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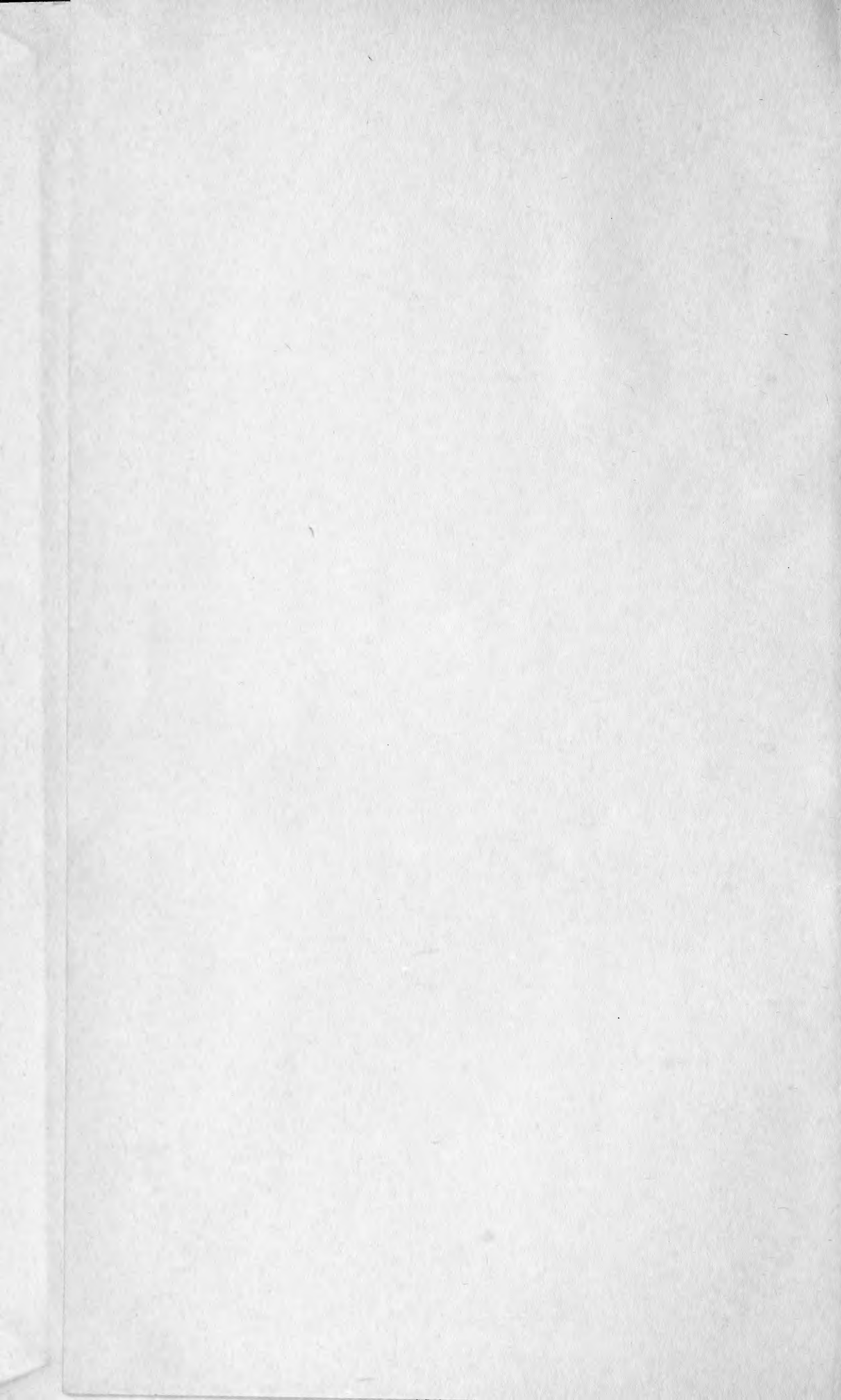
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THE  
**ENTOMOLOGIST'S RECORD**  
 AND  
**JOURNAL OF VARIATION**

EDITED BY

MALCOLM BURR, D.SC., F.R.E.S.  
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 F.R.E.S., F.R.C.P.  
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 and  
 HENRY J. TURNER, F.R.E.S., F.R.H.S.,  
 Editorial Secretary.

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VOL. XLIX. (new series).  
 JANUARY to DECEMBER 1937.

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This, to us, eventful year has passed, and we can truly say that we have maintained our position. The completely unforeseen and unexpected decision of our printers to retire from business at very short notice was a shock, which appeared to portend disastrous eventualities for our continuation. However, all is well that ends well, and we have apparently regained our steady pace, after the inevitable period of irregular appearance. We hope that in the coming year we shall be able to publish quite regularly and that we shall be able to continue the Notes on Collecting from our various correspondents. We have been promised some very special information for dealing with micro larvae by our contributor, L.T.F. We wish to thank all our contributors for their help in sending us matter, but we ask for more and more short notes on special points, and would like our attention to be called to interesting items affecting entomology for our Current Notes. With best wishes for the coming season.—Hy. J. T.

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Subscriptions for Vol. 49 (1937) are now due.

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No. 1

JANUARY, 1937

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with the  
assistance of

Editor Emeritus.—G. T. BETHUNE-BAKER, F.Z.S., F.R.E.S.

By HENRY J. TURNER, F.R.E.S., F.R.H.S., *Editorial Secretary.*

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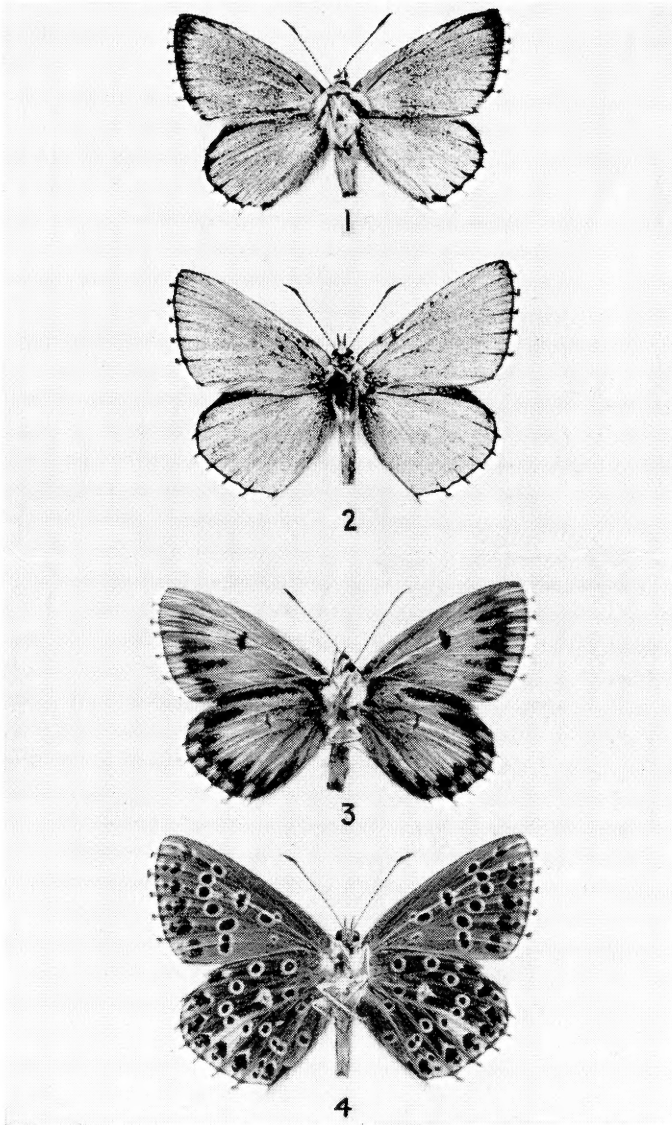
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*The Entomologist's Record.*

LYCAENA BELLARGUS

- 1, 3. Freak, upper and underside.
- 2, 4. Normal, upper and underside.



# The Entomologist's Record

AND

## JOURNAL OF VARIATION.

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VOL. XLIX. No. 1.

JANUARY 15TH, 1937.

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### An unusual Freak of *Lycaena bellargus*, Rott. 1775. (Plate I.)

By T. BAINBRIGGE FLETCHER, R.N., F.R.E.S., F.Z.S., F.L.S.

On 24th June, 1936, I found at Rodborough, Glos., a very unusual freak of *Lycaena bellargus*, male, shown on Plate I., figures 1 (upper-side) and 3 (underside). Both upper- and undersides are abnormal. On the upperside the blue colour appears darker than usual, this effect being produced by a sprinkling of black scales over the whole surface. On the forewing on the exterior fourth of the costa these black scales wholly replace the normal blue and the whole of the terminal area is similarly black over a variable distance, towards tornus about as broad as length of cilia and increasing irregularly towards apex, where the black margin is about twice as broad as length of cilia. On the hindwing the black edging is broader than normal but not developed to such an extent as on the forewing.

On the underside the normal ground-colour (grey on forewing, grey-brown on hindwing) is replaced by chalky-white and on both wings the basal spots are completely absent. On the forewing the discoidal spot is conspicuous, semilunar and black, without any trace of the normal white edging; the normal series of seven submedian spots is represented by elongated patches of brownish scaling and the normal series of subterminal ocellations by pale smoky-brown streaks along the veins: cilia with reduced patches of darker shading on tips of scales. On the hindwing the discoidal spot is represented by a narrow transverse streak of brown and black scales across the cell; between veins 7 and 8 is a conspicuous elongated black streak, not reaching base of wing, and between veins 6 and 7 is a shorter similar streak, these two streaks being apparently produced by a fusion of the ocelli (three between veins 7 and 8 and two between 6 and 7) normally found in these positions; the other normal submedian spots are absent except the last (ninth), which has become a short black streak followed by an elongate patch of brownish scales extending to dorsum; but the subterminal ocellations are represented by small patches of orange scales edged anteriorly with blackish brown and throwing out short pale smoky-brown streaks to termen.

This specimen seems to represent a curious combination of characters. On the lower side in some respects it recalls *ab. striata*, of which Tutt (*N.H. Brit. Butt.* III. 351: 1909) wrote that the finest specimen was that figured in *Entom.* XXXIII. 281 (1900) (reproduced in Tutt, *t.c.*, t. 42 f. 16), but in that form the streaks are well-developed on the basal half of the wing, whereas in my specimen the streaks are well-developed on the outer half of the wing and all markings unusually obsolete on the basal half, in the latter respect recalling *ab. obsoleta*, Tutt, but it is very distinct by its chalky-white ground colour. As regards its upperside I have never seen any specimen with such well-developed black marginal markings. It seems to be an unique freak and as such I do not give it a name or consider that such a purely individual form should be named. My specimen, so far as the underside markings are concerned, is more like the *ab.* of *semiargus* figured by Tutt (*t.c.*, t. 42, f. 26) but in that the streaks are more produced towards base, reaching the discoidal spot on forewing. The figures of underside aberrations of *L. icarus* in Tutt, Vol. IV., t. 11, ff. 13, 14, 17, may also be compared, but all these have the basal spots more or less developed on at least one wing. The general similarity of these forms in different species, however, is noteworthy and suggestive of a cause in common to all of them.

The Plate gives a very good idea of my specimen. I am indebted to Dr. H. Eltringham for his excellent photographs, which have been well reproduced by Messrs. Siviter-Smith.

This freak was found on a stony hill-side in a place fully exposed to the sun all day except in the very early morning. This same spot also yielded several examples of the *ab. obsoleta*, Tutt, on the same day and on the next day. I suppose that these unusual forms are produced directly by a high temperature, probably from pupae which are formed under or near stones which become greatly heated by the sun's rays. A good proportion of the obsolete specimens have the wings more or less crumpled, a fact which Tutt also noted in the case of *L. coridon* (*N.H. Brit. Butt.* IV. 4: 1910): "one often finds that a very slight amount of crippling is accompanied by loss of spotting on the underside, or by change in the normal spotting," and Tutt suggested that "the obsolete markings have, in some manner, a causation in physical weakness" (p. 7). As these obsolete forms, both of *bellargus* and *coridon*, in both of which they occur here not infrequently, are found during or just after hot spells, it seems permissible to suggest that they are caused in the manner indicated above. The freak, described here, had only a very slight crumpling of one forewing (flattened out in setting) but was otherwise in perfect condition, but I doubt whether it would have flown naturally, as it seemed decidedly weak when found about noon and was moribund by the evening. I have heard it stated that these extreme forms are boycotted on the wing by normal individuals, but it would seem that any apparent boycotting is more probably due to the physical weakness of the aberrant individuals rendering them unable to compete with the normal ones.

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## Orthoptera in Britain in 1936.

By MALCOLM BURR, D.Sc., F.R.E.S.

The past year, in spite of the execrable weather, has been an eventful one for Orthopterists in Britain, as it has seen the addition of one very distinctive species to our list, an isolated occurrence of another most surprising one, and the confirmation of one of our greatest rarities.

The addition is, of course, *Conocephalus fuscus*, Latr., which Dr. Blair recognized among material taken five years ago in the Isle of Wight. It will probably be found in many other suitable localities. Collectors should keep their eyes open for this, and for the macropterous var. *burri* of the better known *C. dorsalis*.

The surprise is *Caloptenus italicus*, L., a female of which was recently reported from Ballard Down in Dorsetshire by Mr. J. D. Cowper. This is so unexpected that special effort should be made next August to find if this species is really established there.

The rarity confirmed is *Acrydium bipunctatum*, L., the northern form of our familiar *A. vittatum*, Zett., which has been for so long known under the name *kiefferi* and *bipunctatum*. This northern form, the one described originally by Linnaeus, and later by de Saulcy as *kraussi*, has much shorter antennal segments than the central form, and once seen is unmistakable. It was on our list on the strength of a specimen without data in the British Museum and two from Abernethy in the Cambridge Museum. Now I have pleasure in recording that Mr. Roger Waterston has taken a series at Clackmannan Forest, in south Perthshire, which is not far from Abernethy. In reply to my S.O.S. of a year ago, I have received specimens of *Acrydium* from the Outer Hebrides (Barra), from Argyll and Invernessshire, but they are all *A. vittatum*, as are all English specimens that I have seen.

No other occurrences of special interest. Mr. F. H. Lancum, in "The Shooting Times," records in Devonshire a blindworm eating *Tettigonia viridissima*, which is reported by Mr. Kimmins to have been vociferous along the coast from Herne Bay to Reculver in the summer. Mr. Paul Freeman has taken *Metrioptera brachyptera*, L., in Burnham Beeches and *M. roeselii*, Hag., at Billericay. This was on hilly country, about sixteen miles from Southend, the furthest record from the coast that I have heard of.

I have had little chance of field work myself, but managed to find a single male *Ph. cinerea*, L., and *Lept. punctatissima* in oak in a hedge near Dorney. Grasshoppers were few and far between, and it was only by hard work that I was able to find a few odd individuals of the commonest species, *Ch. bicolor* and *Ch. parallelus*, near Dorney.

In August I spent a day collecting in Donnington Park, in Leicestershire, where I hoped to find something interesting, but all I came across was about three *Ch. parallelus* and swarms of common earwigs on the trees.

On 14th August I was able to steal an hour on Rushmere Common, near Ipswich, where I found a few straggling *M. maculatus* and one or two *Ch. bicolor*.

A great adventure for me was an hour or two with sweep-net and bottle, under brilliant sunshine, on 27th August, at Aberlady, in Haddingtonshire, my first day out in Scotland. I was directed to the

place by Dr. Stephens of the Royal Scottish Museum, and it certainly looks splendid collecting ground. It is the mouth of a burn, which runs out into flats through sand dunes, on the coast. It is particularly rich in birds. There were plenty of redshank, and green, ringed and golden plover. There were terns about, though I did not see the roseate, which occurs there. But I did see three ravens out for a stroll on Gullane golf-links. I was puzzled for a time by small flocks of birds that looked the size of starlings with the same flight, until I realized that they really were starlings. What had puzzled me was their note, for these feathered monkeys were imitating the melancholy whistle of the Redshank, which is numerous along the burn. There was a small camp of boy scouts, whose latrines provided immense flocks of flies, but of other insects there were few. Of Orthoptera, by dint of patient search, I was able to find about half a dozen specimens each of *Chorthippus bicolor*, Charp., and *Myrmeleotettix maculatus*, Thunb.

Some interesting new localities have been noted for common species by the expedition to Barra, in the outer Hebrides, organized in 1935 by the Biological Society of the University of Edinburgh. The results of the expedition are very interesting and well worth reading (*Proc. R. Phys. Soc.* XXII. Part 5). The common earwig was found abundantly all over the island, *Acrydium vittatum*, Zett., two females, and *Omocestus viridulus*, L., was generally distributed through the island, but not so common as *Myrmeleotettix maculatus*, Thunb., which is abundant.

I am hoping that my little book will fulfil its purpose, which is to stimulate interest and work. It has begun its function by producing the record of *C. italicus*. I hope orthopterists will crop up all over the country, especially in outlying districts, and send in their notes to *The Entomologist's Record*.

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### Euplecti as Myrmecophiles.

By H. DONISTHORPE, F.R.E.S., F.Z.S., etc.

(Department of Entomology, British Museum, Natural History).

Although the species of *Euplectus* in general are not considered to be regular Myrmecophiles, or, as Wasmann puts it, they appear to be only accidental ant guests, still, I think, as the evidence below will show, they are rather more than that. They belong to the *Pselaphidae* of which many species in the World are regular guests and, indeed, only found with ants. Moreover, as so many of them are frequently found in company with ants, and occasionally in large numbers, it is evident that they have gone a little further along the road towards becoming regular guests than just, what I have called, experimenting with the myrmecophilous habit. I find I have taken some ten species in Windsor Forest alone in company with ants, and in some cases in considerable numbers. The following is a list of the records I am aware of where species of *Euplectus* have occurred with ants:—

*Euplectus punctatus*, Muls., with *A. (D.) brunneus* in ash trees, Windsor Forest 9.vii.26.

*Euplectus tomlini*, Joy, with *A. (D.) brunneus* in oak tree, Windsor Forest 15.ix.36.

