oscillating localized boundary of *P. c-album* areal extension. This would explain the fact that while the Comma is always found in the Conway valley, and that this area does appear to be its headquarters (Michaelis, H. N., personal communication); yet its appearance on the Creuddyn is somewhat haphazard, being absent from this area in 1968 even though many transects were made during the flight period. This is the case with certain other Rhopalocera in N. Wales.

Fig. I displays the two var. *Hutchinsoni* R. from Dolgarrog (right and left top) and two forms of *P. c-album* taken in 1970; the one referred to above as being similar to that described as f. *nigrocaria* by G. Ellis (1949) (left centre); and the second (right centre) a dark variety of the species. These can be compared with the included nominotypical *P. c-album* (right-left lower).

The Inhabitants of Oak Apples

By A. E. LE GROS

Dr Askew (1961) charted the inter-relationships between Cynipids and Chalcids to be found in oak apples, the bud galls of the Cynipid *Biorhiza pallida* Olivier. I commented (Le Gros 1963) on some of the other insects that pass part or all of their life history in these galls. This summer, as part of a study of the gall midges of oak, I had occasion to rear the inhabitant from twenty galls collected from Hayes Common, Kent, on 30th June. The twenty were selected from a number and were without emergence holes. Rearing took place in a glass jar, with a polythene bag tied over the opening.

The gall causer was the first to emerge, 72 females and 30 males, between 4-10 July. Surprisingly no specimens of the "guest" Cynipid *Synergus gallaepomiformis* B. de Fonscolombe which is nearly always present, emerged. Presumably they had been devastated by parasites, which appeared between 5-28 July. The first and most numerous species was *Torymus auratus* (Fourc.) (23 males, 17 females, 5-18 July) followed by *T. nigricornis* Boheman (14 females, 17-24 July) and *T. cingulatus* Nees (3 females, 20 July). Eight males which may have belonged to either of the last two species accompanied them. Finally between 24-28 July came *Mesopolobus jucundus* (Walker) (3 males, 17 females), *Eupelmus wrozonus* Dalman (2 females) and *Megastigmus dorsalis* (Fab.) (2 males, 11 females).

On 8th July I noticed a pink mould on one of the galls and it spread rapidly, but did not prevent insects emerging. Between 5-11 July 15 beetle larvae and 2 small moth larvae left the galls to pupate in the soil.

When I first examined the galls on collection I had noted several reddish Cecidomyiid larvae in cavities on the surface of the gall near the point of attachment. On 18 July there were two male *Lestodiplosis* sp. flying in the polythene bag. This species, which Mr W. Nijveldt tells me is undescribed, is predatory on the larvae of another Cecid fly *Clinodiplosis biorhizae* Kieffer which is usually common in old galls from September onwards and feeds on the gall tissue. I was surprised to find the larvae so early on the galls, but as I have reared Cecids indistinguishable from the above mentioned pair on other decaying woody galls (*Andricus fecundator*, *A. kollari* and *A. inflator*) I suspect that *C. biorhizae* is polyphagous and has more than one generation a year and is followed by its predator.

Apart from these Cecids there are not many reports of diptera from these galls. Basden (1952, 1954) states that the fruit fly *Drosophila subobscura* Collin was twice recorded as bred from oak apples, in one case the galls were fermenting. I was surprised again therefore to see a pair of grey and black Muscids on 28 July. These were identified as *Anthomyia procellaris* Rondani by Mr A. C. Pont of the Brit. Mus. (Nat. His.). Some of the flies of this genus are known to be fungus eaters.

The eggs must have been laid before the mould developed, and it is possible that the fly larvae fed on the gall tissue.

There were no further emergences and on 24 October I broke the galls to fragments and found there were still a number of Chalcid larvae present. They were fully grown and would probably not pupate and emerge until the spring of 1972.

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Some Records of Grasshoppers (Acrididae) in S.W. Ireland

By J. F. BURTON

(B.B.C. Natural History Unit, Broadcasting House, Bristol)

During a fortnight's family holiday in West Cork from 23rd August to 5th September 1971, I had some limited opportunities to look for Orthoptera and make no apologies for publishing my somewhat scanty observations in view of the lack of attention which the Irish Orthoptera has received.

Although most of our excursions were made in the countryside around the village of Schull (where we stayed), we crossed into Co. Kerry on one occasion, 27th August, in order to visit Killarney. All four species I encountered are already well known from both the West Cork and North Kerry vice-counties (Kevan, 1961; Ragge, 1965), but it still seems worth listing the actual localities in which I found them. Incidentally, there are many bogs in the vicinity of Schull, Ballydehob and Skibbereen which looked suitable for the Large Marsh Grasshopper *Stethophyma grossum* (L.), a species already known to inhabit West Cork, but I was unable to search for it except in two likely bogs near Ballydehob. I visited these very briefly on a hot sunny morning, but failed to hear any stridulating males.

I also kept a sharp lookout in likely habitats for the Lesser Mottled Grasshopper. *Stenobothrus stigmaticus* (Rambur), recently discovered in the Isle of Man (Ragge, 1963; Burton, 1965), where I am familiar with it, but again without success.

Common Green Grasshopper, *Omocestus viridulus* L.: common almost everywhere in Counties Cork and Kerry. Recorded in the following localities:—

Schull: common in most, if not all, suitable places.

Barley Cove: common.

Ballydehob: common in the surrounding moorland countryside.

Ballydehob—Bantry Road: very common.

Sherkin Island: common, 30th August.

Tragumna Beach, nr. Skibbereen: common on 4th September in lush areas on the rocky slopes above the sea, especially where Bracken grew. I collected a female of the rare 'green purple sides' variety.

Killarney, Co. Kerry: common, 27th August.

Common Field Grasshopper, *Chorthippus brunneus* (Thunberg): widespread and common in drier habitats, but overlapping with *O. viridulus*. Recorded in the following localities:

Schull: common along roadside banks and on rocky areas around Mount Gabriel.

Ballydehob: very common on rocky ground.

Barley Cove: abundant on the dunes.

Sherkin Island: abundant, 30th August.

Tragumna: common on rocky slopes and dry areas behind the beach, 4th September.

Mottled Grasshopper, *Myrmeleotettix maculatus* (Thunberg): locally abundant on moorland and rocky ground. Noted at the following localities:

Sherkin Island: common on the rocky outcrops above Little Harbour on 30th August.

Between Bantry and Ballydehob: common on rocky outcrops beside the road near Knockroe, 29th August.

Tragumna: common on the rocky slopes above the beach on 4th September.

Common Groundhopper, *Tetrix undulata* (Sowerby): common on the slopes above Little Harbour on Sherkin Island, 30th August. Most were black, but a few were mottled brown in colour.

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Notes and Observations

FAITHFUL IN DEATH: On September 9th while walking round the local woods I saw a speckled wood butterfly (*Pararge aegeria* L.) in flight, which appeared to have a peculiar appendage attached to its abdomen. After some difficulty, I caught the butterfly and found that it was a female and the appendage was the body, part of the thorax, and one wing of a male, with its claspers still firmly gripping the female. I gently eased the two abdomens apart and the lady flew away apparently none the worse.

The mated couple must have been attacked by a bird, but it seems curious that the attacker made such a poor job of it.—**MAJOR GENERAL C. G. LIPSCOMB**, Crockerton House, nr. Warminster, Wilts. 17.x.1971.

ABUNDANCE OF POLYGONIA C-ALBUM L.—I have never regarded the comma butterfly, *Polygonia c-album*, as a particularly common insect but on October 5th, during an hour's walk in local woodlands, I counted no less than 34 specimens feeding on over-ripe blackberries in the rides, and this in an area where in previous autumns the normal sighting has been two or three in a day.—**MAJOR GENERAL C. G. LIPSCOMB**, Crockerton House, nr. Warminster, Wilts. 17.x.1971.

A NEW FOOD PLANT FOR THE PRIVET HAWK MOTH LARVA?—In late August of this year I discovered a larva of the privet hawk moth, *Sphinx ligustri* L. feeding on a scabious plant growing in my garden. It had obviously been there all its life, as there were droppings of all sizes beneath the plant. A further search of the other scabious plants revealed three more larvae, all about full fed. I have found the species on privet, lilac, ash and holly, but to me, scabious is a new food plant for the species. — **R. C. REVELS**, Top Field Farm, Dunton Lane, Biggleswade, Beds. 28.x.1971.

THE HOLLY BLUE IN LONDON: Confirming reports of the abundance of the second brood of this species this year I would like to report that on July 30th I saw a number of holly blue (*Celastrina argiolus* L.) butterflies in the Chelsea Physic Garden in London. There appears to be a flourishing colony there.—**C. A. CLARKE**, The Dept. of Medicine, University of Liverpool, Ashton Street, Liverpool L69 38X. 1.xi.1971.