- Euplectus karsteni*, Reich., 3 with *A. (D.) brunneus* in oak tree, Windsor Forest 28.viii.36, 2 ditto 1.ix.36.  
 With *A. (D.) fuliginosus* (Waterhouse) Fowler.  
 With " " " (Rouget) André.  
 With *Formica rufa* von Hagens, and Kraatz.
- Euplectus nanus*, Reich. With *A. (D.) brunneus* in oak tree, Windsor Forest 1.ix.26, ditto 15.ix.36.  
 With *Formica rufa*, von Hagens, and Kraatz.  
 With *A. (D.) brunneus* in company with *Euryusa sinuata* and *Batrisodes schwabii*, Reitt. Paskau, Reitter.  
 With *A. (D.) fuliginosus* and *F. rufa* (Märkel) André.
- Euplectus sanguineus*, Denny, with *A. (D.) brunneus* in ash tree, Windsor Forest 25.vi.25.
- Euplectus piceus*, Mots., with *A. (D.) brunneus* in oak tree, Windsor Forest 15.ii.28; with *A. (D.) fuliginosus* in hawthorn, Windsor Forest, 24.ix.30; several with *brunneus* in oak tree, Windsor Forest, 28.viii.36.  
 With *Formica rufa*, Parkhurst Forest, Fowler.  
 With *Leptothorax acervorum*, F. in oak branches, Wytham Park (Collins), Walker.  
 With *A. (D.) emarginatus* (Märkel) André.
- Euplectus nitidus*, Fair., with *A. (D.) brunneus* in oak tree, Windsor Forest, 11.vi.30.
- Euplectus brunneus*, Aubé, with a *Myrmica* in elm stump, Wytham Park (Collins), Walker.
- Euplectus afer*, Reitt., v. *infirmus*, Raff., with *A. (D.) brunneus* in ash tree, Windsor Forest, 25.ii.25, 29.vi.25; ditto in considerable numbers, 9.vii.26, and 9.vii.27.
- Euplectus signatus*, Reich. In ants' nests, Fowler.  
 In hundreds in a small *F. rufa* hillock, Dutch Limburg, Wasmann.  
 With *A. (D.) fuliginosus* and *F. rufa* (Märkel), Aubé.
- Euplectus acanthifer*, Reitt., 3 ♂♂ and 4 ♀♀ with *A. (D.) brunneus*, Corfu, Reitter. Reitter and Wasmann consider it to be a regular *brunneus* guest.
- Euplectus fischeri*, Aubé. Only with *Formica rufa*, von Hagens and Kraatz.
- Euplectus ambiguus*, Reich., with *F. rufa*, Dutch Limburg, Wasmann.  
 With *F. rufa* (Märkel) André.
- Euplectus tuberculatus*, Tourn., with small red ants.
- Euplectus sikorae*, Wasm., with *Ponera johanna*, Forel, Madagascar (Sikora), Wasmann.
- Bibloporus bicolor*, Denny, with *A. (D.) brunneus* in oak tree, Windsor Forest, 4.v.24.  
 With small ants, André.

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### Random Notes on Argentine Collecting.

#### 3.—The Riverain Forests of the Chaco-santafecino.

By KENNETH J. HAYWARD, F.R.E.S., F.R.G.S., F.Z.S.

To the north of the Province of Santa Fé, along the western bank of the great river Paraná, lies a stretch of low ground some twenty-five miles wide, that for want of a better term I always refer to as the river forest.

Forest in the accepted sense of the word it is not, but rather a wild waste of low ground, intersected by many streams and backwaters, and studded with innumerable lagunas, the dry land everywhere covered with the tall sword-grass and dotted with clumps of forest or creeper-covered cane-breaks, liable to inundation when the rivers run in flood.

To me, whilst I lived in that part of the country, this region was the most interesting of my hunting grounds. Rich beyond dreams with bird life of every kind, the rivers and lagunas teemed with fish, their placid surfaces covered with floating camalote and water hyacinth and the great *Victoria* lilies on whose leaves the *Boa curuyú* basked in the sun. Here too were many strange insects, and at night myriads of fireflies lit up the weed-covered waters like a fairy Venice. The portion that I knew best lay between the Rio Paranaminí and a more stagnant backwater known as the Pindó at a point where these two streams formed an island some two miles wide and two or three leagues in length, where one could zig-zag amongst the lagunas or follow the streams as one pleased.

As it meant a journey of some thirty miles to reach this spot, I was accustomed to spend long days there, when I had the chance to visit it, arriving soon after sunrise and leaving only when nightfall was approaching and on many occasions I camped along the rivers for shorter or longer periods.

I am afraid its greatest attraction was the magnificent wild shooting and the extraordinary mixed bag that at times fell to one's gun. Amongst the long rough grass one found both the large and small tinamous and an occasional hare and in the woodland wild turkey, *charata* (*Ortalis canicollis*) and at least six species of pigeon. But undoubtedly the greatest interest lay in the lagunas with their population of water loving birds that swam on the surface or fed along the muddy flats. How great was their variety may be gauged from the fact that no less than sixteen species of duck and teal and about an equal number of the snipe family, *Scolopacidae*, are mentioned in my notebooks. To these one must add the numerous brightly coloured kingfishers, the storks, cranes and ibis, whilst in the forest belts one found bright plumaged parrots of several species and hundreds of lesser birds whose colours ranged from black to pure white, from yellows and vivid reds to the more sombre browns. It will be long before the beauty of a flight of pink-breasted flamingos as they flew leisurely across the reddening sky of an early dawn, fades from my memory, nor once heard, can one ever forget the long drawn out "chah-hah" of the "crested screamer" that floating down from the blue vault of heaven reaches one with such purity of tone and seems symbolic of great open spaces and of days, when only the Indian roamed the forests and pampas of this land.

In the spring the sunlit forest glades and river banks became a coloured carpet of purple petunias, of pink and scarlet verbenas, golden-yellow daisies, the white flowers of the wild tobacco plant, and a host of other wild blossoms, whilst the trees and bushes were covered with trailing mauve and pink convolvuli.

At this period the dark *Papilio perrhebus* mingled with the yellow *Catopsilias* and common *Vanessids*, *Colias lesbia*, the common *Erynnis* species of the *Hesperiids* with many of the long tailed *Goniurus* and



*Chioides catillus* and *Codatractus aminias*. *Terias deva* flew amongst the bushes intermingling with the shade loving *Euptychia* of which at least four species abounded. On rare occasions a flash of brilliant metallic blue would disclose the magnificent *Pseudolycaena marsyas*, but I searched in vain for the common Heliconiids of which at least *H. erato* f. *phyllis* might have been expected.

Later in the season with the increasing heat the flowers in great part disappeared and the vegetation became dry and burnt up and fewer butterflies were to be found. Collecting amongst the tall sword grass and in the little open spaces that one found amongst it, where the turf was short and where a beautiful dwarf yellow iris flowered, one found *Hamearis chilensis* and *Epulus signata* and occasional specimens of the very local Riodiniid *Ematurgina bifasciata*, the typical lightly marked form, that differs so greatly from the form I have since taken in Entre Rios and from the specimens I know from Córdoba, where the markings are so expanded that they almost cover the wing to the exclusion of the ground colour.

In mid-summer when the Ubajay trees shed their soft yellow fruits and they lay fermenting on the ground, it was worth while paying a visit to these trees since a great number of fruit-loving beetles, especially *Cerambycidae* and the small *Nitidulidae* were always to be had, and many wasps and flies.

Another fruit that attracted an enormous number of flies was that of a bush called locally arichí-chú. The fruit is small and when ripe the husk-like covering splits exposing the bright carmine flesh and flat black seeds. Birds soon clean out the flesh, but the husk with its brilliant interior colouring continues to attract insects for several days. Many beetles also frequented the ripe fruits of certain large *Opuntia* that one occasionally came across on the higher ground.

On one occasion, whilst exploring a very dark patch of forest, I startled a large insect of some six-inch wing span, but was unable to capture it, nor did I get a long enough view of it to be able to say for certain what it was, and whilst it was probably only the common *Erebus odora*, or another of the very similar large black moths that one finds commonly in the darker Misiones forests, yet there always remained the hope in the back of my mind that it might have been a *Caligo*, a genus of which I never took a representative in the Chaco-santafecino. In this same tract of woodland one sometimes found *Ageronia februa*, and on certain days I have heard their "clicking" at a distance of over forty yards. They delighted to rest on the rough bark of a certain fallen and decayed tree from which they would rise a dozen at a time as one approached.

*Precis lavinia* was generally very common in the district and at times little less than a plague, nevertheless the dark *infuscata* form was always very rare. In May of 1928 after an extremely wet late summer and fall I was collecting between the Pindó and the Paranamiñi one day and was surprised to find that out of some twenty eight specimens of *lavinia* taken, practically every one I saw, no less than twenty five were of the *infuscata* form, whilst a fortnight later the same experience was repeated though only very few of the insects remained on the wing. This fact coupled with later observations seems to indicate some connection between excessive dampness during the early stages and a preponderance of the suffused form.

In the forest hereabouts one used to find a great number of the giant webs of a social spider, probably *Aranea socialis*. During the daytime the spiders, which often numbered many hundreds in a single colony, formed themselves into a living ball, which varied in size according to the number of spiders present till at times it was nearly as large as a football. When I first saw these balls of spiders in the trees I mistook them for the nests of the camuatí wasp (*Polybia* sp.). On close examination one finds what at first sight had appeared one gigantic web is in reality composed of many hundreds of individual spider's webs all depending from a series of main threads. So large are the combined webs that they often completely block a forest path or stretch for several yards across the forest glades. Each individual web is owned by a single pair of spiders, and at dusk they may be seen hurrying to take up their positions for the night's hunting. At first there is great activity whilst the day's damage is repaired, after which they remain quiet until some unfortunate insect blunders into their section of the web. Just before daylight they retire once more to the shade and "ball up" for the day. To see these huge webs at dawn when the dew-drops on them glisten like gold in the soft rosy half-light that, as the first rays of the sun top the horizon, changes for a few moments the whole aspect of the forest till even the waters of the lagunas appear flushed with pink, is a sight worth going far to see. But to walk into one of these webs in the darkness is quite another story, for in a few seconds one is covered from head to foot with hundreds of startled angry black and red spiders that take no little time and patience to remove.

But apart from the birds and insects, this riverain forest contained many species of water snails, fresh water mussels and razor-shells, some of extraordinary size, that could be picked up along the rivers and by side of the permanent lagunas. There were gaily coloured frogs and ugly toads, snakes and small mammals and iguana. Along the rivers and in the lakes the *Caiman sclerops* abounded sometimes reaching a length of nine or ten feet. Nor was it impossible that one might come suddenly on the little "guasuncho" deer or the larger "ciervo" or even the shy "carpincho," largest of the rodents, and on one memorable occasion I chanced to see a troupe of black monkeys that screamed at me from the tree tops.

Thus as one returned after the day's outing and saw dimly the cattle huddled closely around the flickering smudge fires lighted to keep off the hordes of mosquitos, when all the grassland and forest seemed alive with twinkling fireflies, there was always much food for thought and fresh memories to be pigeon-holed away or later written up in one's notebooks.

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### An Extract.

By HORACE DONISTHORPE, F.Z.S., F.R.E.S., etc.

My colleague, Dr. Malcolm Burr, has lent me the book "An Almanac for Moderns" by Donald Culross Peattie: George Allen and Unwin Ltd., London, as there are various short chapters on ants to be found in it. This note is not in any way a criticism on the book, which appears to me to be written in a very pleasant style, but to call

attention for the following passage on page 45. It is very nice to find someone, who appreciates Lubbock at his true value. To my mind the one blot on the *History of the Entomological Society of London, 1833-1933* is that no mention is made of Lubbock, one of its greatest men, if not even its greatest man:—

“APRIL THIRTIETH.—On this day in 1834, was born in London Sir John Lubbock, first Baron Avebury, one of the most delightful souls who ever ornamented science. He came out of the class out of which naturalists beyond the purely amateur and personal sort are least to be expected—the English gentleman who is trained at Eton and makes his way in the City, the banker, peer, chairman of committees on coinage, monetary reform, shop hour regulations, open spaces, public libraries and bank holidays.

It is not surprising that such a man should be the author of *The Pleasures of Life, The Uses of Life, The Beauties of Nature. But his Ants, Bees and Wasps*, which seems to be no more than a notebook kept while observing these social insects in the artificial observation nest which he invented, is, in reality, the very stuff of science. It is built up page by page of the intensive watching, often minute by minute, the ingenious and controlled experimentation by which alone true knowledge may progress. We see him experimenting on the color sensitivity of bees; we find him in an Italian railway carriage with a tame, educated wasp! And it in no way detracts from the charm of his book to have him break off sometimes with a notation that he was called to London at this point, and we imagine him journeying to some philanthropic public undertaking.

Lubbock was also an excellent botanist, with an instinct for picking up the pieces that purely systematic and formal botanists often neglect, such as seeds and seedlings, and making first class biology out of them. But it is his book on ants that I read repeatedly, and each time with an increasing fondness for the kindly old man behind it all.”

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## NOTES ON COLLECTING, etc.

DOES MYRMECOZELA OCHRACELLA, TENGST., OCCUR IN ENGLAND?—Apparently it does not, but perhaps some of our readers can give definite information. Meyrick (*Rev. Handb.*, p. 820: 1928) states:—“Hants. Perth, local, perhaps overlooked.” Stainton (*N.H. Tin.* XIII. 50: 1873) wrote:—“I believe it has also occurred in the New Forest in Hampshire,” and this is presumably the origin of Mr. Meyrick’s statement. It is of course well-known from Rannoch, where it has been recorded by Stainton, Barrett (*E.M.M.* I. 46: 1864), Blackburn (*E.M.M.* III. 117: 1866: and IV. 139; 1867), and Metcalfe (*Entom.* LI. 222-226: 1918), and from Rothiemurchus Forest, Inverness-shire, by Woodbridge (*Entom.* LIII. 236-237: 1920). Donisthorpe (*Guests of Brit. Ants*, pp. 108-109: 1927) gives further records from Rannoch and says definitely that “in Britain it is only found in Scotland”. The Wood-ant is common in this district and I have often made myself unpopular with its colonies by scratching the nest gently with a stick in the approved manner, but hitherto with no result as regards *M. ochraceella*, and it seems rather more than doubtful whether this moth really occurs in England at all.—T. BAINBRIGGE FLETCHER, Rodborough, Glos. 11th December, 1936.

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## CURRENT NOTES AND SHORT NOTICES.

SOME USE FOR "JAZZ"!—According to a telegraphic message in *The Times* of 28th October, Jazz music can save the Japanese Silkworm Industry from the great damage done by a parasitical maggot, as jazz music played on a gramophone drives the maggot deep into the body of the silkworm, where it dies of asphyxiation in less than half-an-hour. *Se non è vero, è ben trovato.* We do not blame the maggot for trying to escape from jazz even at the cost of suicide! But, prevention being better than cure, the next step apparently is for a Japanese musician to compose jazz music which will keep the parent fly too busy dancing to have time or energy left to lay its eggs.

A Meeting of the Entomological Club was held at Friary Hill, Weybridge, on 8th October, 1936, Mr. H. Willoughby Ellis in the Chair. *Members* present in addition to the Chairman—Mr. H. Donisthorpe, Mr. Jas. E. Collin, Dr. Harry Eltringham, Mr. W. J. Kaye, and Mr. R. W. Lloyd. *Visitors* present—Dr. K. G. Blair, Dr Karl Jordan, Mr. W. Rait Smith, Mr. E. C. Bedwell, Capt. N. D. Riley, and Mr. W. H. T. Tams. The *Members* and *Visitors* arrived in the early part of the afternoon and were received by Mr. and Mrs. Willoughby Ellis. The party divided between the House, Garden and Museum, where, in addition to the collections of British Lepidoptera and Coleoptera, a practically complete collection of British Hemiptera-Heteroptera was on view. Tea was served in the Lounge at 4.30, after which the company again interested themselves in the Library and Museum. Supper was served at 6.30 and after an interesting day the company dispersed about 11 o'clock.

The most important work upon the Dermaptera that has appeared for many years is the volume on the earwigs in the "Faune de l'U.R.S.S." In other words, the earwigs of Russia, by G. J. Bey-Bienko. The author, who has long since won his spurs by first rate work in Orthoptera and Dermaptera, gives a monograph of the Dermaptera of one sixth of the earth's surface. And he does it well. We may congratulate this brilliant disciple of our Hon. F. R. Ent. S., A. P. Semenov-Tian Shansky.

Including kinds recorded from the adjoining frontier districts, he lists 76 species. He gives detailed keys for determining genera, species and subspecies, and adopts the general scheme of classification which I outlined many years ago. He rejects the *Hemimerina* but admits the *Arixenina*, and brings forward a new suborder, the *Archidermaptera*, for the fossil species *Protodiplatys fortis*, described by Martynov from the Jurassic deposits of southern Kazakstan, which has 4-5-segmented tarsi, apparently rudiments of venation in the elytra, and segmented cerci, like the larvae of *Diplatys* and the *Karschiellinae*.

The author gives a detailed account of the structure and habits of earwigs, with an interesting speculative discussion on their origin and geographical distribution. It is noticeable that there are very few *Protodermaptera* in the Palaearctic Region, and that the dominant genera are *Forficula*, with 24 species in the U.S.S.R., and the related *Anechura*, with 14. The latter has had specially brisk evolution in the mountain-formation of central Asia, and has been subdivided into four subgenera.

The author points out that there have been two centres of evolution with maximum number of species, the Western, with 28 endemic species, and the Eastern with 30. In both the genera *Forficula* and *Anechura* are dominant, and there is a marked parallelism between the two areas. The author develops a theory of their origin, but it is difficult to accept his view that the *Forficula-Anechura*, or indeed, any earwig, group, evolved in the Angara region. That is all very well for the grasshoppers, with an immensely long history of steppe conditions, but the earwigs are sylvicolous and hygrophilous. They *must* have worked their way northwards. We may notice two significant facts, that the cosmopolitan *Labidura riparia*, which lives in trees in India, in the northern latitudes is found only on banks of water; while in arid districts of central Asia, earwigs are found exclusively in the immediate neighbourhood of moisture.

It is interesting to note that the common S. Russian earwig, *F. tomis*, has the same domestic habits as our own.

It is an important and useful book. Fortunately there is a good resumé in English which I recommend all interested to read.

*L'Amateur de Papillons* is another magazine, which British entomologists, above all, those who work the micros, should consult. The current numbers, June-October contain a carefully worked out table of the French species of *Lithocolletis* with short descriptions and an illustration of the fore-wing of every species found in France, 84 in number. This analysis includes most of our British species and maybe a close study of it will find another one or more to add to our List.

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## REVIEWS AND NOTICES OF BOOKS.

The plate in the present number is from the firm of Messrs. Siviter-Smith (see advert.). As Mr. P. Siviter-Smith is an active practical entomologist, readers of our magazine may rest assured that adequate skilled care will be used in handling specimens sent to this firm for reproduction purposes.

In No. XLII of the *Memoires Soc. des Sciences Nat. du Maroc* Dr. Hans Zerny has described the "Lepidopterous Fauna of the Great Atlas in Morocco and its District." This work of more than 150 large quarto pages with 2 plates of over 80 new species (including micros) and forms and a few text figures is a further contribution to a long series of important summaries of the Fauna and Flora of definite areas emanating from the official naturalists of Vienna of which Dr. Rebel and Dr. Zerny are eminent representatives. Chapter 2 describes the Geographical area. Chapter 3 an account of the various expeditions made by lepidopterists from the year 1900 to date and a short account of the results of these journies. Chapter 4 contains Lists of the endemic species and the proportions of species of surrounding fauna areas found. Chapter 5 a List of the new species and forms described in the volume, more than one hundred. Chapter 6, the titles of the various works consulted for the information. Chapter 7 list of the localities whence collections have been made. Chapter 8, names, references and details of the 684 species recorded from the area, filling the remainder of the work. This is a wonderful compilation, filled with ascertained, reliable facts and information, and brought as nearly up to date as possible.

The display of the matter, differentiation of type, and scientific arrangement render the volume easy of reference, and the matter selected is just that of use to future workers in Moroccan investigation. Dr. Zerny has added another to his long list of valuable contributions to the literatures of entomological science.