RHYACIA SIMULANS HUFN. AT WOKING, SURREY. — On the morning of the 26th August, 1971, there was a specimen of *Rhyacia simulans* Hufn., the dotted rustic, in my M.V. trap in the garden here. This seems to be an unusual visitor to the area; the moth is in reasonably fresh condition, but the colouring is not quite the same as specimens from the Cotswolds.—**J. A. C. GREENWOOD**, The Thatches, Pyrford, Woking, Surrey. 3.x.1971.

ETAINIA SPHENDAMNI HERING AND OTHER ACER-FEEDING NEPTICULIDS AT BLACKHEATH.—The above-named species seems to be one of the lesser known 'neps' in Britain; I am aware only of the original discovery at Bexley, Kent, by the late L. T. Ford (information obligingly furnished by Mr Jacobs who possesses two of the specimens, taken in June 1945), so a further record may not come amiss even though it does not appreciably extend the known distribution. My pair came to m.v. light here in 1959 (♂ 19.vii, ♀ 6.viii); the species was kindly determined for me by Dr J. D. Bradley of the British Museum. The ♀ is fully 8 mm. in expanse, decidedly large and conspicuous for a member of this family. The species is close to *E. sericopeza* Zell. but appears to differ significantly in the position of the two outer pale spots of the fore wings: in *sericopeza* they are said to be opposite each other (Meyrick, 1895), whereas in my *sphendamni* that on the dorsum or tornus is well beyond (posterior to) the costal one.

Ford (1949, *Guide Smaller Brit. Lep.*: 203-4) indicates the same life-history for these two species, implying that the foodplant of *E. sphendamni* is field maple (*Acer campestre*). As, however, that tree seems absent from my district—unless still to be found in Greenwich Park—it is very possible that the insect here utilizes either Norway maple (*A. platanoides*) or sycamore (*A. pseudoplatanus*)—both present in and near my garden, the latter only too ubiquitously so! From the apparent rarity of the moth, I rather suspect the far less abundant and more maple-like *platanoides* as the local host of *sphendamni*. These seed-or seed-wing-feeding Nepticulids on *Acer* are more difficult than others to find as larvae. Another of them, *E. decentella* H.-S., occurs here regularly and far from uncommonly at light, and has been seen also on sycamore trunks. Though conspicuous and easily recognized, it has seldom been recorded since its discovery in the Bournemouth district in 1933; but probably it is now widespread in southern England, or at least around London, as it occurs also in the Carshalton area of N.E. Surrey (D. Collins, first noted 1955). Finally I may mention that the mines of *Nepticula speciosa* Frey, another little-recorded species with us, have in the last 10 or 12 years appeared sparingly in the leaves of sycamore saplings in my garden; their identity was kindly confirmed by Mr S. C. S. Brown. Most of those found are empty, or the larva proves to be parasitized; and from the rather varied dates on which tenanted ones have been found, I am inclined to agree with Lt.-Col. Emmet (*antea*: 78) regarding the probable bivoltinism of the species here (but see also 288).—A. A. ALLEN, 63 Blackheath Park, S.E.3. 29.x.71.

NEPTICULID COCOONS: AN UNUSUAL COLORATION? — Mr Chalmers-Hunt's note (*antea*: 26) on a tendency to gregariousness of these cocoons in captivity—which to some extent I can confirm—reminds me of an observation made over ten years ago when breeding out Nepticulids from mines gathered

locally. A small batch of larvae of one of the hawthorn-feeding species, collected in August from my garden hedge, produced cocoons whose colour, instead of the usual familiar 'withered-leaf' or 'brown-paper' tint, was a pronounced crimson-red. In this there appeared to be no variation; the single exception among them, of the ordinary 'cocoon colour', doubtless belonged to another species. Samples of the mines were kindly determined by Mr S. C. S. Brown as those of *Nepticula ignobilella* Stt. I suppose that the above peculiarity must be well known to our specialists in the family, but have seen no reference to it other than that by Lt.-Col. Emmet (*antea*: 168) who, writing of *Stigmella paradoxa* Frey, states that the cocoon is reddish purple; it may, therefore, be worth pointing out that red or purple cocoons occur in at least one further species. It would be interesting to learn whether this characteristic is found sporadically throughout the group or is confined to one or two species.—A. A. ALLEN, 63 Blackheath Park, S.E.3. 29.x.71.