A very pretentious work, *Handbuch der Zoologie*, is being published in Berlin in sections, of which that on Lepidoptera lies before us. It consists of over 160 large quarto pages of matter on all phases of the study of the Lepidoptera. The authors, again from Vienna, are Dr. Zerny and Dr. Beier. The name of Zerny ensures reliability that the best in all portions has been got together, and arranged in a manner economical to the time of the student. There are 194 figures largely diagrammatic with a good proportion of microscopical preparations. The Morphology of the four Stages is fully detailed with figures. Colour is considered at length in all its lepidopterous aspects, and no small portion of the matter is devoted to the structure and functional actions of the body. Attention is paid to the more abnormal developments in some groups, such as the porrect palpi in the Pyrales, the curious brushes connected with scent organs, the structure, activities and significance of the varied and striking developments of the generative organs. The ethology of the Lepidoptera deals with the many characteristics of life leading up to protective resemblance, the so-called Mimicry, warning colours and so forth. But little is said of the economic side but more space is devoted to geographical distribution its causes and limitations. The above takes about 120 pages. The remainder of the section gives a detailed classification of the Order. Throughout, all statements are enforced by ample specific examples and there is a long list of titles of reference works.

THE PROCEEDINGS & TRANSACTIONS OF THE SOUTH LONDON ENTOMOLOGICAL & NATURAL HISTORY SOCIETY FOR 1935-1936 is well up to the usual high standard, and leaves the reader with one complaint only, that the title is so unwieldy. Is there no word to convey both "Transactions" and "Proceedings"? "Report"? "Publications"? Does not Natural History embrace Entomology? It opens with a speaking portrait of that grand old friend of Entomology and entomologists, the lamented Robert Adkin, with a sympathetic account of his life and work. The *Proceedings* contain much interesting matter, and the President's address is an account of the biology of *Chrysopa septempunctata*. The lacewing flies are such friends of the horticulturalist that it is good to see them receiving some share of the attention that is usually lavished on the more popular orders. There is plenty of scope for work in these "neglected" groups. But the outstanding feature of the volume is the account of an entomological journey to the Alto Parana of the Argentine, by a well known contributor to the *Entomologist's Record*, Capt. K. J. Hayward. The interest is exceptional, and not confined to any one group. The snapshots of the falls of Iguazú show that these magnificent cascades rival the Victoria Falls themselves in splendour. Mr. Hayward's experiences will be read with envy by those who have collected only at home as well as by those who have been in the tropics. A highly important feature of the Society's work is the very full reports of the Field Meetings. These, so useful in stimulating research and recording the occurrence of local and hitherto unrecorded species, deserve much commendation, and are evidence that the organization is alive.—M.B.



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## MEETINGS OF SOCIETIES.

**The Royal Entomological Society of London.**—41, Queen's Gate, South Kensington, S.W. 7., 8 p.m. Jan. 20th (Ann.), Feb. 3rd.

**The South London Entomological and Natural History Society,** Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. Jan. 28th (Ann.), Feb. 11th.—Hon. Secretary, S. N. A. Jacobs, "Ditchling," Hayes Lane, Bromley, Kent.

**The London Natural History Society.**—Meetings first four Tuesdays in the month at 6.30 p.m. at the London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C.1. Visitors admitted by ticket which may be obtained through Members, or from the Hon. Sec. A. B. Hornblower, 91, Queen's Road, Buckhurst Hill, Essex.

**Entomological Section, Birmingham Natural History and Philosophical Society.**—Evening Meetings. On the third Monday of each month; 7.45 p.m., at 55, Newhall Street, Birmingham. Visitors welcomed. Those who would like to attend or exhibit please apply to—P. Siviter Smith, Pebworth, Stratford-on-Avon.

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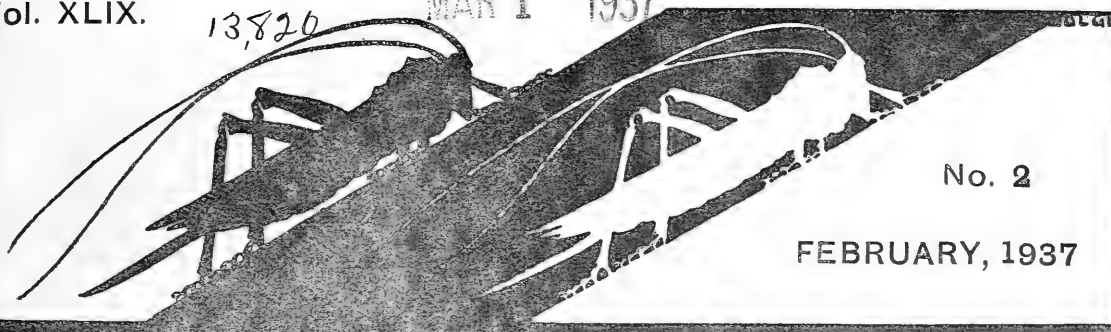
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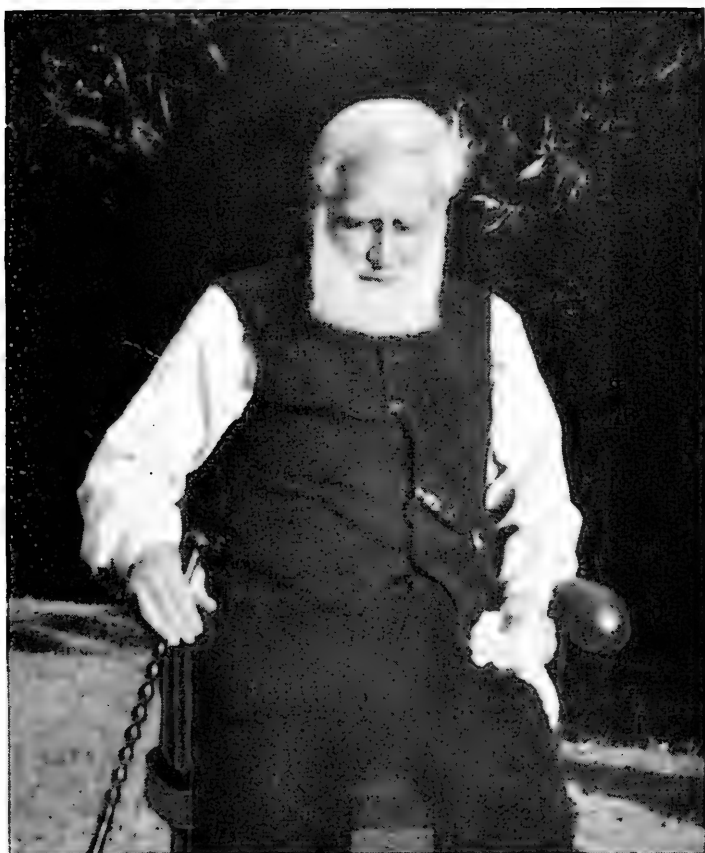
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*The Entomologist's Record.*

REV. CHARLES RICH NELSON BURROWS, F.R.E.S.



## Notes on Staudinger's "*Erebia aethiops* var. *aethiopella*" and a recently discovered analogous Form.

By B. C. S. WARREN, F.R.E.S.

Just forty years ago Staudinger described his var. *aethiopella* from a single ♂ from the Kentei mountains. This insect has since remained a somewhat unknown quantity. In my monograph of the genus, published last year, I retained it as an aberration of *E. aethiops*, in accord with Staudinger's view. I had been able to examine his type specimen (and figured it *loc. cit.* pl. 102, figs. 1622, 1627) and felt from its superficial features that it was quite likely to be an aberration of that species, though the possibility that it might be an aberration of *E. neriene*, Böb. (= *sadakovii*, Evers.) suggested itself, but from an examination of the superficial characters alone it was not possible to come to any certain conclusion. There was therefore nothing to gain in changing it from *E. aethiops* so long as there was no definite reason for doing so.

In 1930 Higgins renamed it *Erebia ignota*, Staudinger's name being a secondary homonym of *Erebia aethiopellus*, Hoffmsg. I adopted this change in my monograph because Staudinger's use of the term "var." agreed with what we call a subspecies.

A few months ago I was informed by Herr Bang-Haas of Dresden that he had received 11 ♂s of an *Erebia* from Li-hsien in S.E. Kansu which for the greater part agreed very closely with Staudinger's type of *aethiopella*. Some of these specimens had rudiments of the bands visible on both upper and underside, but a number were practically without rusty-red colour on the upperside, and just showed a slight wash of it on the underside of the forewings, the underside of the hindwings being absolutely without markings except for three very small, white points, the pupils of the black spots, the latter being lost on the underside but present on the upperside of the hindwings, and well-developed on the forewings on both sides. The actual colour of the underside of the hindwings is a greyish or blackish brown. These features, it will be seen, correspond very closely with the features of Staudinger's *aethiopella*. I now possess six of these specimens, three of the extreme dark form, and three transitional ones with rudiments of bands, also some fully banded specimens from the same locality. Of these I have dissected four, selected from each form, which demonstrates that all are a race of *E. alcmena*. The question naturally arose then, whether Staudinger's *aethiopella* was perhaps also an aberration of that species. Should this be the case considerable changes in nomenclature would be necessary. I informed Bang-Haas of these facts, and pointed out that it was impossible to solve this interesting question by superficial examination; until the anatomical characteristics of Staudinger's type were known, one could only guess at its affinities. On realizing this fact, he most kindly offered to lend me the type again with permission to dissect it, and I am glad to take this opportunity of expressing my thanks to him for his generous action, which at last enables the true affinities of this remarkable insect to be established.

The mount of the genitalia has since been completed, and it shows that *aethiopella* is an aberration of *E. neriene*, Böber.

The newly discovered dark aberrations of *E. alcmena*, and Staudinger's specimen constitute, therefore, a remarkable case of analogous aberrations in two closely related species, and I do not think the two could be distinguished by superficial characters. The only difference that I can note is that *aethiopella* is larger, and that the white pupils are more pronounced, but in such a variable species it is improbable that these characters would hold if a second aberration of this type were to occur.

I have already mentioned that normally marked specimens (*i.e.*, examples with complete or fragmentary bands on the upperside, and sometimes with traces of the bands normal to *E. alcmena* on the underside of the hindwings) occurred a Li-hsien with these dark aberrations. These better-marked specimens are referable to the f. *szetschwana*, Goltz, of the ssp. *minschani*, B.-H. In his description of this form (which is given in my monograph p. 152) Goltz notes that the band on the upperside of the forewings is greatly restricted below the apical spots and often actually broken, and that the underside of the hindwings is almost unicolorous; specimens with the band broken or just united by a very narrow line of colour must therefore be taken as typical of the form. Others in which the band is continuous and less restricted on the forewings, and with a more or less marked antemarginal band on the underside of the hindwings are typical *minschani*. The opposite extreme, in which the only colour visible is in the form of minute and very indistinct rings, of a very dark mahogany-red, encircling the black spots on the upperside, and a very slight wash on the central area of the underside of the forewings, constitutes a hitherto unrecognised aberration analogous to the ab. *aethiopella*. All these forms fly together at Li-hsien, the f. *szetschwana* being, apparently, far the most abundant, but it is connected by many transitions to the extreme dark aberrational forms.

Other slight differences, besides those already mentioned, exist in both *aethiopella* and the extreme, dark aberrations of f. *szetschwana* the most striking of which are the loss of the black spots on the hindwings in *aethiopella* and its almost white fringe. Some ♂s in *E. alcmena* can also have a white fringe, as can be seen in the specimen figured in my monograph (pl. 102, fig. 1609) a ♂ of the ssp. *veldmani*. The black spots, especially on the hindwings, are very variable in size in both *E. neriene* and *E. alcmena*, and their presence or absence in either species could not be accepted as of any value as a character for identification. The general similarity of these aberrations remains unaffected by such differences, and as I have said already, identification by their superficial features is probably impossible, unless a series of the race with which a given specimen was captured, was available for comparison. On account of this similarity it seems desirable to mark the existence of this *aethiopella*-like form of f. *szetschwana* by giving it a name, and I therefore designate it ab. **ignotoides** nov. (Type and two paratypes in my collection).

The correct names of these analogous aberrations therefore are: *E. neriene*, Böber ab. *ignota*, Higgins (= *aethiopella*, Stg.), and *E. alcmena*, Gr.-Gr. ssp. *minschani*, B.-H. f. *szetschwana*, Goltz ab. *ignotoides*, Wrn.

The ab. *ignotoides* is evidently not very rare at Li-hsien, both it and the ab. *ignota* are, so far, only known in the ♂ sex.

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## Cornish Notes 1936.

By CHARLES NICHOLSON.

*(Continued from Vol. XLVIII., p. 132.)*

*Danaus plexippus*.<sup>\*</sup>—One seen on 4th Sept. near Church Cove, The Lizard. Two reported for Devon and 3 in Hants.

*Polygonia c-album*.—Decidedly commoner in the county than previously and reported from various parts, mostly single specimens. First seen (♀) on a Buddleia in a neighbouring garden, 23rd Aug.: a male boxed off *Scabiosa succisa* in my own garden, 2nd Sept.: several seen on Michaelmas Daisies afterwards and last appearance noted on 11th Oct. The Rev. Alfred Thornley, of Carbis Bay, saw one flying amongst Michaelmas Daisies at Marazion on 22nd Sept. which is the furthest west so far for the county, in which about 20 specimens have been reported this year.

*Eugonia polychloros*.—Lord Rendlesham saw a specimen on 13th Aug. on the same window of the same room in his house at Mawgen-in-Meneage, as he saw one on at the end of September last year!

*Aglais urticae*.—Mr. Thornley reports it very scarce this year at Carbis Bay, where it is usually common; but here and in other localities it seems to have been much commoner than usual, after several seasons of scarcity in the county. First seen 18th March; last 10th Oct.

*Nymphalis io*.—First seen 10th May; last 22nd Sept. Very scarce generally—usually the commonest Vanessid in the county—and mostly seen as single specimens; but more common in some localities.

*Vanessa cardui*.—Scarce, but rather more seen than usual. First seen, Perranporth, 28th Aug.; last Tresillian, 4th Oct.

*V. atalanta*.—In about its normal numbers. First seen, 26th July (2 worn); last 18th Oct. (in gardens) perfect. Larvae of all sizes found on 3rd Aug. and one nearly full grown on 6th Sept. Two were killed by Braconids from very pale fawn cocoons; species not yet determined.

All these Vanessids, except *polychloros*, were strongly attracted by Unwin's Dwarf Bedding Dahlias, until the Michaelmas Daisies came out, and almost monopolised their attentions, the usual proportions being, on a good patch of daisies, about 20 *urticae*, 10 *atalanta*, 1 or 2 *cardui*, 1 *io*, 1 *c-album* occasionally, and frequently 1 or 2 *croceus* joined them, with a "white" or two.

*Dryas (Argynnis) paphia*.—Two reported as seen at Ladock by a correspondent on 21st May (!). I naturally questioned this record, but as my correspondent knows our butterflies well, says they were not *polychloros* and sticks to his identification, I think it will have to pass. After all it is little more remarkable than the capture of *Argynnis cydippe* at Lyndhurst on 21st May, 1893, reported in *The Entomologist* for that year, p. 231.

*A. aglaia*.—A worn specimen boxed on Perranporth Sandhills on 4th Aug.

*Pararge aegeria*.—Not as common as generally usual. First seen 26th April (in garden); last 18th Oct. (in neighbourhood).

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\* The true *plexippus*, L. has a "white fascia like *chrysippus*" (*Sys. Nat.* of Linné) which this American insect does not have.—Ed.

*P. megera*.—Less frequent than usual. First seen 17th May; last a wing left by a bat in our verandah 10th August.

*E. jurtina* and *E. tithonus*.—Both very common, as usual.

*Aphantopus hyperantus*.—Usually uncommon, but rather more seen this year; first seen (about 6) 28th June, last (a few) 3rd Aug.

*C. pamphilus*.—Not seen this year; very uncommon hereabouts!

*Callophrys rubi*.—Five specimens seen by a correspondent at 5 p.m. on 24th June near Bodmin. These are the first I've heard of in Cornwall.

*Heodes phlaeas*.—Very scarce this year. First seen 23rd Aug.; last, 30th Sept., on *Eupatorium weinmannianum* in garden.

*Polyommatus icarus*.—Rather uncommon.

*Lycaenopsis argiolus*.—Not so plentiful as last year. First seen 18th April; last, 9th August.

*Nisoniades (Erynnis) tages*.—Not common hereabouts. One perfect specimen seen in a rushy place near Tresillian Village on 9th August. No doubt a second brood specimen.

*Adopoea lineola*.—Uncommon hereabouts. One in a cornfield 26th July.

*Augiades sylvanus (Ochlodes venata)*.—Not common here. A few seen 5th July in neighbouring fields, and 1 in garden, 20th July.

*Macroglossum stellatarum*.—Very scarce in Cornwall this year. One at Fowey over a rose in a pot, 22nd July; one flying over red valerian about 2.15 p.m. in showery weather at Launceston, 23rd July; one at Carbis Bay (where it is usually common) 12th Sept.; one at pink and scarlet geraniums in a neighbouring garden here on 11th Oct.—a sunny morning after a cold night.

*Spilosoma urticae*.—One boxed off herbage on Goss Moor near Bodmin, 23rd May, a dull day.

*Arctia villica*.—1 male and 2 females sent to me from Probus for identification, 10th June. Many eggs laid, from which I have about a score of larvae about two-thirds grown, feeding on bramble in a cold room and more or less hibernating.

*Cerura vinula*.—A fine male emerged, 30th May, from a larva sent for identification last year. I offered it to our tamest wild thrush, who accepted it with pleasure and was not at all disconcerted by its large size and woolliness!

(To be concluded.)

## NOTES ON COLLECTING, etc.

UNUSUAL LARVAL HABIT OF *STENOPTILIA ZOPHODACTYLA*, DUP.—While seeking larvae of this "plume" on seeds of *Erythraea centaurium*, Pers. at Farley Mount near Winchester on 12th September, 1936, Mr. S. C. Scarsdale Brown drew my attention to one plant, whose every leaf contained a mining lepidopterous larva. Greatly puzzled as to what these larvae could possibly be, we sought for more without great success, for we only found one other affected plant with two more larvae. However the problem was soon solved, for by 24th September the larvae had left their mines, and were then seen to be those of *S. zophodactyla*. Pupation took place three days later, and moths emerged during the latter half of September. A search through the literature yielded a reference

to this habit in Barrett's *British Lepidoptera*, Vol. IX, page 379; "Mr. W. H. B. Fletcher finds the young larvae till the second moult, mining the leaves." The larvae found appeared to have maintained the habit throughout the larval stage, and though seeds were present, they were not eaten.—WM. FASSNIDGE (M.A., F.R.E.S.), 47, Tennyson Road, Southampton.

LAMPRONIA (INCURVARIA) TENUICORNIS, STT. IN HAMPSHIRE.—Beyond the chance capture of a pair of this species, beaten together from a large birch on the outskirts of Baddesley Great Cover, near Southampton on 12th June, 1932, and records of single captures in the New Forest and the Southampton district by Mr. J. W. Corder, nothing seems to be known of this species in Hampshire, and repeated search for the larval galls failed completely until 1936, for not even an old gall rewarded my long and patient seeking. Only good luck and an acquired habit of looking at young birches yielded at long last, on 20th Dec., 1936, the coveted gall on an isolated young tree about six feet in height, at Chilworth near Southampton, where I found a side shoot of two year's growth that showed swellings at adjacent nodes about two inches apart. Even then, so accustomed had I become to finding only a swelling of the woody growth, I investigated so carelessly that my penknife just damaged the larva in the first gall opened which considerably damped my elation. Knowing now exactly what to look for, I carefully hunted through the birches scattered around, but quite unsuccessfully, though plenty of the different galls of *Eucosma tetraquetrana*, Haw. were found.