THE GREEN VAR OF CARDAMINES PUPA (LEP.)—The pupa of the Orange Tip (*Anthocharis cardamines* L.) is often said to be green or brown "dependent on its surroundings". This is undoubtedly wrong. Any resemblance is purely coincidental. I have only bred the species for four years, and had three green pupae in different years. The grown larva quits the stem on which it has spent its youth and seeks a sheltered, firm, upright support which may be flat but is more often convex and narrow, preferably slightly wider than the larval girth. The surrounding herbage is then all green (June/July).

The occasional pupa which remains permanently bright green, unlike any autumnal or winter colour, instead of turning the normal straw-brown, must be a distinct variety, genetically controlled. It would be interesting to breed from a pair of them. I have one green specimen at present, which "escaped" and pupated on the vertical outside edge of a brown cardboard box. — C. F. COWAN, Little Gaddesden House, Berkhamsted, Herts.

PUPATION SITES OF CELASTRINA ARGIOLUS L. (LEP.) — The Holly Blue is usually said to pupate "underneath a leaf". This is quite wrong for the several of each brood that I have watched during the past two years. On turning purple they vacate the home stem on which they have spent their youth, and search for a crevice. A small dark hollow to fit their size appears to suit.

In confinement they will accept the foot of the side of a box if there is overhead cover. A fallen leaf will afford this cover, when "underneath a leaf" could imprecisely describe the position. As a last resort, after perambulating the box, one may return up the jam jar to the original stem and there pupate in a curled-up leaf. Usually this will be on the upper surface, although holly does occasionally provide a few suitable

undersides. A popular site has been underneath the lid of a covered jam jar, access having been gained through one of the holes pierced for stems, some of which have been removed. But one, repeatedly replaced and escaping, took refuge under the Grandfather's Clock, with satisfactory results.

Since it "arrived" here in 1969 (vol. 82, p. 216), *argiolus* has thrived. Reports of it from eight more squares between here, Codicote and Cublington have been sent in to Monk's Wood.— C. F. COWAN, Little Gaddesden House, Berkhamsted, Herts.

THE OVIPOSITING OF SEMELE (LEP.)—The Grayling butterfly (*Hipparchia semele* L.) is said to lay her eggs on grass. This is not an invariable rule. On top of Witherslack in the Lake District on 27 July 1958, the prevailing westerly wind was strong across the flat limestone and Graylings were tacking against it, close to the ground. They were making frequent halts, and I realised these were ovipositing females. I watched them settle on the numerous rocks and stones among the grass. Standing on "tiptoe" (all four legs) on the lee side of a stone, the abdomen was curved forward between the hinder pair of legs and the egg deposited between the fore pair (median legs). After much frustration in the high wind, one reasonable documentary photograph was obtained. — C. F. COWAN, Little Gaddesden House, Berkhamsted, Herts.

A PEACOCK BUTTERFLY IN SHETLAND: About the end of August 1969 I came across a single butterfly, *Inachis io*, (L.) on the open heather-covered ground between Skaw and Saxavord at the Northern end of Unst, Shetland. The weather at the time was sunny, the wind not strong, and migrant birds were moving southwards.

This is the first published report of the butterfly's having been seen in the Northern Isles. — D. R. A. RUSHTON, The Manchester Museum, The University, Manchester. 27.x.1971.

YPSOLOPHUS HORRIDELLUS TREITSCHKE: I was interested to read the Editor's record of this moth from Kent and his description of it as confined to a narrow belt in the south of the country. I had been taking this species commonly each year in Southampton at M.V., and then this summer, I moved to North London. I was surprised to find in my M.V. trap that *Y. horridellus* is even commoner here, and I wonder how much further north its range extends.—REV. DAVID J. L. AGASSIZ, St James's Vicarage, 144 Hertford Road, Enfield, Middx. 29.x.1971

YPSOLOPHUS HORRIDELLUS TREITSCHKE IN KENT. — I was especially interested to read S. N. A. Jacob's note on this subject (*antea*: 288) as a solitary *horridellus* came to light in my house in Orpington on 8th August 1971. For the past fifteen years a few *Y. scabrellus* L. have visited the same light each August, but *horridellus* has not previously appeared. I have never before encountered *horridellus* in Kent or indeed elsewhere. — F. A. SWAIN, 17 Ridgeway Crescent, Orpington, Kent. 6.xi.1971.