For the benefit of others who may feel disposed to spend a few winter afternoons in the search, at a time of year when there is not much outdoor work to be done, I add here in translation the remarks of some continental observers. Meess. *Die cecidogenen und cecidocolen Lepidopteren*, 1923, gives two good coloured figures of the gall on Plate 32, and on page 566 says: "At the junction of a twig; a roundish swelling, the bark strongly thickened. Larva whitish with a black head and small brown plate on second segment. The larva often leaves the gall in the late Autumn." He gives *Betula verrucosa*, Ehrl. as the foodplant. Spuler gives the same word-for-word description of the larva, and then says: "In the winter in swellings in twigs of *Betula*." Schätze: *Die Biologie der Kleinschmetterlinge*, 1931, says "In twigs, in conspicuous round swellings, usually shining red-brown, in the previous year's or older twigs. It seems to me that the larva does not itself cause this swelling, but makes use of the abandoned youthful abode of *tetraquetrana*, which it enlarges. The galls should be collected at the end of the winter. The larva pupates in the gall." De Joannis: *Révision critique des espèces de lépidoptères cécidogènes d'Europe*, etc., published in *Annales de la Société Entomologique de France*. 1922, gives on pages 134 and 135 an account of what had been published concerning this species before that date, but adds nothing new. The only comment I can make on my slender experience is that the galls I found are neither conspicuous nor shining red-brown, that they are abundantly distinct from the galls of *E. tetraquetrana*, that both galls contained larvae apparently full-fed, and that I have spent three more afternoons in the search without success, not even finding an old gall. Perhaps somewhere in Britain the gall will be found as described by Amerling, in *Lotos*, X, Prague, 1860, "so abundant and so numerous that the birches attacked

could be recognised from afar by the bushy appearance of their smaller branches."—ID.

[Since this note was written, three old galls from which the moths had emerged were found in Lordswood, not far from the first locality. Two of them were on one twig, at nodes four inches apart, and all three were on young birches at about five feet from the ground.—W.F.]

*EUCOSMA CIRSIANA*, Zell.—The pink larva of this species is best taken from February to early April. It is then full fed but not yet pupating, and if the domicile is broken, it readily repairs it and takes no harm. Soon after this date the larva is preparing for pupation, and at this stage disturbance is fatal. The imago usually appears about 25th May. The process of splitting the thistle stems is tedious, and needs care; and although the species is widely distributed, it is (in my experience) most abundant. Open ground is more profitable than woods; and in a suitable spot about four larvae to an hour's stem-splitting are as much as can be expected.

In size the species is very uniform, ♂ and ♀ alike measuring 17-18mm. though occasionally individuals of 15mm. are bred from thistles. The allied species, *Eucosma pflugiana*, Haw.—or form for Meyrick's *Revised Handbook* combines them—is larger, with a ♂ of 22mm. and a ♀ of 19-20 mm. The markings of the ♂, chiefly the pale blotch at the f.w. anal angle, distinguish it from the ♀ and from both sexes of *cirsiana*. Apparently *E. pflugiana* is confined to low-lying and more or less swampy ground.

The larva of *E. cirsiana* also feeds in the stems of knapweed; the resulting imago is usually smaller and sometimes much smaller. I have never found the larva in the stems of the smaller knapweed, *Centaurea nigra*; and I have never had an opportunity of examining the large, *C. scabiosa*, at the right time of year.

A closely related species is *Eucosma cnicicolana*, Zell.\* which in spite of its name feeds in the root crowns of *Inula dysenterica*. Very few localities seem to be known at present for this species; but alike in size, colouring and habit, it is inconspicuous, and may well have been overlooked.—R.E.E.F.

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## CURRENT NOTES AND SHORT NOTICES.

A note from Mr. G. A. Brett, of the Wellcome Entomological Field Laboratories, Claremont, Esher, has been overlooked. He reports as follows.

I have this year (1936) been marking *V. atalanta* in this locality with green cellulose paint (both hindwings being marked) in the hope that:—

1. Some may be recorded in other localities, thus giving some information on their habits of migration.
2. They may be recovered where they were marked, next spring, thus showing that they are at least partial residents.

A total of 47 specimens has been marked, a few only on the under-side. If anyone should see or capture any of them either this year or next, will they kindly let me know at the above address.

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\* *E. littoralana*, Pierce.

Dr. E. Scott of Ashford has just published a local *List of Butterflies and Moths* (Macro-Lepidoptera) occurring in the neighbourhood of Ashford, Kent. This is another of those handy books of reference for the use of naturalists interested in the local fauna, as well as furnishing a record of what has been already done in the district, and as a basis for further research. A valuable feature is a map of the area concerned, extending around Ashford for about 8 miles. The limitations of the district are stated in the Foreword; the restricted heather area, absence of coastal influence, the extended woodland areas, the chalk area, hills and river valleys. The printer has hidden a well-known denizen of Kent as *Linea scoriata*: decidedly funny! The nomenclature is mixed. The butterflies are the List of the Royal Entomological Society with its *Ochlodes venata*, a name quite undiscoverable in all text-books likely to be in the hands of most collectors. The Moths are the Lists in South's famous books of 30 years ago, regardless of the work of Prout in Seitz as summarised in our pages ten years ago, which includes corrections as to the concept of various species given in South. We note a few spelling errors like *gooseniata*, *hyperanthus*, *octogessima*, *leucophoea*. Such books are useful as bases for all future local work.

Five parts of the Main *Volumes of Seitz* have just come to hand, all of the American Fauna. Four of these deal with the American Bombycids, etc., and one with the Noctuids. The former, Volume VI., is nearing completion now, having reached to p. 1216 and pl. 176, which deal with the *Aegeriidae*. The plate illustrates 57 species and forms of the last and its near allies. There are 4 other plates in these parts. The volume on the Noctuidae has reached the *Catocala* of which there are two plates containing 63 figures of "red underwings."

The *Supplement to the Palaearctic Noctuidae* of Seitz has reached sheets 28, 29, 30, and the volume remains to be completed by the short summary of those additions made during the progress of the volume, and the Index. The Deltoids are included. This part 63 is rather an important one to British lepidopterists, as additional forms to over 30 species found in Great Britain are described in the 24 pages of the part. This work is very comprehensive in its endeavour to include all noted aberrations and is absolutely indispensable to all students of the British Lepidoptera. It is useful to note that each species mentioned has the reference page to the main volume appended and, if figured, that figure also. The species here are those from the rare immigrant *Ophiussa stolidus* to *Hypena obsitalis* of the list. The Corrections and Additions included are from *Arsilonche* to *Euxoa*.

A. P. Semenov-Tian-Shansky, in spite of the handicap of failing eyesight, has been able to complete two more important papers of his beloved subject of zoogeography during the past year. One, on the "Principal Features of Alpine Faunas" will appear in the *Bulletin of the Academy of Science of the U.S.S.R.* The other will appear later in the Russian periodical *Priroda* (Nature), on "New Information on the Origin of Desert Faunas." We may be perfectly certain they will both be extremely interesting.—M.B.

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## REVIEWS AND NOTICES OF BOOKS.

FAUNE DE L'U.R.S.S., INSECTES DERMAPTÈRES. par G. J. Bey-Bienko. (Ac. Sci. Leningrad, 1936.)—As it is twenty years since any comprehensive work on the earwigs has appeared, this production of the active Russian school of entomologists is very welcome. G. J. Bey-Bienko has been doing first rate work in Dermaptera and Orthoptera, under the inspiration of A. P. Semenov-Tian-Shansky. That accounts for the fact that his is far more than a merely faunistic work. It is rich also on the philosophical side, and the author develops at considerable length his theory on the origin and history of the Dermaptera of the Palaearctic Region. The book is in Russian, but there are plenty of illustrations, and a very good abstract, giving all the essentials, in English. Pages 1-72 deal with general aspects, structure, life-history, ecology, classification, geographical distribution and origins, economic importance, and literature. Pages 77-207 are the systematic part, with full tables.

The classification adopted is that proposed by me many years ago, with but slight modifications. The author rejects the *Hemimerina*, accepts the *Arixenina*, and adds a new suborder, the *Archidermaptera*, for a fossil species, *Protodiplatys fortis*, Martynov, a remarkable fossil from the Jurassic beds of Kazakstan. It is unmistakably an earwig, in spite of the 4-5 segments of the tarsi, and femora, at least the hinder pair, are keeled, and the forceps represented by segmented cerci, as in immature *Diplatyidae* and *Karschiellidae*.

Of the true earwigs, there are known actually in the territories of the Russian Empire, which is to-day known officially as the S.S.S.R. in Russian, U.S.S.R. in English, and U.R.S.S. in French,\* 26 species out of the 106 known in the Palaearctic Region, but in this work deals with 87 species, as the author wisely includes those known from the neighbouring districts, which makes it a very useful and complete work.

At the first glance at the mere list of species a few points strike the eye. Of the *Pygidicranidae*, so numerous in the tropics, and apparently occurring in Europe in the Oligocene, there is a single Palaearctic representative, the curious subfamily with one species, *Challia fletcheri*, Burr, from Korea, whose nearest relative is the single subfamily also with only one species, known from a single locality in Tenerife; evidently remnants of an ancient wide-spread group. Of the *Labiduridae*, there are 12 species, but it is really doubtful if any of them are naturally native, even the cosmopolitan *L. riparia*. Of the *Labiidae*, of which 270 species are known, there are 8 on the list, almost all introduced, and it is to be noted that the author questions the naturalness of the occurrence of *Labia minor* in the Palaearctic Region. The two characteristic genera of the region are *Forficula* and *Anechura*, with 24 and 14 species included respectively.

The geographical distribution of the earwigs in central Asia is very instructive, and its study leads to conclusions that will be accepted, at

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*i.e.*, initials of the "Union of Socialistic Soviet Republics" in the respective languages.

least in the main lines, I think, by students of other orders, conclusions elaborated by Semenov-Tian-Shansky and Uvarov.

The picture begins in early Tertiary times, when southern and central Eurasia was covered with a deciduous forest enjoying a warm, moist climate. Here lived the somewhat more primitive ancestors of the two characteristic genera *Forficula* and *Anechura*, ranging right across the continent. Then late in the Miocene when the great mountain-building movement set in, and the old peneplain was bodily raised to a great altitude, the earwigs gradually adapted themselves to the slowly changing conditions, or else were exterminated. When the mountains reached sufficient height to act as a curtain and shut off the moisture coming from the south, the central part became drier, and vast areas of mid-Asia were converted into desert and semi-desert before the close of the Tertiary Period. Earwigs are hygrophilous and the aridity was fatal to them, but they survived in the still warm, and above all moist, eastern and western portions, until the glaciers came and did havoc in the west, though their moisture was less formidable to them than the aridity. Consequently, a number survived even in the glaciated parts of the west, and evolution proceeded in the non-glaciated portions, as it did with the isolated groups on the new mountains.

The result is that we have a very impoverished earwig fauna in Central Asia, with only 8-9 species, but a relatively rich one at each end, especially of the related genera *Forficula* and *Anechura*, which are overwhelmingly Palaearctic.

In Europe we are so accustomed to the abundance of *F. auricularia* that we are apt to regard it as typical, but it is not really widely distributed, for its eastern limit is Kopet Dagh in Transcaspia. But in the Far East we have an analogous fauna, with species curiously corresponding to our western ones, but not one in common. Semenov-Tian-Shansky, calls these vicarious species, the "geminate species" of D. S. Jordan, and thus our *F. auricularia* is represented there by three closely allied, but more primitive, forms, and there are several other pairs and groups.

The eastern centre of evolution is richer than the western. Of the dominant palaearctic genera *Forficula* and *Anechura*, we in the west have 14 and 6 species, but the Far East has 20 and 12 respectively. But the most striking fact is that recent discoveries have revealed unexpected wealth in the interior of China, particularly in the province of Szechuan, whence Bey-Bienko has described a series of extremely interesting earwigs. Relatively little as that country has been explored entomologically, still it is well enough known to enable Semenov-Tian-Shansky to say that in those mountains and valleys, and in Han Su and eastern Tibet we have a survival of the old Miocene fauna unparelled in the Palaearctic Region. There has recently been a striking reminder of this by the giant panda, now in the news, which is to-day confined to Szechuan, but must once have had a very wide distribution, as its near relative and possible ancestor, *Ailurus anglicus* left its bones in our Red Crag.

Meanwhile, those earwigs which found their homes being gradually raised into the cooler climates of higher altitudes were being either exterminated or adapted to their changing environment. In the mountains of Semirechie there is a remarkable creature, to which

Semenov-Tian-Shansky, with his deft scholarship, has given a neatly descriptive name, that is almost a diagnosis, *Mesasiobia hemixanthocera*, the half-yellow-headed dweller in Central Asia, which is probably the modified descendant of some early *Forficula*; the processes on the last tergite are certainly reminiscent of the primitive Chinese *F. davidi*, Burr. In the Himalayas at altitudes of 3500 metres and even over there is a plain black earwig, *F. schlagintweiti*, Burr, which may well represent the ancestral form of *Oreasiobia*, with two species in the mountains of Central Asia and Kashmir. The author confirms the suggestion I made in 1910, that it is a link between *Forficula* and *Anechura*.

*Mesasiobia* and *Oreasiobia* are intermediate between *Forficula* and *Anechura*, which is associated with mountains. The latter has fewer species but greater diversity, so much so that Bey-Bienko divides it into 4 subgenera, some of which have the curious tendency to sinuosity of the forceps in a vertical plane. Several *Anechurines* and related genera show a broadening and flattening of the body, which is an adaptation to life under stones, in the absence of trees, which is so strongly marked in the Tibetan subgenus *Burriola*, the Caucasian *Borelliola*, *Eumegalura* from Szechuan, and our Alpine and west European *Chelidurines*. Parallel development occurs in other genera remote from *Anechura*, such as some *Psalidae* and the Andean *Esphalmeninae*, both of which are members of the *Protodermaptera*, contrasted with the *Eudermaptera*, to which *Forficula* and *Anechura* belong. All these mountain genera are also subject to a darkening of the body and to brachypterism, phenomena seen also in the grasshoppers.

Neither Semenov-Tian-Shansky nor Bey-Bienko attach extreme importance to the destructive effect of glaciation, for that would imply that the differentiation into species, and even into subgenera, as in the case of *Burriola* and *Borelliola*, had been effected since the glaciation, which in such a conservative group is hardly admissible.

It is interesting to learn that the common Russian earwig, *F. tomis*, has the same domestic habits as our own, but lays its eggs in the spring, and is sometimes numerous enough to do damage in gardens, *F. auricularia* is common in Russia too, and does damage to gardens and crops, mainly by eating the half-ripe seeds. A curiosity is the central Asian *Oreasiobia fedtchenkoi*, which is a nuisance to tobacco-growers in the mountains of Turkestan. — MALCOLM BURR.

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## (52) BITUARY.

Rev. Charles Rich Nelson Burrows, F.R.E.S. (*Plate II.*)

The Rev. C. R. N. Burrows, one of the staunch supporters of the *Entomologist's Record* since its commencement in 1890 under the editorship of the late J. W. Tutt, has passed on at the ripe old age of 85. For the last few years he had suffered from severe arthritis, which rendered him a helpless cripple. Until a few years ago he was always ready to contribute some of his valuable notes and articles to our pages, and during the last 20 or 30 years, until his powers of concentration failed, on the subject in which he was particularly interested, the generative structures of the Lepidoptera. In this study he was one of the insistent

advocates that these organs are of great definite value in classification.

He came of a family possessed of considerable property, his share of which he was unable to enjoy until a few years ago, owing to legal disputes. As a child he had extremely bad health and was unable to take the education of the time and in fact was for a while blind. His memory was very clear until the last and he at times spoke of himself as a little child helping his aunts to prepare lint for the Florence Nightingale efforts to aid the wounded in the Crimean War. When about of age he persuaded an uncle to supply funds for him to go to the Cape. And against the wish of his parents, who never expected to see him again, this frail sickly lad went out to Natal. He had early taken an interest in natural history and was a frequenter of the British Museum and well remembered Walker, Butler and others of that time. When he was a boy, he lived near F. Walker's home and often saw Walker, who used to take boxes of specimens home with him from the Museum to work at, slip on the road and drop the boxes all over the place—whence perhaps the present condition of some of Walker's types! He was in Natal during the period 1873-1875 collecting for the British Museum, spending an active open air life, and before he returned became robust and well. About that time Natal was founded as a colony and he flattered himself that he was one of the founders. It was in Natal that he met Baines who had been the early companion of Livingstone, and was a strong critic of the action of Livingstone in dismissing Baines on the lying statement of his brother, whom later he (Livingstone) also discarded for his conduct with natives. Many were the tales of adventure he (Burrows) told to us of his intimates. On one occasion he went to visit a Kaffir chief. He had to creep into the kraal; the inside was quite dark, and on standing up he hit his head and pitched forward across the chief, a very obese man.

On his return from S. Africa in vigorous health he read for the ministry and was curate for some time in North East London. About this period he went out to Manitoba and was subsequently appointed to the vicarage of Rainham in Essex. While in London he became acquainted with the late Rev. G. Raynor, who afterwards was a life-long friend. Subsequently he was offered a transfer to Mucking where he remained until he was compelled by his health to resign 2 years ago. Over 50 years he spent in Essex of which the last 37 were at Mucking. During all this long period he interested himself in Lepidoptera, collecting and observing in his spare hours and keeping copious notes. The duties in these parishes gave ample opportunities for the scientific studies which he loved so well. And they were varied. He was no mean practical chemist, interested in the rarer metals, besides being an expert microscopist following out the work of Michael, who wrote the Ray Society volumes on the *Oribatidae*. As an entomologist we all knew of his association with the works of F. N. Pierce to whom he furnished much of the material and preparations for comparison. We remember too his masterly proving that *Hydroecia nictitans* as then treated was a multiple species, and clearly showing the specific distinction of the fine forms, which we now know as *H. crinanensis*. Subsequently this separation by genitalic characters was confirmed by breeding. This was considered a fine confirmation of the practical use of these structures as reliable specific characters.

His skill in portraying with his pencil the indications given by his

wonderful microscopic slides was amazing. Literally he made thousands of sketches especially for the use of F. N. Pierce in his studies and classical works on our British Lepidoptera, for articles for various friends and workers, J. W. Tutt, L. B. Prout, Col. Swinhoe, myself, etc. But his entomological work was not confined to his indoor study. While able he was an active collector in the marshes of his neighbourhood in and around Tilbury and Thames Haven, at the same time using in his large, rather wild overgrown garden, both light and sugar. The results reported time after time many local species often in numbers. These efforts were continued for many years until infirmity grew on him, when he freely disposed of his apparatus to younger men, whom he thought showed aptitude for future study. On the death of the late Dr. Chapman he received the material amassed by him for his study of that mysterious group the *Psychidae* and set to work in earnest, corresponding with those interested in them both in Europe and America. He finally amassed a fine collection and made extensive notes, but expressed dissatisfaction with all he had done owing to insufficiency of literature on the subject. Recently the whole of this collection and the notes concerning it were passed on to our colleague T. Bainbrigge-Fletcher as the only available entomologist to carry on the investigation. His collection of British Lepidoptera was quite representative and had been used to furnish specimens for his own and others' investigations on their structural characters.

In spite of all these scientific activities his life's duties stood first and were never neglected. His parish duties were carried on well and attracted many, who were not parishioners, to his little church. A few years ago, when his infirmity was growing upon him, the Bishop of Chelmsford visited him and was extremely kind with his sympathetic remarks and commendations on Burrows' labours. Locally his worth has been expressed in a long notice in the "Grays and Tilbury Gazette." Although the weather was extreme at his funeral, the church was filled by many who had known him, or were interested in the church work he initiated, or had sat under him many years, even long ago.

He was never married, but still had a great love for older children, and many are the lads in difficult home associations, whom he has influenced to become useful men and citizens. In appearance he had a striking resemblance to the famous Dr. Alfred Russel Wallace. For many years he had been a Fellow of the Entomological Society of London and in 1920 with the writer became a Life Member of the Entomological Society of France.—HY. J. T.

[In *A.M.N.H.* (4) XIV. 394-420 (December, 1875), A. G. Butler described a Collection of Lepidoptera from Southern Africa by which the collection of the B.M. had "lately been enriched, through the liberality of C. R. N. Burrows, Esq.," by whom the insects had been collected or bred, "chiefly at (sic!) Natal." Amongst these is *Tatorinia burrowsii*, n.sp. (pp. 408-409).—T.B.-F.]

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In the Review on p. 11 (ante) it should have been stated that the work mentioned could be obtained from Messrs. R. B. Janson & Son, 44, Gt. Russel St., W.C.1, who are the agents for the *Mem. Ins. Sci. Cherif. du Maroc*.

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## MEETINGS OF SOCIETIES.

**The Royal Entomological Society of London.**—41, Queen's Gate, South Kensington, S.W. 7., 8 p.m. March 3rd, 17th.

**The South London Entomological and Natural History Society,** Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. Feb. 25th, March 11th.—Hon. Secretary, S. N. A. JACOBS, "Ditchling," Hayes Lane, Bromley, Kent.

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Communications have been received from or have been promised by Capt. K. J. Hayward, (the late) Rev. C. R. N. Burrows, H. Willoughby-Ellis, Hy. J. Turner, D. G. Sevastopulo, A. J. Wightman, T. Greer, T. Bainbrigge-Fletcher, Dr. Malcolm Burr, E. P. Wiltshire, Dr. E. A. Cockayne, Rev. R. E. E. Frampton, Orazio Querci, Dr. Verity, L. T. Ford, H. Donisthorpe, C. Nicholson, J. E. Collin, H. W. Andrews, Capt. C. Q. Parsons, G. Heslop Harrison, B. C. Warren, Wm. Fassnidge, and Reports of Societies.

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*Alexandrovsky*

*The Entomologist's Record.*

A. B. SHELKOVNIKOV.

## Cornish Notes 1936.

By CHARLES NICHOLSON.

(Concluded from page 16.)

*Miana latruncula*, Schiff. (determined by W. H. T. Tams) was the first specimen I have met with and was represented by 2 wings left by a bat in our verandah on 25th June.

*Agrotis tritici*, a small dark specimen (vouched for by Miss Annie Prout), wings in verandah 9th Sept.

*Agrotis segetum*, var. *nigricornis*, Villers. One wing in verandah on 24th Oct. This was the only *segetum* wing in the verandah this year.

*Noctua glareosa*, 1 wing in verandah, 22nd Sept.

*N. plecta* seems to have been exceptionally common in the county this year. Usually I find a few wings in the verandah and an odd specimen or two otherwise, but this year 18 specimens were represented, of which 8 came on the night of 21st Aug. which was rather cooler than those on either side of it. Mr. B. A. Cooper of Willesden, Secretary of the Amateur Entomologist's Society, spent a fortnight's holiday near Falmouth in July and August and reports that on 6th Aug. "a warm dark wet night with bright moon later, I took at sugar about 40 *N. plecta*, though during the previous 10 days I had only taken 4 in all and these in the last 3 days. This, of course, may have been due to weather, but other species did not correspondingly increase. I also took 5 *plecta* flying along hedges on this night, which I had not done previously. Many specimens appeared quite fresh, but it hardly seems likely that such a large number would emerge at once." This experience seems to suggest that *plecta* may sometimes be an immigrant, but I am not aware of any evidence in favour of that idea. Has any other reader had a similar experience this year?

*Epunda nigra*, one wing in verandah 28th Sept. ; there were several last year.

*Plusia gamma*. In scores at flowers of ragwort, which is very plentiful, on the sand dunes (locally known as "towans") at Perranporth on 28th Aug., often 4, 5, or 6 at the same plant. Not much in evidence elsewhere, from all accounts, but many wings left by bats in our verandah, representing about 59 specimens, between 26th June and 14th Nov.

*Nomophila noctuella*. The only specimen seen this year was a very worn one in an upland field on 5th July. I feel sure that this species, as well as the next, live and breed in the gardens hereabouts and that knotgrass is not the only foodplant of *noctuella*, because there is none in the garden and the places where one finds the moth are not usually likely habitats for the plant.

*Phlyctaenia ferrugalis*. I usually see a few specimens of this flying in the verandah, or on the windows attracted by light, but it was represented by wings only between 31st Aug. and 27th Sept.—seven specimens on 7 days.

*Chlorissa viridata*. On 16th June I was at the Lizard for the day and was fortunate enough to see and box a very faded female of this little Emerald on a Common there. She laid a good many eggs on heather (ling) and a few on hawthorn, but the larvae did not appreciate the former and I lost a good many. The survivors fed better on

hawthorn but I have only 6 pupae. Whether they are cannibalistic or simply born escapers, I don't know.

*Acasis viretata*. A single moth in the usual worn condition of captured specimens was seen here on 25th Aug.—only the second one in 8 years in spite of the privet hedge on one side of the garden and plenty elsewhere.

*Euphyia bilineata*. This species is very rare here (1) but 3 specimens have been seen this year—one disturbed from a hedge on 7th June and the others represented by wings in the verandah on 2nd Aug. Only 1 seen in previous years.

*E. silaceata*. I have always wondered why I have never seen this here; but this year a living one was seen on a window on 20th Aug., a dead one on the verandah floor on 26th Aug. and wings of 3 others on 21st, 30th Aug. and 8th Sept. respectively.

A grey Geometer with 2 very zigzag transverse lines and some other indistinct markings, boxed in the verandah on 18th Aug. was determined by Mr. L. B. Prout as *Hydriomena obeliscata* and wings of three others appeared on 9th, 19th and 27th Sept. respectively. On 25th Sept. a wing of the brown form with darker central fascia appeared in the verandah. This is the form with which I am well acquainted, and have seen in the New Forest, Surrey, and other pinewoods. The sudden appearance of these two forms here is extremely interesting, because I have not seen them before. With the exception of larch plantations and various other conifers on Pencalenick estate half a mile away and 3 pines in my own garden 2 of which were grown from seed and the other dug up as a small seedling about 5 years ago at Parkstone, Dorset, there have been no conifers here until 3 years ago when a belt of young larches was established in a meadow across the road but not opposite the house. The moths may have existed before in the plantations and spread to the young larch belt and thence to my pines; if so, an interesting instance of extension of area.

*Dysstroma truncata*. The first brood of this was not seen, the first appearance—wings in the verandah—being on 17th Aug.; after that just 100 specimens were recorded, either living or wings only, in the verandah from 30th Aug. to 13th Oct., the last specimen, at rest on the house wall, being the blackest I have seen so far. Several *centum-notata* and 1 *comma-notata* were amongst them, but most were *perfuscata* forms.

Not quite so many species (55) were represented by wings in the verandah as last year (59); they consisted of Butterflies 1 (*megea*), *Noctuae* 31, *Geometrae* 18, *Pyrales* 5. I may add that there were about half a dozen slight frosts between 28th Sept. and 15th Oct., the only ones worth noticing being on the nights of 6th and 7th Oct., which seem to have driven most of the butterflies into hibernation and of course reduced the dahlias and nasturtiums to ruins. Nevertheless 2 *croceus*, 1 *c-album*, 2 *atalanta*, and 1 or 2 *urticae* and the *stellatarum* were seen on various dates up to 9th Nov., and wings of *gamma* continued to be found in the verandah at intervals up to 14th Nov.—(TRESILLIAN, TRURO, CORNWALL.)

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## Macrolepidoptera. Collecting notes for 1936 in South Devon and elsewhere.

By CAPT. C. Q. PARSONS.

The larvae of *Agrotis lucerneae* were scarcer than in 1935, those of *H. oditis* (*hispidus*)\* still survive, though, I think, the insect will soon be exterminated in Torquay by the trampling of the annually increasing number of summer visitors.

A ♀ *Dasyampa rubiginea* came to sallow on 28th March, laying 16 fertile ova and no others, though she survived another 10 days, when I liberated her.

Larvae of *Agrotis tritici* and *A. vestigialis* were dug out from under chickweed on the sand-hills early in May, still quite small. Kept in an open tin half-filled with sand and fed on cabbage and lettuce, they were very shy, dragging the foodplant below the level of the sand to feed in the daytime and at night, producing only their heads which they rapidly withdrew at the slightest sign of illumination. When apparently quite full grown they seemed to throw discretion to the winds, racing round and round the tin in spite of the glare of an electric torch, possibly searching for a better place in which to pupate.

Even at that stage there seemed no very striking difference in the two species by their speed or markings.

*Agrotis ripae*, which were reared on the same diet in Sept., 1935, have till now, Jan., 1937, shown no sign of grease and when fed on carrot have invariably been discoloured before being removed from the setting board.

*Drepana lacertinaria* appeared at light on 10th May, *Ephyra porata* on the 15th, *Drymonia trimacula* (*didonea*) and *Notodonta trepida* the 19th, the last insect in some numbers: *Palimpsestis duplaris*, 10th June. On the 19th of May *Ectropis punctulata* appeared with *Hydriomena ruberata*, which flew rather locally on a heathy bit of ground: a ♀ of the latter species obliged with a good batch of ova; unfortunately the larvae proved cannibalistic to the extent that they showed a liking for the hind claspers of their neighbours. They were not sleeved on a growing bough; but fed on *Salix caprea* in rather close quarters, whenever their food was changed quickly spinning the leaves to the bottom of the tin, starting this habit at a very early stage. I have no other species of sallow or willow in the garden and thought they would find the leaves of *S. caprea* rather too spacious to cope with when growing on the tree, unless of course they had made the best of circumstances by folding over the edges of the leaves to form a retreat.

*Dyschorista fissipuncta* (*upsilon*), in company with *Amathes lota* nearly fullfed, on 1st June were found in the chinks of willow bark.

I visited a locality near Chagford on 7th June with a friend, where the slug-like caterpillar *Ruralis* (*Thecla*) *betulae* was fairly plentiful. Unfortunately only two *Nola cucullatella* appeared in the beating tray; an insect which has so far practically avoided me. Broom was more productive yielding *Chesias legatella* (*spartiata*).

During an unsuccessful search for the larvae of *Agrotis obelisca* some miles west of Paignton, I was surprised to find two larvae of *Callimorpha quadripunctaria* (*hera*), almost fullgrown feeding on salad

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\* *hispidus* is not a British species.



burnet. *Erastria fasciana*\* was dislodged fairly plentifully while beating oak trees on the 10th. [While having a picnic lunch on the 11th by the side of the road on the high ground between South Brent and Gidley Bridge I was pleased to see *Epirrhoë tristata*. At one time there must have been quite ten apparently assembling in a small group. South mentions Dartmoor as a locality, but so far I have not seen it here in 14 years.]

The night of 19th June was very hot and thundery inland in S. Devon, though I'm sure the Rev. T. G. Edwards had more variety at his single coast lamp-post (Vol. XLVIII. No. 9) than I had in my haste. The night was so good that I had not the patience to remain in one locality, but sampled three, several miles from each other. *Hadena (Mamestra) contigua* and *H. (M.) genistae* ignored my patrol lamp and just sat on the grasses, the former in fair numbers. Those which came to light included *D. dodonea*, *D. lacertinaria*, *D. falcataria*, *Acronicta leporina*, *Diacrisia sannio*, *Pseudoterpna pruinata*, and *Chlorissa (Nemoria) viridata*, the last mentioned in profusion, mostly faded.

On the 20th June *Neuria reticulata* appeared at valerian blossom, *Stauropus fagi* came to light on the 23rd, and two *Senta maritima* in different surroundings on the 24th.

In the woods again on the 27th the males of *Comibaena pustulata* arrived unfaded.

In a belated attempt to catch *Eupithecia pini (togata)* on 7th July in a locality where it occurred some years ago, I found *Calocalpe undulata* fairly common, only having seen it here once before.

I stopped at Grange-over-Sands from the 11th to the 21st, during which time the weather was mostly rainy and cold with the exception of one night when the rain was accompanied by thunder and lightning; then everything was perfect.

The species taken, mostly at light near Holker Moss, included *Noctua primulae (festiva)*, *N. baja*, *N. brumnea*, *N. ditrapezium*, *Cleoceris viminalis*, *Dyschorista suspecta*, *Hipparchus papilionaria*, *Xanthorrhoe munitata*, and *Venusia cambrica* in small numbers, and *Hydriomena furcata (sordidata)* in great profusion and variety. *Abrostola tripartita*, *Plusia iota*, *P. moneta*, and *Mamestra furva*, the last named somewhat worn, were attracted by valerian blossom.

A fresh ♀ *D. suspecta*, which I provided with a tempting piece of Cocksfoot grass, sugar and alcohol, perished miserably; it was only on my return home that I discovered in "Barrett" that she would have much preferred a birch trunk.

On the 22nd I moved on to Ainsdale till the 29th. *Agrotis praecox*, *A. vestigialis* and *A. tritici* appeared at ragwort blossom, some of the last species, or possibly *A. nigricans*, were sooty black.

The poplars in places harboured hosts of the empty cocoons of *Leucoma salicis*. The larva of *Dicranura vinula* was common; but I saw no signs of *D. bifida*. On one of two birch trees I found 5 *A. leporina* and 2 *N. dromedarius*, the other birches in natural surroundings between Southport and Formby appeared to grow on Formby golf course. In

\* This is not *fasciana*, L, which is *Pammene fasciana*, L. (= *juliana*, Curtis). The Noctuid here referred to is *pygarga*, Hufn. 1766 (See Durrant, *Ent. Record*, XXXII, 35-36, 1920)—T. B.-F.

the same district on both public and private land I saw only one oak tree and that of an uncommon kind, well pruned, in Lord Street, Southport. consequently some well fed *D. binaria*, which I was rearing died from want of better occupation.

*Epunda lutulenta* and one var. *consimilis*, Stph. appeared at sugar on 17th Sept. I managed to get the resultant larvae as far as the 2nd instar for the second time; when they died about mid December from no apparent ailment. They were kept in a room with a minimum temperature of about 45°. Last Autumn they were provided with a piece of damp blotting-paper in the bottom of the air-tight tin, though none appeared to have any difficulty in changing their skins on either occasion. In 1935 I placed some larvae on a growing clump of grass in a flowerpot covered with fine muslin placed in an open window; but they fared no better than the other half of the batch fed on cut grass in close confinement. I should be most grateful for any advice on the subject.

There was a complete absence of *Agrotis segetum* at the Autumn sugar; the species swarmed in 1935. A pair of *Leucania l-album* I enclosed in a 2lb. jam jar for 3 nights, and provided with slight nourishment, finally resulted in some 50 infertile ova. There could have been no mistake about the sex of the male with his black basal tuft.

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## A Contribution to our Knowledge of the Lepidoptera of the Islands of Eigg, Canna, and Sanday.

By GEORGE HESLOP HARRISON, B.Sc., Ph.D.

The present paper results from two visits paid to Canna and Sanday in November, 1935, and August, 1936, and two to Eigg in April, August, and September, 1936. It does not by any means purport to be a full account of the Lepidoptera of these islands, as that group was collected more or less casually as a relaxation from more intensive work in other directions.

On Canna and Sanday, except for the plantations near the houses of the owner, Mrs. Thom, where ash, elm, conifers, etc. grow, only wild roses, *Salix aurita*, *S. repens*, and similar shrubs are encountered. I therefore restricted my energies on this island, except by day, to sugaring near the plantations, and to working the ragwort flowers.

As for Eigg, the natural vegetation is much richer than that of Canna, birch, willows, alders, hawthorns occurring in the gorges and sheltered valleys. Moreover, many of the slopes up the ridges bear hazel, whilst higher still, holly and scrub oaks are to be found frequently in the rock clefts.

On all three islands, throughout my stays, heavy rain and wind impeded the work, which was further affected by the fact that, from previous experience, I knew the dangers of working in the dark alone; thus much of the more promising ground remained unexplored.

*Pieris napi*, L.—Common, and especially the females, quite dark; everywhere on the three islands.

*P. rapae*, L.—Sparingly on Eigg.

*Vanessa atalanta*, L.—Common enough, as a result of the 1936 immigrations, everywhere.

*V. urticae*, L.—Also plentiful, and much the same as North of England specimens; on all the islands.

*Maniola jurtina*, L.—Very fine, especially on Canna and Sanday, in the form of var. *splendida*, B.-W.

*Polycommatus icarus*, L.—On Canna not rare, with large, very blue females.

*Smerinthus populi*, L.—Larvae quite common on various *Salices*, Eigg, and on *S. repens*, Canna.

*Dicranura vinula*, L.—Also as larvae on *Salices*, Eigg.

*Pheosia tremula*, Cl.—Beaten, although sparingly, from willow on Eigg.

*Lasiocampa quercus*, L.—Larvae common on all the moors of Canna and Eigg.

*Macrothylacia rubi*, L.—Sparingly on the moors of Eigg.

*Saturnia pavonia*, L.—Larvae on *Calluna* on Eigg.

*Hylophila prasinana*, L.—Beaten from oak, Eigg.

*Spilosoma menthastri*, Esp. and *S. lubricipeda*, L.—Both found as larvae on Eigg.

*Arctia caja*, L.—Young larvae on Eigg.

*Acrionicta rumicis*, L.—Larvae found on various low plants, Eigg.

*A. psi*, L.—Larvae beaten from birch on Eigg; a curious fact, as I have not seen this common species on any other island of the Inner Hebrides.

*Noctua glareosa*, Esp.—On ragwort flowers, and quite typical.

*Noctua brunnea*, Fab.—Not common on Eigg.

*N. xanthographa*, Fab.—Common enough and, except for var. *rufa*, Tutt, and var. *obscura*, Tutt, showing but little of its usual variability; Eigg, Canna, and Sanday.

*Agrotis c-nigrum*, L.—Also found on Eigg, and *not* on Raasay, Rona, Scalpay, or Canna.

*Triphaena comes*, Hb.—Common on Canna and Eigg, but no *curtisii* or *nigrescens* forms were captured.