ERNOBIUS NIGRINUS STURM. (ANOBIIDAE, COL.) IN NORTHUMBERLAND: On July 6th 1970, I took a specimen of this beetle by sweeping near Slaley in Northumberland, which was kindly identified for me by Mr A. A. Allen. This species, which feeds on the Scotch Fir, has hitherto been regarded as being confined to the highlands of Scotland, where, according to Fowler, it is found in the Tay, Dee and Moray districts. It has not previously, so far as I know, been seen in England, and its occurrence in Northumberland is therefore of considerable interest. —SIR ERIC ANSORGE, Timbers, Welders Lane, Chalfont St Peter, Bucks. 2.xi.1971.

TRIFURCULA IMMUNDELLA ZELLER IN KENT:—While reading Colonel Emmet's splendid articles in the Record on the British Nepticulidae, it occurred to me that readers might be interested to learn of a record of *immundella* in profusion in Joydens Wood. On the afternoon of 31st July 1965 I was beating for larvae in clumps of old bushes of broom (*Cytisus scoparius*). Each bush must have been sheltering several hundred imagines of *immundella* as I repeatedly had to shake upwards of fifty of them out of the umbrella I was using as a tray. — F. A. SWAIN, 17 Ridgeway Crescent, Orpington, Kent. 6.xi.1971.

STIGMELLA ACERIS FREY: A SECOND BRITISH RECORD.—This species has hitherto been recorded from Britain only once, when Mr S. N. A. Jacobs found five vacated mines on a well-grown maple at Comp Farm, Malling, Kent on 20th August 1949; he did not publish his find, however, until 1962 (*Ent. Record*, 74: 41). Directed by Mr Jacobs, I visited the locality on the 18th of August this year, but drew blank. My impression was that the area had been sprayed with insecticide, since not only the maples, but also the orchard apple trees and hedgerow hawthorns showed virtually no sign of leaf-miners or, indeed, of any insect life. Subsequently I kept a lookout for *aceris* at every opportunity while I was in Kent and was finally rewarded on the 28th of October, when I found three empty mines at Lullingstone Park, about ten miles from the original locality. Although they were much discoloured, the characteristic features described by Mr Jacobs were still in evidence. The mined leaves were close together on a single branch of a large sapling and though I searched hard, I could find no further examples on the adjacent maples. Not far away, however, there is a venerable giant of a maple springing from dense underscrub. This renders even the lower branches virtually unapproachable. Perhaps this tree is the headquarters of *aceris* in the area. Possibly the larva is mainly a canopy-feeder on well-grown trees and this is the reason for the paucity of records. — A. M. EMMET, Labrey Cottage, Victoria Gardens, Saffron Walden, Essex. 5.xi.1971.



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WANTED.—Pupae of the Scalloped Hazel (*Gonodontis bidentata*) and Peppered Moth (*Biston betularia*), please write stating price and numbers available. Also wanted. contact with anyone willing to collect larvae of the Scalloped Hazel in country districts in 1972, or able to supply information on localities where larvae may be found. — *J. Muggleton*, Dept. of Zoology, The University, Manchester, M13 9PL.

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THE PROFESSOR HERING MEMORIAL RESEARCH FUND

The British Entomological and Natural History Society announces that, as a result of applications received by 30th September 1971, awards have been made to Miss J. M. Ruse, Department of Zoology, University of Manchester, to help her research into the biology of leaf miners and their parasites on *Sorbus aucuparia* and related host plants; and to Mr P. R. Cobb, Editor of the Proceedings of the Heacham and West Norfolk Natural History Society, for continuation of his work on the life-cycle and distribution in Britain of the gall-wasp *Andricus quercuscalicis* (Burgsdorff).

Further applications are invited for awards to be made after 31st March 1972, for the promotion of entomological research with particular emphasis on:—

- (a) Leaf miners
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- (c) Lepidoptera, particularly Micro-Lepidoptera
- (d) General Entomology

in the above order of preference, having regard to the suitability of the candidates and of the plan of work proposed.

It is envisaged that awards would be made to assist travelling and other expenses, necessary for field work, for the study of collections, for attendance at conferences, or for exceptional costs of publication of finished work. In total they are not likely to exceed about £120 in 1972.