*T. orbona*, Hufn.—Very rare, Eigg only.

*T. pronuba*, L.—Common enough on all the islands.

*Mamestra oleracea*, L.—Larvae common on low plants on Eigg.

*Charaas graminis*, L.—Abundant on flowers on all the islands.

*Luperina testacea*, Hb.—Found on Canna and Eigg, but not on Rona or Scalpay.

*Miana strigilis*, L.—Common everywhere.

*M. fasciuncula*, Haw.—Common enough and well distributed.

*Xylophasia monoglypha*, Hufn.—Abundant and quite typical, Eigg and Canna.

*Aporophyla lutulenta*, Bkb.—Rare on Eigg, in form of var. *luneburgensis*, Fr.

*Polia chi*, L.—Scarce, and quite ordinary, on Eigg and Canna.

*Hydroecia crinanensis*, Burr.—Common on Eigg, Canna, and Sanday at ragwort.

*H. lucens*, Fr.—Also of frequent occurrence.

*H. paludis*, Tutt.—Rare Eigg and Canna. These three species have been verified by reference to preparations, which I have made of their genitalia.

*H. micacea*, Esp.—Very abundant, especially on Canna.

*Caradrina quadripunctata*, F.—Common enough; Eigg and Canna.

*Pachnobia rubricosa*, Fab.—Generally common on Eigg, and practically always as var. *rufa*, Tutt.

*P. leucographa*, Hb.—A single male of this unexpected insect, which I believe is here recorded for the first time for Scotland; Eigg only.

*Taeniocampa gothica*, L.—Nearly always as var. *pallida*, Tutt, and forms between it and *rufescens*, Tutt. One splendid *obsoleta* female, however, was captured; Eigg only.

*T. stabilis*, View.—As var. *pallida*, Tutt, and var. *rufa*, Tutt, on Eigg.

*T. incerta*, L.—Very pale forms on Eigg; distinctly rare.

*T. gracilis*, L.—Not uncommon; var. *pallida*, and var. *rosea*, Tutt, at flowers of *Salix aurita*, Eigg.

*Omphaloscelis lunosa*, Haw.—Far from uncommon on ragwort flowers on Eigg and Canna.

*Xanthia lutea*, Strm.—Rare on Eigg.

*Calocampa exoleta*, L. and *C. vetusta*, Hb.—Both of these species are not uncommon at sallow on Eigg in spring.

*Plusia gamma*, L.—The 1936 immigration was responsible for the abundance of this species on Eigg, Canna and Sanday.

*Hypena proboscidalis*, L.—Common where nettles occur.

*Ortholitha limitata*, Scop.—Scarce on Eigg.

*Trichopteryx carpinata*, Bkh.—Not uncommon amongst birch on Eigg.

*Cidaria pyraliata*, Schiff.—A single specimen on Eigg.

*C. corylata*, Thnbg.—Larvae plentiful on Eigg.

*C. truncata*, Hufn. *C. immanata*, Haw.—The former nearly over, and the latter at its best on Canna, Sanday, and Eigg when I was there in August and September; both very variable.

*C. miata*, L.—Quite common, Eigg.

*Coremia designata*, Hufn.—A few specimens on Eigg.

*Thera variata*, Schiff.—Taken from spruce on Canna.

*Amoeba olivata*, Schiff.—Past its best but still common; Eigg in September.

*Malenydris multistrigaria*, Haw.—Common on Eigg in April.

*M. didymata*, L.—Also common enough; Eigg and Canna.

*Campyogramma bilineata*, L.—Abundant on all the islands especially in the form of the dark-banded variety.

*Eupithecia goossensiata*, Mab.—Larvae common on heather; Eigg.

*E. castigata*, Hb.—Larvae on various flower heads, Canna, Sanday, and Eigg.

*Abraxas grossulariata*, L.—Larvae very common on heather, Eigg and Canna.

*Lomaspilis marginata*, L.—Larvae on *Salix aurita* on Eigg.

*Cabera pusaria*, L. and *C. exanthemata*, Scop.—Both of these species are common enough in their larval stages.

*Epione apiciaria*,\* Schiff.—Females captured, and eggs obtained on Eigg; not seen on Raasay, Rona, etc.

*Metrocampa margaritaria*, L.—Larvae on Eigg in spring.

*Selenia bilunaria*, Esp.—Larvae found on *Salix aurita* on Eigg.

*Gonodontis bidentata*, Cl.—Captured as the imago in the third week in April on Eigg.

*Boarmia repandata*, L.—Larvae on heather, etc. on Eigg.

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\* = *repandaria*, Hufn.

## NOTES ON COLLECTING, etc.

MICRO-COLLECTING. MID MARCH TO MID APRIL.—The larvae of several species of the genus *Hemimene* feed in the roots of the common yarrow (*Achillea millefolium*) during the winter months and are best obtained in March. The larvae burrow for a short distance up the flowering stems of the previous year and if, during mild weather, the stems are gently pulled up with as much of the root as possible, many will be found to contain a larva. The stems often break at the point at which a larva is feeding. During cold weather the larvae will be down in the root stock. The stems should be planted in a shallow seed box and when the imagines are due to emerge the box should be covered with muslin or other suitable material stretched on a light wooden frame. In this manner I have bred a number of *politana*, *petiverella*, *sequana*, *plumbana* and *plumbagana*.

The larvae of *H. acuminatana* feed in the root stocks of the ox-eye daisy (*Chrysanthemum leucanthemum*), mining up the new flowering stems, causing them to be shorter and thicker than normal; the leaves on tenanted stems are also dwarfed. If all suspicious looking stems are opened until a larva is found, one will soon learn to recognize which contain larvae. The stems should be gathered towards the end of March. The larvae of *H. consortana* feed in a similar manner about three weeks or a fortnight later.

The imagines of *Mompha propinquella* are seldom seen even in localities where this species is plentiful; the larvae, however, can readily be obtained by carefully searching the seedling plants of the willow-herbs—*Epilobium hirsutum* and *E. montana*—in the lower leaves of which they feed towards the end of March and early in April. Plants growing in sheltered places—*e.g.*, around a tree stump or in a hedge bottom—seem to be preferred by this species to plants in more open ground. When feeding on *E. hirsutum* the larvae generally use the lower part of the leaf, mining down into the thick fleshy stalk where they are not easily seen. When *E. montana* is chosen as the food plant, the whole of the leaf is mined, three or four leaves being used altogether: the bleached leaves, betraying the presence of a larva, are fairly conspicuous. Plants containing a larva should be pulled up and planted in damp sand in which they will grow sufficiently for the larva to reach maturity.

*M. miscella* is another species which can more easily be obtained in the larval stage. The larva mines the leaves of rockrose (*Helianthemum*) preferably of plants growing on a bank. The white blotches on the leaves, although small, stand out in contrast with the dark green foliage. The larva is full fed about the middle of April.—L.T.F.

LARVA OF OXYPTILUS PARVIDACTYLUS, Hw.—*Oxyptilus parvidactylus* is abundant at Rodborough from the last week of May onwards throughout June and in less numbers in July and its foodplant, *Hieracium pilosella*, grows in quantity on the hillsides, but its larva has so far eluded me and I shall be obliged if any reader can give any practical hints for its discovery when about full-fed. Chapman's account (in Tutt's *Brit. Lep.* V. 423-424 : 1906) states that the larva feeds hidden in the centre of the plant, at the base of a young central leaf, and Meyrick

(*Rev. Handb.*, p. 450: 1928) says "in heart of *Hieracium pilosella*," Huggins, however, states (*Entom.* LXII. 138: 1929) that the larva is found on the young leaves, sometimes penetrating very lightly into the central rosette, killing the young shoot, but it does so externally, burying its head and front segments only. Chapman (*l.c.*) states that he found larvae at Reigate on 4th June, 1906. I imagine that this date would be rather late to look for them here, as the moth is well out by then (Tutt's date, "the last fortnight of June," is nearly a month too late) and I should expect the end of April or early in May to be about the right time. Huggins says, "the larva is at the present date . . . to be found feeding"; but, as the date is not given, this is not very helpful: presumably his note was written in May, as it was printed in the June number of the *Entomologist*. The larvae must be present here in considerable numbers, judging by the abundance of the moth, but none of the plants which I have examined has shown any sign of feeding. It may be merely that there are so many *Hieracium* plants that it is difficult to find an individual larva, as is the case with *Stenoptilia pterodactyla*, which is common in my garden, but there are so many thousands of *Veronica* plants that often a long search is required to find a *pterodactyla* larva, as they are very scattered. The larva of *O. parvidactylus* could doubtless be reared from the egg on potted plants, but I should like to be able to find it under natural conditions and any hints regarding this will be welcome.—T. BAINBRIGGE FLETCHER. Rodborough, Glos. 24th February, 1937.

EVETRIA PURDEYI, DURRANT, IN GLOUCESTERSHIRE.—*Evetria purdeyi* was originally described by Durrant (*E.M.M.* XLVII. 252-253: 1911) from Folkestone, attached to Scotch Fir (*Pinus sylvestris*). In 1912 it was recorded from Norfolk by South (*Entom.* XLV. 327) and Whittingham (*t.c.* 295). In 1917 Adkin (*Entom.* L. 141) recorded it from Lewisham, where it had been found since 1907, under Austrian Pines (*Pinus laricio* var. *nigricans*). In 1924 Huggins (*Entom.* LVII. 42) noted it at Sittingbourne, bred from old shoots of Scotch Fir. In 1926 (*Entom.* LIX. 160) Waters recorded it from Dawlish and Kingswear, S. Devon; among Austrian Pines. In 1927 Huggins (*Entom.* LX. 232) noted it from Freshwater I.W. In 1930 Fassnidge (*Ent. Rec.* XLII. 167) recorded it from Chilworth and noted that it was increasing in S. Hants. In 1932 Adkin (*Entom.* LXV. 33) recorded it from Eastbourne in 1930. On 14th August 1936 I took a specimen at light in my house here and this had probably come from the pine-trees (Austrian Pines, I believe) in my garden. Its occurrence in Gloucestershire, whence it has not been recorded previously, is a noteworthy extension of its distribution in S. England.—T. BAINBRIGGE FLETCHER. Rodborough, Glos. 24th February, 1937.

POLYGRAPHUS POLYGRAPHUS, L., IN SUFFOLK AND NORFOLK.—Through the kindness of Mr. H. S. Hanson, I have recently been able to take examples of this very rare British beetle, near Halesworth in Suffolk. On 3rd February I went to this locality, where I was met by the forester in charge, who showed me a number of spruce trees (one quite dead, others nearly so), which were being attacked by this wood-borer. Its larvae occurred in very great numbers, the whole of the bark of the trees being riddled by its borings. I was able to get a

nice series of the adults for myself and the Museum, and many larvae and sections of bark for the latter. Mr. Hanson also told me it was equally abundant at Thetford in Norfolk.

The only other known genuine British locality is Scarborough. In the *Entomologist's Annual* for 1872, p. 88, E. C. Rye writes, sub *Polygraphus pubescens*, F.—“A few specimens of this interesting wood-feeder, belonging to a genus new to our lists, were taken at the end of last summer, under fir bark near Scarborough, by Mr. R. Lawson, to whose accustomed liberality I am indebted for this insect.” Fowler's record [*Col. Brit. Isles* 5 424 (1891)], of course, refers to the same capture.

Dr. Joy recorded (*Ent. Mo. Mag.* 1925, p. 16) this beetle from under the bark of a pit prop at Barry Docks, S. Wales. These specimens were most probably introduced from the Continent. The beetle not having, otherwise, been taken for nearly 70 years, it was beginning to be regarded as a non-genuine British insect (like so many of the old captures at Windsor Forest, and elsewhere, which we have since retaken); but there is now little doubt that it was a good British species, and has occurred, perhaps sparingly, in other British localities, but has not been found. Lieut. Colonel Graurdet in his admirable *Catalogue of the Coleoptera of the Forest of Fontainebleau*, records this beetle as being a pest in that forest. He also points out that it has destroyed a number of *young* spruce plantations. Personally I am more interested in its distribution and occurrence as a British insect than in the question of its being harmful or otherwise. As to how it should be dealt with I will leave to those who study such matters.—HORACE DONISTHORPE. Department of Entomology, British Museum (Nat Hist.).

“THE ASPARAGUS FLY” (*PLATYPAREA POECILOPTERA*, SCHR.) IN ENGLAND.—The January number of the *Journal of the Ministry of Agriculture* contained an article on the appearance in England of this fly, well known on the Continent as a “pest” affecting asparagus. The larvae burrow in the stems of this plant and weaken their growth. The imagines appear from mid-June to mid-July. Pupation takes place in the stems and eventually, when these decay, the pupae winter in the earth. This fly is one of the Trypetid group and resembles the well known “Celery Fly” (*Acidia heraclei*, L.) but is somewhat larger and darker. It was first noticed in 1935 in a private garden in Hertford, and subsequently numerous infestations have been found in South Herts. The article, illustrated by two plates, treats of the life-history of the species and of various remedies, of which the most effective so far found is to cut down and burn infected stems in the autumn, thus preventing the pupae from escaping from the decaying stems to the earth. Experiments are now being carried out with a view to obtaining a soil-insecticide that will destroy the over-wintering pupae.—H.W.A.

NEW BRITISH LOCALITIES FOR *METRIOPTERA ROESELII*, HAGENBACH, AND *METRIOPTERA BRACHYPTERA*, L. (ORTHOPTERA, TETTIGONIIDAE).—Up to the present, *Metriopectera roeselii* has been regarded as a littoral species in Britain. It has only been recorded from around the mouth of the Thames and from just south of the Humber (vide Lucas, *British Orthoptera*, Ray Society, 1920, p. 169).

On 3rd August, 1933, I found this species quite commonly on the



roadside between Wickford (Essex) and Maldon (Essex), and I found it again, on 5th August between Wickford and Burnham-on-Crouch. The males were "singing" loudly on the grass stems about a foot from the ground in the hot sun. They were difficult to see, and I had to approach with caution, for a quick movement on my part stopped them "singing" and sent them to the grass roots. I only managed to catch two males, and I saw no females. The colonies spread quite a long distance, but were sparsely populated, and all the insects were either in or near the roadside ditch.

I have not visited the above area since 1933 and saw no more of this species until 31st August, 1936, when I came across quite a populous colony at Doddinghurst near Brentwood (Essex), and a small one near Brentwood Wireless Station. Again I caught no females. On 24th September, 1936, I found a colony in a damp meadow at Billericay (Essex), and here I caught two females and several males. The individuals of this colony appeared to be rather greener than those of the others. This may be due to the unfavourable season (Lucas, p. 168).

Dr. Burr considers rank vegetation in damp fields favourite spots for the species (Lucas, p. 168). This agrees very well with my observations. Thus this species does occur inland (Brentwood is 22 miles from Southend and 12 miles from Tilbury), in Essex at any rate, and can no longer be regarded as wholly littoral in England. It is not littoral on the continent.

On 2nd September, 1936, I found a colony of *Metrioptera brachyptera* at Burnham Beeches (Bucks). Dr. Burr informs me that this is a new locality for this species. It was a very populous colony, the insects hopping up in numbers as I walked about. So far as I could see females were more numerous than males. The colony was situated in a damp, low-lying part. They were far less nimble than *M. roeselii* and their song was altogether different, being a short chirp, whereas that of *M. roeselii* was a very shrill, piercing, long note continuing for perhaps a minute and a half. I do not know whether the lack of sun on that day had any effect on the chirping of *M. brachyptera*.

Dr. Burr has very kindly confirmed my identification of the two species.—PAUL FREEMAN. Imperial College of Science and Technology, S. Kensington, S.W.7. January, 1937.

[Mr. Freeman's note is very interesting. I see no reason why *M. roeselii* should not turn up in many other localities. I think Lucas is right in attributing the green colour to teneral condition. There can be little doubt that green was the original colour of the *Dectiidae*, in which it persists to the adult stage in a few species. Mr. Stainforth found it on the Humber shore, between Easington and Skeffing (*Ent. Rec.* XLVII. p. 102, 1935). In Bavaria Ramme found it swarming on cultivated land at a good altitude, but on higher, stony ground it was replaced by *M. brachyptera*. In West Prussia it was found only in wet places, and it is rather curious that there La Baume found *M. brachyptera* only in dry places, while with us it is associated with bogs. Ramme states that in the Alps there is no law. In Poland he found about half the specimens were of the macropterous form, which is surely the original. He considers that district near its focus of distribution. Worthington records *M. roeselii* "perhaps from Cambridgeshire in

Jenyn's collection, but not in his list" (*Derm. and Orth. of Cambridge-shire.*)

Refreshing my memory by a glance at Lucas, I see that he records *M. brachyptera* as taken on East Burnham Common by Mr. Campion.—M.B.]

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## CURRENT NOTES AND SHORT NOTICES.

A meeting of the Entomological Club was held at "Florence House," 332, Great West Road, Heston, on Friday, 18th December, 1936, Mr. H. Donisthorpe in the Chair. *Member present* in addition to the chairman—Mr. Jas. Collin. *Visitors present*—Dr. K. G. Blair, Dr. Malcolm Burr, Dr. A. D. Imms, Dr. Karl Jordan, Mr. J. Ramsbottom, Capt. N. D. Riley, Mr. W. Rait-Smith, Mr. W. H. T. Tams. The company arrived about 6.30 and was received by the Misses Kirk and Mr. Donisthorpe. The Chairman's six Entomological albums were on view, in which items relating to a large number of notable Entomologists, past and present, are to be found. The Chairman intimated that these will eventually become the property of the Royal Entomological Society of London. Supper was served at 7.30, and after a very entertaining and enjoyable evening the party dispersed about 10.30.—H. WILLOUGHBY-ELLIS.

A meeting of the Entomological Club was held at Tring on 21st November, 1936, Lord Rothschild in the Chair. *Members present*, in addition to the Chairman.—Mr. H. Donisthorpe, Mr. H. Willoughby Ellis, Mr. Jas. E. Collin, Mr. W. J. Kaye. *Visitors present*—Mr. C. M. Collinette, Major Philip Graves, Prof. G. D. Hale-Carpenter, Dr. Karl Jordan, Mr. John Levick, Sir Guy A. K. Marshall, Sir Edward B. Poulton, Mr. Louis B. Prout, Capt. N. D. Riley, Mr. H. Stevens, Mr. W. H. T. Tams. The members and visitors were received by Lord Rothschild during the morning at the Museum, where a special exhibit of the genus *Charaxes* was on view. The collection, consisting of 8000 specimens contained in 180 drawers was placed on tables for the convenience of the members and guests. The collection illustrated the advance in our knowledge of the genus since the publication of the Monograph of *Charaxes* and allied genera by Rothschild and Jordan in 1898-1900. Some 90 new species and subspecies have been discovered since the beginning of the century; others known at that time only from single specimens are now represented by good series; and in other cases the range of distribution has been considerably extended. The species are arranged in the collection in two main groups, the first group containing the stronger forms with the costal margin of the forewing heavily serrated, and the second the smaller species with less powerful flight and the serration of the costal margin denser and feebler. The species of the second group, particularly the ♀♀, frequently resemble some species of the first group, the similarity in colour and pattern being often surprisingly close. Luncheon was served after 1 o'clock after which the Museum was again open for inspection and the party dispersed about 4 o'clock having spent a very enjoyable day.—H. WILLOUGHBY ELLIS.

In a separate from *Flora og Fauna* (1936) of Denmark, 4 species new to Denmark are recorded, including *Acidalia herbariata*, *Sesia*

*myopaeformis*, *Ephyra quercimontaria* (compared with *E. punctaria*) and *Catocala adultera* (compared with *C. nupta*). We are indebted to Skat (Dean) Hoffmeyer of Aarhus cathedral, who is an enthusiastic entomologist.

The *Cape Naturalist* for 1936 devotes the greater portion of its issue to articles on Insects: The Christmas Butterfly (*Papilio demoleus*); Sound-producing Organs of a few Peninsula Insects; The Stick-insects of the Cape; Butterflies of the Cape; Useful Books on Insects of South Africa; etc.

The *Annales Entomologici Fennici* are published four times a year and contain contributions on all Orders of Insects. mostly in Finnish (with German summary) and German speech, with a few illustrations.

So few Fellows of the Royal Entomological Society took sufficient interest in the present late hour of meeting to reply to the Council's circular that the matter was dropped and unfortunately one still has to rush for train or is precluded from being present.

A *Bibliographical and Systematic Account of the Entomological Works of Jacob Hübner* is being published by the Royal Entomological Society. By Francis Hemming. The basis of the work is the wonderful collection of Hübner's original MSS., drawings, early issues, etc., now in the possession of the Society. Perusal of this Summary will doubtless settle for all time the actual dates of issue, the position of the much debated *Tentamen*, the position of the *Verzeichniss*, etc.

In the *Can. Ent.* there is an article on the genus *Lycaena*. Nine out of every ten entomologists will think of "blues." But no, the authorities say we must understand "coppers." As most lepidopterists are, and long will be, dependent on ordinary literature, surely it would be advisable for writers and editors to add ("coppers") after *Lycaena* although it savours of "black" = "white."

The Jubilee Meeting of the Verrall Supper took place at the Holborn Restaurant on 19th January, 1937, and although a record number of tickets had been applied for, many were unable to attend on account of the prevailing influenza epidemic, and the actual attendance was 167.

To commemorate the fiftieth anniversary the menu was specially prepared with a history of the event and two photographs of the late Mr. G. H. Verrall, one taken in the year 1887 the date of his first Entomological Club Supper, and one in 1911 the date of his death.

Sir Edward Poulton, F.R.S. was in the Chair.

After the two loyal toasts and the silent toast of Mr. Verrall the founder, Mr. Willoughby Ellis proposed a vote of thanks to the Chairman, during which he said the Entomological Club was instituted in 1826 by Messrs. George Samouelle, A. H. Davis, Samuel Hanson and Edward Newman, and has remained in permanent existence ever since.

Its centenary was celebrated in 1926 its age being now 111 years, the oldest purely Entomological Society in the world. Mr. Verrall was elected in 1887 and gave his first Club Supper in that year, just 50 years ago, and Sir Edward Poulton being the only survivor of those who were invited on that occasion was asked to occupy the Chair to-night, and they were very grateful to him for consenting to do so. The speaker referred to Sir Edward's leading position in the Entomological World and last year they congratulated him on the honour conferred on him by His Majesty the King and on this occasion on his

election as President of the British Association for the forthcoming session.

The toast was received with great acclamation and Sir Edward in reply thanked the company for their warm reception.

The following Overseas visitors were present—Mr. A. W. A. Brown, Toronto; Prof. E. O. Essig, California; Mr. N. B. Tindale, S. Australia; and Dr. Fritz van Emden, Dresden.

Mr. Jas. E. Collin, who as Verrall Supper Member of the Entomological Club is always responsible for the organization of these gatherings, is again to be congratulated on the excellent arrangements made for this notable occasion, which was one of the best and most enjoyable experienced during the long series.—H. WILLOUGHBY ELLIS.

Just twelve months ago we reviewed the *Catalogue of the Macrolepidoptera of Ireland* compiled by Lt. Col. C. Donovan, I.M.S. (ret.), and now there has been published a six-page *Supplement* from further data which have come to hand. The care with which the original work was compiled is evidenced by the fact that only two or three corrections have been necessary. The issue of this work was evidently wanted, for we have in these six pages short additional notes to nearly one hundred species. This work has evidently been a great impetus to the Irish collectors during 1936, and proves the practical use of such summaries of what has been done, to form a basis of further research, both in the field and in one's records. These extra pages can be obtained from Col. Donovan, Bourton-on-the-Water, Glos.

The annual instalment of the *Minen-Herbarium* has come to hand and contains examples of the leaf-mines of a further 20 species, making a total of 420 in the whole series so far. This time we have 7 mines of Lepidoptera, 11 of Diptera, 1 of Coleoptera and 1 of Hymenoptera. To micro-lepidopterists and to dipterists this series of admirably mounted and labelled specimens is essential to their studies. In fact in one's collection might be added to the imagines an example of a leaf or a portion of a leaf containing the creature's larval habitation, just as in the lepidopterous *Coleophora* series one usually adds an example of the larval case. Each example is mounted in a folded sheet of paper labelled with generic and specific names of both species and host plant, with the families of both added, also the locality. We must congratulate Dr. Hering for his praiseworthy efforts in this modern line of research.

Messrs. Batsford, Publishers, of N. Audley St., London, W.1, are issuing a series of moderately priced works entitled "Art and Nature in Colour." As a specimen we have received *The Beauty of Butterflies*, a small volume of quarto size consisting of 12 plates of illustrations of some of the most beautiful and strikingly coloured butterflies, natural size. There is an Introduction by Julian S. Huxley, who points out the "alarming ignorance of science among most literary men and artists", and goes on to say that "the realization of life's variety, of the existence of creatures that have their being in innumerable alien ways from ours, is a valuable corrective to self-centredness." He considers "Art, which fails to utilize the facts and ideas of science as material for inspiration, is undeveloped and unenterprising." Several pages of text on "tropical butterflies" are well worth reading with their references to Wallace, Bates, etc. About 40 figures excellently executed are given on the plates and a few notes on each species are added in

the list of figures. This is a very attractive publication and at the price of 5/6 is quite reasonable. Such works as well produced as this, are most useful as introductions to beauty in a study of natural science.

On 17th February a rather important paper, from an economic point of view, was read at the meeting of the Royal Society of Arts. "Recent Research on Wood-destroying Insects," by Ronald C. Fisher, B.Sc., Ph.D. After an introductory and brief account of the work of the Forest Products Research Laboratory at Princes Risborough, and some general remarks on the aim and scope of Forest Entomology, the lecturer passed on to the consideration of the insects known as "pin-worms," beetles of the families *Scolytidae*, *Platypodidae*, *Lyctidae*, etc. The *Lyctus* species was taken first, and after detailing its life-history he surveyed the methods adopted for the prevention of the spread of this pest, the points in the life-history more susceptible to preventive measures, with the opinions and suggestions of various specialists in these investigations. In a similar way the lecturer dealt with the *Xestobium* beetle ("death-watch") and noted the different method of attack. There was a very interesting tabular record of the Duration of the Life-Cycle of the latter beetle, on different woods, temperature, moisture content, fungus decay, life-cycle, etc., and the remarks on each species were illustrated by cinematographic pictures.

The *Memorie Soc. Ent. It.*, just received published in 1935 contains an account of the Tortrices of Piedmont by Dr. Della Beffa and registers a number of forms hitherto unnamed; Dr. U. Rocci discusses the possibility of *Zygaena transalpina* as now understood, being a composite species and in reality it may turn out to be a group of species.

In the *Memorie Soc. Ent. It.*, for 1936, Conte Turati and Sigr. Kruger add a large number of records of hitherto unrecorded species, new forms, and new species to the knowledge of the Lepidopterous Fauna of Cirenaica, illustrated with a plate of 27 figures.

Dr. Rocci in *Boll. Soc. ent. It.*, Oct., 1936, records and figures a *Zygaena maritima*, which has the R. fore-wing duplicated in place of R. hind-wing. The L. side is normal. The 2 wings are closely identical. An example of Homoeosis.

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## OBITUARY.

### A. B. Shelkovnikov. (With Plate.)

It is with profound regret that I have to record the death of my old friend, Alexander Borisovich Shelkovnikov, the news of which has only recently reached me. It occurred on 15th May, 1933, of angina pectoris.

Alexander Borisovich was born in 1870. His father was an artillery officer with a fine record of service. He was on the general staff in the Polish campaign and later received an appointment, very unusual for an Armenian, as Chief of Military District in Daghestan just after the pacification of the wild highlanders following the capture of Shamyl, which brought the thirty years war to a close. While in Daghestan he bought an estate called Geok Tapa, the Green Hill, in the district of Aresh on the steppes in the Transcaucasus, but never lived there,

for shortly after he died of typhus during the Turkish war. Alexander Borisovich was intended to follow his father's profession and passed through the Corps of Pages to the artillery of the Imperial Guard, but his heart was rather in Nature than in uniform. While still a Page he had attended meetings of the Imperial Geographical Society and was a Corresponding Member of the Academy of Science. So he abandoned his military career and withdrew to Geok Tapa, where he lived the simple life of a country gentleman and devoted his time to the development of his estate, which he beautified and modernized, and the study of the fauna and flora of the Caucasus. He took special pleasure in the lavish entertainment of numerous guests, mostly naturalists. He was a genial and delightful host and also a first rate all round naturalist. In 1912 and again in 1915 I spent several weeks of extraordinary charm at Geok Tapa, which I have described in *The Entomologists Record*, 1912, p. 297, Pl. II., and 1915, p. 251. It was to me a wonderful experience, working in not only the Caucasian province, but making the acquaintance of the strong Transcaspian element.

During the period of trouble, his estate was raided by Tartars, his house burnt down, and the beautiful park and splendid vineyards destroyed, and Alexander Borisovich and his family had some difficulty in escaping to Baku. After the revolution he received the congenial appointment of Director of the Armenian Museum and Botanical Garden in Erivan. In 1924 I saw him in Leningrad, when he and A. P. Semenov-Tian-Shansky lunched with me, and again in Moscow a little later, when he was on his way back to Armenia. He told me he was very happy in his work, as he spent so much time in the field on expeditions into the remoter parts of Armenia. Not long before his death he wrote that he intended spending a few more years wandering about the wilds of Armenia and after that he proposed to sit down and write an account of the animals and plants of the Caucasus, which he knew better than any man living. It is indeed a loss that he was not spared to complete what would have been a vivid description of a part of the world that is, even to-day, relatively little known.

Of course, he underwent the experience that so few escape in Russia, of a spell in prison, and for seven months after his liberation he was without employment. This undoubtedly undermined his health, but to the very last he was busy preparing for another expedition, and to the end his letters were full of vigour and optimism. I have known few men with a greater *joie de vivre*.

His contributions to scientific literature were not very numerous, for he was not a specialist. He produced several interesting accounts of his numerous expeditions into such little known districts as Karabagh and Svanetia, on the heights of Elbruz, but his fame will rest mainly upon the enormous number of specimens which enrich so many museums, bearing the well-known label: "D. Aresh. Geok. Tapa. Schelkovnikov." and his indirect contribution, through the numerous specialists, whom he delighted to invite to give them a glimpse of his wonderful world, was really very great.—MALCOLM BURR.

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CHANGE OF ADDRESS.—*H. B. D. Kettlewell*, to Homefield, The Common, Cranleigh, Surrey.

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## MEETINGS OF SOCIETIES.

**The Royal Entomological Society of London**.—41, Queen's Gate, South Kensington, S.W. 7., 8 p.m. March 17th, April 7th.

**The South London Entomological and Natural History Society**, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. March 25th. April 8th, 22nd.—*Hon. Secretary*, S. N. A. Jacobs, "Ditchling," Hayes Lane, Bromley, Kent.

**The London Natural History Society**.—Meetings first four Tuesdays in the month at 6.30 p.m. at the London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C.1. Visitors admitted by ticket which may be obtained through Members, or from the Hon. Sec. A. B. Hornblower, 91, Queen's Road, Buckhurst Hill, Essex.

**Entomological Section, Birmingham Natural History and Philosophical Society**.—Evening Meetings. On the third Monday of each month; 7.45 p.m., at 55, Newhall Street, Birmingham. Visitors welcomed. Those who would like to attend or exhibit please apply to—*P. Siviter Smith*, Peabworth, Stratford-on-Avon.



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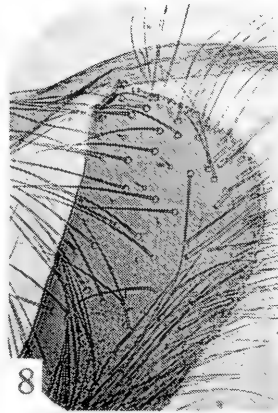
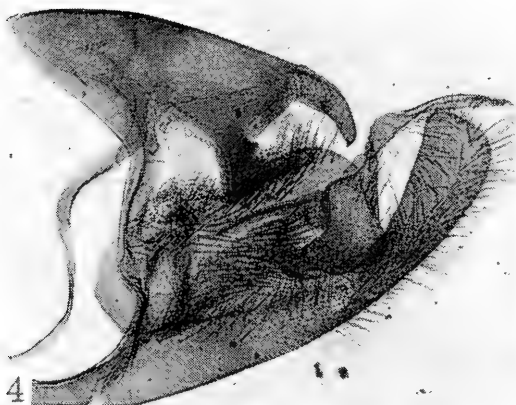
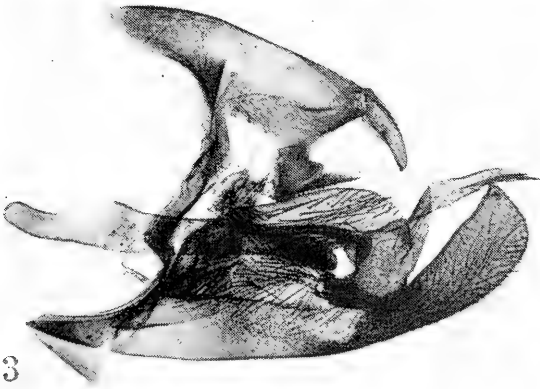
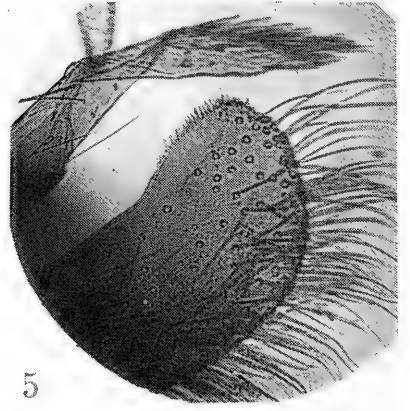
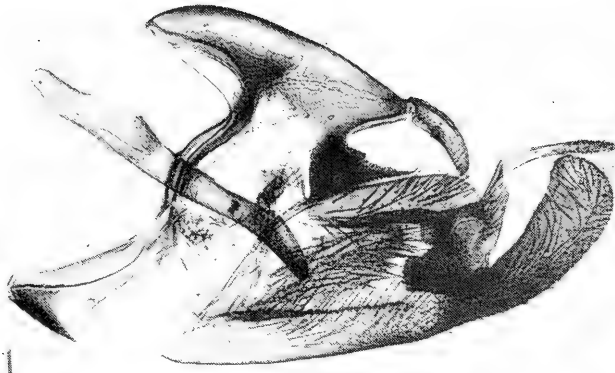
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Supplementary Notes on the Structural Characteristics of *Pyrgus sibirica*, Reverdin, and *Pyrgus chapmani*, Warren.  
(Lep. Hesperiiidae). (With Plate IV.)

By B. C. S. WARREN, F.R.E.S.

In the autumn of 1935 Dr. Verity sent me a few mounts of the genitalia of *Pyrgus chapmani* which he had made, and some further specimens of *P. sibirica* for me to dissect myself. From an examination of his mounts Dr. Verity had been unable to decide whether his specimens were referable to *P. chapmani* or *P. sibirica*, and on turning to my work on the genus<sup>1</sup> the illustrations there were not sufficiently clear to enable him to solve the question.

Neither of these species is any better known now than when they were first described, although Reverdin described *P. sibirica* as long ago as 1911. These specimens of Dr. Verity gave me the opportunity of obtaining a set of rather better photographs of the genitalia of these species than were formerly available; and although I cannot add anything of value concerning the superficial features of either, I think that these clearer photographs will simplify comparison, and are therefore quite worth publishing. The new photographs have the immeasurable advantage of being taken at uniform magnifications (those in my former work were actually taken by men in different countries) and in some cases they are more highly magnified, enabling certain important characters to be seen clearly, which were quite invisible in the previous photographs.

Dr. Verity possesses six ♂ and four ♀ of *P. sibirica*, which he obtained from Bang-Haas in Dresden, and which he thinks formed part of the original series from which the specimens supplied to Reverdin came. Dr. Verity also has a short series of *P. chapmani*, these likewise came from Bang-Haas. The specimens of the latter were labelled "Transbaikalia," "Sayan Mountains" and "Tunkun Mountains." The localities from which I already knew this species were, Munko Sardyk (Sayan mountains), the Vitim district, and one ♂ merely labelled "S. Siberia." The species therefore is widely spread in southern Siberia, ranging from the Vitim Plateau, Transbaikalia, through the East and West Sayan Mountains; but the exact limits east and west are quite uncertain. On the other hand *P. sibirica* is, so far, known only from the Altai Mountains.

Turning to the anatomical characters which distinguish these insects, it proves that some variation exists in the formation, or rather one should say outline, of the cuiller, such as also exists in several other species, of which *P. alveus*, *P. foulquieri*, *P. centaureae* and *P. freija* are well-known examples. As in the case of these species, however, this variation is slight, and does not prevent the two species being identified by the features of this process, though it may produce a sufficiently close resemblance at times to cause some uncertainty to an observer who is not really familiar with the characteristic formation of each species.

(1) *Monograph of the Tribe Hesperiiidi* (European species), etc. *Trans. Ent. Soc. Lond.* 1926, Part 1.

The difference, which exists in the formation of the cuiller in these two species, is to be found in the extent to which it is curved. In *P. sibirica* it is bent more towards the harpe, which causes (1) the proximal edge to assume an irregular outline, (2) reduces the width of the space between the apex of the cuiller and the base of the style, and (3) causes the point of greatest expansion of the cuiller to lie either just above, or in line with the summit of the stylifer.

In *P. chapmani* the cuiller is less bent towards the harpe, and has more the aspect of having been taken hold of by the apex and pressed downwards, away from the harpe. This causes (1) the proximal edge to be regular in outline, (2) increases the width of the space between the apex of the cuiller and the base of the style and (3) causes the point of greatest expansion of the cuiller to lie below the line of the summit of the stylifer. It is of course important to remember that in comparing the formation of the cuiller between one species and another, the clasp should in all cases be kept on one given plane. The position of the clasp in fig. 2 on the accompanying plate is the one in which the nature of the characteristics mentioned can be most readily observed. If the page is moved slightly when looking at the other figures (1, 2 and 4) so as to bring the clasp in them on to a corresponding horizontal plane, comparison will then be simplified and the differences quite easy to grasp. It is not possible always to mount a dissection in a manner to bring the ventral and dorsal processes of the genitalia into a uniform alignment, neither is it always possible to compensate fully for this in photographing a specimen, especially if it is wished to keep the dorsal portions nearly horizontal to the eye also. However, with figs. 1 and 3 only a very slight movement will be found necessary to bring the clasps into a position similar to that in fig. 2; but somewhat more will be required in the case of fig. 4.