Applicants need not be resident in the United Kingdom, and Research in any part of the world may qualify.

Applicants should send a statement of their qualifications, of their plan of research, and of the precise objects for which an award is sought, to R. F. BRETHERTON, C.B., M.A., F.R.E.S., Hon. Treasurer, Folly Hill, Birtley Green, Bramley, Guildford, Surrey, early in 1972 and in any case not later than 31st March.

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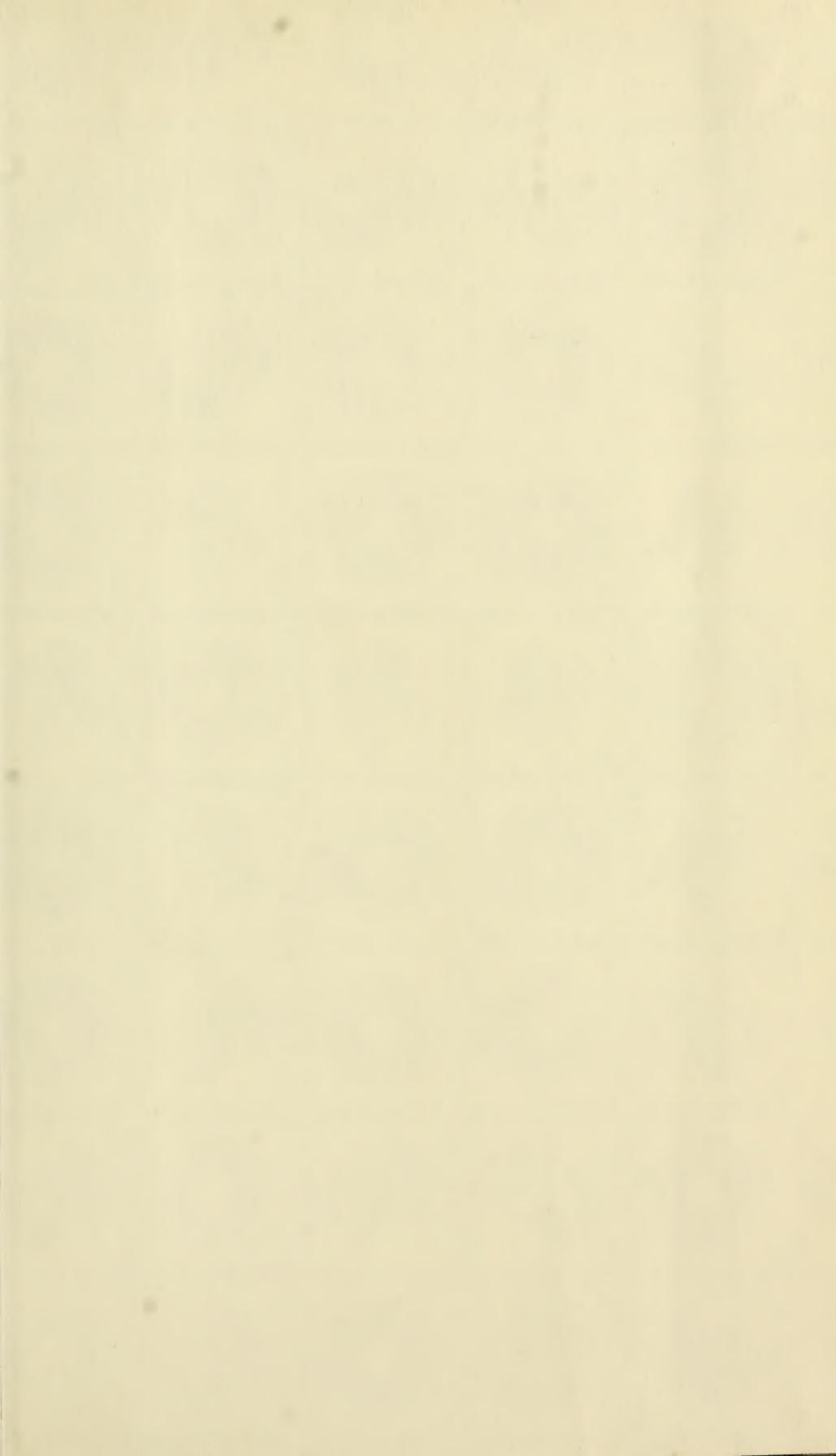
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