The characters which have been described are not the only ones in which the cuillers in these two species differ. In my original description of *P. chapmani* I stressed the fact that the apex of the cuiller is sharply pointed in that species, and bluntly rounded in *P. sibirica*. This feature also, is affected by variation, and in some examples of *P. chapmani* (like fig. 4) the sharp point seen in fig. 3 is apparently rounded off, and consequently the specimen is suggestive of *P. sibirica*. But when this specimen is more highly magnified (shown in fig. 8), one sees the apex really terminates in a point, which is very different from the blunt, or rounded termination in *P. sibirica* (shown in figs. 5 and 6). A second specimen in which this apical peak is set a little back from the proximal edge of the cuiller is shown in fig. 9, while an equally magnified example of the terminal peak at its utmost development is shown in fig 7.

Connected with the formation of the dorsal termination of the cuiller there remains yet another very important difference between these two species. In *P. sibirica* the summit is crowned with a fringe of minute spines, seen very clearly in fig. 5 (one of Reverdin's specimens) less clearly in fig. 6, owing to a technical difficulty in focussing, but the spines are just as fully developed as in the other specimen. In *P. chapmani* the pointed summit of the cuiller is completely devoid of spines, as can be seen in figs. 7, 8 and 9. Although there is variation in the extent of the spine cap in *P. sibirica*, its presence or absence is a constant characteristic in these species.



It is interesting to recall that a somewhat similar character distinguishes that pair of closely related species *P. centaureae* and *P. freija*. They are, in actual fact, less closely related than might be supposed judging by their superficial resemblance; the totally different development of the antistyle indicates this, for in most closely related species in this genus, that process shows a considerable degree of similarity. *P. sibirica* and *P. chapmani* have more in common than the former pair of species, and in their case there is no striking difference in formation in the antistyle. The presence and absence then, of the terminal spine cap of the cuiller is all the more important; one may add that this spinal armature assumes very varied appearances in many species, and is always a character of marked constancy.

Turning to the dorsal parts of the structure, another marked feature in which these species differ, is the restriction of the uncus at the point of junction with the tegumen in *P. sibirica*; in *P. chapmani* at the same point the uncus is at its greatest width (compare figs. 1, 2, 3 and 4).

I use the term "tegumen" in a restricted sense, applying it to the 9th tergite only; this corresponds with the use of the term "tegmen" by Chapman, which I followed in my monograph. I have since abandoned the latter in favour of "tegumen," for this term, having first been restricted to dorsal parts only, and then further by the use of the very essential term "uncus," could apply to nothing other than the 9th tergite.

The formation of the uncus itself is slightly tapering to the distal point in *P. chapmani*, and more or less equal in width throughout in *P. sibirica*. The proximal features of the uncus are very characteristic in many species, and should have been given greater prominence in my monograph, but, as in the case of the spine system of the cuiller, the photographs illustrating that work were not taken with a view to demonstrating these peculiarities. I may add here that the term "uncus" as used by Reverdin, not only covers the actual uncus (10th tergite) but also certain developments of the lateral portions of the 10th abdominal segment, which in some cases are so enlarged as to extend until they become dorsal and unite with each other, forming a link between the true 9th and 10th tergites. To have demonstrated these points would have necessitated replacing a large number of Reverdin's photographs with others, a course which was impracticable at that time. It would also have caused a lack of uniformity between my descriptions and those previously published by Reverdin.

I would once again emphasize that the characteristics referred to as distinguishing *P. sibirica* and *P. chapmani* are constant, though subject to a certain range of variability. This of course in no way impairs the taxonomic value of these features, and there can remain no doubt that these two, superficially somewhat similar-looking insects, are distinct species.

In conclusion I must express my thanks to Dr. Verity for the loan of his material, and to Dr. Carl of the Geneva Natural History Museum for the loan of one of Reverdin's mounts of the genitalia of a paratype of *P. sibirica*.

## EXPLANATION OF PLATE.

Male armatures of *P. sibirica* and *P. chapmani*.

1. *P. sibirica*, Rev.  $\times 18$ . Slide No. 219 Verity/1262 Warren.
2. *P. sibirica*, Rev.  $\times 18$ . Slide No. 220 Verity/1263 Warren.
3. *P. chapmani*, Wrn.  $\times 18$ . Slide No. 49 Verity.
4. *P. chapmani*, Wrn.  $\times 18$ . Slide No. 143 Verity.
5. *P. sibirica*, Rev.  $\times 48$ . Slide No. 505 Reverdin.
6. *P. sibirica*, Rev.  $\times 48$ . Slide No. 220 Verity/1263 Warren.
7. *P. chapmani*, Wrn.  $\times 48$ . Slide No. 51 Verity.
8. *P. chapmani*, Wrn.  $\times 48$ . Slide No. 143 Verity.
9. *P. chapmani*, Wrn.  $\times 48$ . **Type.** Slide No. 191 Warren.

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### Collecting Notes for late summer, 1936.

By H. B. D. KETTLEWELL, M.A., M.B.

My wife and I arrived in the Folkestone district on 15th August, where we remained until the 19th, four days of bad weather. Very little was obtained by day. Half-grown larvae of *Lophopteryx cuculla* were beaten from maple at the rate of about two per hour, which was scarcer than last year.

Once again we assembled to newly hatched females of *Lasiocampa trifolii* near Lydd, and for the sake of the comparison of the habits of Romney Marsh *trifolii* with those in other localities, I will briefly state the following facts:—

The females call strongly the evening of the first day of hatching, but if prevented from pairing, will call a second night and less strongly a third; after this they cease to call. Males commence to fly upwind soon after 8 p.m. (summer time), they come fast and straight and always low down and are not easily persuaded to leave. If left alone they collect in large groups and heaps on the outside of the muslin bag containing the female and become so closely intertwined that it is almost impossible to collect any one wanted specimen. Very large numbers arrive in the course of an evening, anything up to sixty or seventy being normal. Pairing lasts for only a few minutes, after which they separate and the female becomes entirely refractory to males.

I here want to mention a point in connection with the variation of this species in Kent. R. South, in his paragraph about the "Romney Marsh form," states that it is yellow as distinct from the usual "brown" form of the other localities, but that "in both forms one or both cross markings may be faint or quite absent and even the white central dot, which varies in size and shape, may be missing."

Be this as it may, there still remains to describe and name (which I hope to do in the near future) a form which, so far as I can ascertain, is unique to the district. It is absolutely distinct from the local type and in the hundreds of *trifolii* I have bred and caught, I have never found an intermediate between it and the local type. In this form all the wings are unicolorous having no bands whatever in either sex.

More striking still, is the entire absence of the dark iris encircling the white central dot, and so far as I know in these forms, this is always the case. In corresponding females the white dot itself is generally absent. In this form the ground colour varies, as in the

Romney type, from bright yellow to pale cloudy amber. It is always a most beautiful form and a most striking one. In seven years of collecting here I have taken twelve examples—ten ♂s and two ♀s, and the correct proportion of variety to type is probably in the region of 1 to 200. As I have obtained pairing and ova from them I hope to report more about this later.

On 20th August we picked up a caravan-trailer which, much to my car's disgust, was pulled down to Cornwall, and the following day uncoupled on those glorious moors running close to the edge of the cliffs between Mullion and the Lizard. We stayed here till 15th Sept. The weather was for the most part very hot but with occasional strong winds.

*Colias croceus* was exceedingly abundant by day with a proportion of var. *helice*. The heather was alive with countless *Maniola semele* and female *Argynnis aglaia* were observed ovipositing on violet leaves in sheltered places along the cliffs. We failed to meet with the *Danais archippus* (*plexippus*), which was observed at the Lizard on 4th Sept. [as again on 24th Sept. at Salcombe, S. Devon, we missed this species by one hour after it had been caught "on geraniums" and let loose again!].

Here again we tried to assemble *L. trifolii*, which occurs commonly on the slopes around the coast. We met with complete failure to start with, using females from Kent and Hayling Island. On 25th Aug. my wife took two at the Lizard and reported totally different habits from their Kentish confrères.

On subsequent nights we found this to be absolutely true. The males commence coming when it is much darker and they assemble for a much shorter time. They are extremely shy and on the slightest movement they were up and off again, and were frequently seen to approach within ten yards and then disappear for good. We never took more than five in one evening. Local females were found fluttering in the long grass about midnight but none came to light.

Cornish *trifolii* are remarkably uniform in ground colour, which is a rich chocolate brown in shade nearly as dark as that of male *L. quercus*. I hope to be able to report later on my various pairings.

Sugared posts and straw bundles produced limited numbers of insects—chiefly *Polia nigrocincta* and *Lithosia caniola*, and an occasional *Metachrostis muralis*, *Agrotis obelisca*, and *Stilbia anomala*. We discovered that, by far and away the most profitable way of collecting, was to walk along the iron fence at the head of the cliff and between it and the moors. From 11 p.m. onwards newly hatched females—some "calling" and others *in copula* or even with extra males sitting around—were found. *A. obelisca* was exceedingly common, although at sugar and light scarcely one was taken. We also noted several worn ♀ *A. obelisca* "calling," which suggests to me that they may require more than one pairing.

*Aporophila australis*, *A. lutulenta*, *Noctua castanea* f. *neglecta*, and *N. glareosa* were frequent along with hosts of paired *N. xanthographa* and *Luperina testacea*. Why this cold and wind-swept iron railing served as the courting ground for all and sundry is a mystery to me.

The beautiful Cornish form of *A. agathina* was taken flying freely between 12 and 12.30 from 12th Sept. onwards, but never on heather.

Light was very disappointing and only produced a host of *Neuronia popularis*, *Luperina cespitis* and *L. caniola*.

On 8th Sept. we found a small marsh full of yellow flag close to Penzance. The following night on passing I took four *Nonagria sparganii* here, all slightly smaller than the usual size. Surely the most westerly point in England for this species?

Having been interested in *A. ripae* for some time we tried to turn up the larvae in the small sandy bays along the coast. We found the larvae in every place we looked as far west as Penzance, but with days of hard work secured 60 only.

On 11th Sept. we went after Dianthocid pupae at Land's End. Very few were encountered until a certain silene-covered headland was visited, which to us looked no different to the others. Here pupae abounded, as many as 9 or 10 per root being taken. *D. andalusica* (*barrettii*) larvae were exceedingly common here too, and it is probable that a large number of the pupae are of this species also, but a good number are *D. conspersa*.

In about five hours we took over 150 pupae. At the same time we found small larvae of *Agrotis lunigera* in the roots of silene and thrift and one minute larva of *Endrosa irrorella*. Also a pupa of *A. nigra*. My fiend, Mr. P. P. Demuth, who went to this same headland just after Christmas, obtained over 60 pupae in one afternoon.

On 15th Sept. we went down to S. Devon, our object being *Leucania unipuncta* and possibly *L. l-album*. Our thanks are here due to Professor Beckwith Whitehouse, whose knowledge of the first named species had been put at our disposal. We failed however to get this species this time, but on the 16th took *L. l-album* at sugar. Subsequent nights were as follows:—17th Sept., 2; 18th, 10; 19th, 9; 20th, 4; 21st, 34; 22nd, 24; etc., and at a later date even greater numbers. We gained the following facts about the species:—

It is remarkably local, being practically confined to a distance of 200 yards. It is a "first round" insect, arriving sometimes very early and before other insects. However, odd ones appear later but the majority have come by 9. p.m.

It frequently sits very low down at the bottom of the post and so may be missed—often with wings quivering in Leucanid fashion and nearly always "jumps" when being boxed. It cannot be considered difficult, however, as we only failed to take one in all we saw.

They were undoubtedly bred on the spot, as one was caught with its pupa case still adhering to it and all were fresh and in perfect condition. It is to be hoped that this beautiful insect has come to stay with us.

I may state here that large numbers of females were kept for eggs and I drew upon the knowledge of all my friends on how best to obtain ova. No fertile eggs were obtained, however, and from this I think it is highly probable that this insect has come to the end of its run in this locality—the result of continued inbreeding from what must have originally been a very few females—presumably in the migration of 1933.

As the insect is double-brooded these numbers could easily be attained since then. The climate in this sheltered bay is one which seldom experiences freezing point, and is protected from winds on all

sides except the south, so that it is unlikely that weather alone could exterminate the species.

In my series I find considerable variation in the length of the "l," being very developed in some and obsolete in others, but in none entirely so, although I believe this does occur. Some idea of its numbers can be gathered from the fact that on many occasions two were on the same post at the same time.

Other insects taken include:—*Epunda lichenea*, *Xylina socia*, *Metachrostis muralis*, *Aporophyla australis*, *Aporophyla nigra*, *Polia flavicincta*, and *Caradrina ambigua*—some in numbers.

With all these and others our caravan slowly and carefully returned to its home on the 24th of September.

### Notes on Collecting at South Benfleet, Essex, 1930 to 1936.

By R. W. ATTWOOD.

For several years past I have made periodical visits to South Benfleet, Essex, and from 1930 have kept records of my captures of insects in the district. The area is very diversified, woodlands, downland, marshes, dykes, sea walls, and even heathland, all being within a convenient distance for collecting.

My parents' house adjoins what is known as Shipwrights' Wood and I have thus had many opportunities for sugaring. The district is rapidly being encroached upon for building purposes. When I first knew it, it was a wonderful place for insects and although still good, much local vegetation has been destroyed and several marshy areas have been drained, altering the character of the ground to some extent.

My first experience of sugaring in this wood was in July 1930 and the moths were attracted in unusual numbers, often twenty or thirty on a small patch. In 1931, 1932, and 1933, I sugared the same group of trees and they were still productive. In 1934 and 1935, for some reason the numbers fell off considerably. I therefore tried a fresh group of trees on the outskirts of the wood and found the insects as abundant as ever, but the old sugaring area was almost useless. In the Winter of 1935 to 1936, the woodman cut down a large strip of saplings and undergrowth near the old trees, where I commenced sugaring. In 1936 the old trees were as productive as ever, while the new trees showed a considerable falling off in numbers. The cutting of the undergrowth apparently allowed the scent of the sugar to be more widely diffused attracting the moths over a larger area.

As in most places, the moths that monopolize the sugar in their various seasons are *Xylophasia (Hadena) monoglypha*, *Agrotis (Euxoa) exclamatoris*, *Noctua (Graphiphora) xanthographa* and *Triphaena (Graphiphora) pronuba*, but there are several good species to be taken. I have taken the following moths at sugar in this wood:—*Acronicta rumicis*, *Amphipyra pyramidea*, *Rusina tenebrosa*, *Calymnia (Caradrina) affinis*, *C. (C.) trapezina*, *Amphipyra (Caradrina) trigrammica*, *Cerigo (Caradrina) matura*, *Phlogophora (Hadena) meticulosa*, *Dipterygia (Hadena) scabriuscula*, *Apamea (Hadena) gemina*, *Xylophasia (Hadena) monoglypha*, *X. (H.) lithoxylea*, *X. (H.) rurea*, *X. (H.) hepatica*, *Mamestra (Hadena) abjecta*, *Apamea secalis (Hadena didyma)*, *Miana (Hadena) strigilis*, *M. (H.) fasciuncula*, *Agrotis (Euxoa) exclamatoris*, *Agrotis*

*ipsilon* (*suffusa*), *Agrotis saucia*, *Noctua* (*Graphiphora*) *plecta*, *N. (G.) augur*, *N. (G.) c-nigrum*, *N. (G.) triangulum*, *Triphaena* (*Graphiphora*) *pronuba*, *T. (G.) comes*, *Noctua* (*Graphiphora*) *brunnea*, *N. (G.) xanthographa*, *N. (G.) umbrosa*, *N. (G.) primulae* (*festiva*), *N. (G.) stigmatica*, *Triphaena fimbria*, *Triphaena janthina*, *Noctua* (*T.*) *baja*, *Aporophyla lutulenta*, *Orrhodia* (*Conistra*) *ligula* (*spadicea*), *O. (C.) vaccinii*, *Xanthia* (*Orthosia*) *lutea* (*flavago*), *X. (Orthosia) fulvago*, *Amathes* (*Orthosia*) *circellaris*, *A. (O.) helvola* (*rufina*), *A. (O.) lychnidis* (*pistacina*), *A. (O.) macilenta*, *A. (O.) lota*, *Scopelosoma* (*Orthosia*) *satellitica*, *Miselia oxyacanthae*, *Hadena* (*Polia*) *protea*, *Leucania impura*, *Leucania pallens*, *L. (Aletia) lithargyria*, *L. (A.) conigera*, *L. (A.) comma*, *Hadena* (*Melanchnra*) *trifolii*, *H. (D.) nana* (*dentina*), *H. (D.) thalassina*, *H. (D.) dissimilis*, *Scoliopteryx libatrix*, *Catocala nupta*, *Habrosyne derasa*, *Thyatira batis*, *Palimpsestis duplaris*, *Palimpsestis or*, *Polyploca diluta*.

*D. (H.) scabriuscula*.—This insect comes freely to sugar at the end of June.

*M. (H.) abjecta*.—I have only taken this moth once, on the 31st July, 1935. I should imagine it would occur more frequently on the marshes, but I have never tried sugaring there.

*A. saucia*.—This insect is a fairly frequent visitor to sugar in September, but varies considerably in numbers each year. I have also taken it in June.

*N. (G.) stigmatica*.—I have never taken this species elsewhere, but it is quite common here.

*A. lutulenta*.—I have only taken two specimens, one in 1930 and the other on the 13th September, 1933.

*H. (M.) dissimilis*.—I took this moth in fair numbers in 1933, but have not seen it here since.

*P. or*.—This insect sometimes comes to sugar, but I find it is more easily obtained in the young larval state.

Sallowing was very productive a few years ago, but now that the wood is open to the public, the willow is cut and taken away by visitors before it is fully out, and the bushes are spoilt for collecting. I have taken the following species here at willow:—*Pachnobia* (*Triphaena*) *rubricosa*, *Taeniocampa* (*Monima*) *incerta*, *T. (M.) opima*, *T. (M.) gracilis*, *T. (M.) stabilis*, *T. (M.) populeti*, *T. (M.) pulverulenta*, *T. (M.) munda*, *T. (M.) gothica*.

*T. (M.) opima*.—I have only taken this species once, on the 10th April, 1930. It was on a small male flowered willow bush, standing isolated on the outskirts of the wood. I have made repeated searches for this insect but have not been successful.

*T. (M.) gracilis*.—This moth occurs in fair numbers every year.

*T. (M.) populeti*.—I have only taken two specimens; the last in 1935.

*T. (M.) munda*.—This is a fairly frequent visitor and occurs every year.

The following insects I find more frequently in the larval state:—*Arctia villica*, *Sarrothrips revayana*, *Nonagria geminipuncta*, *Chariclea umbra*, *Dasychira pudibunda*, *Euproctis phaorrhoea*, *Euchloris smaragdaria*, *Eupithecia absinthiata*, *Eupithecia oblongata*, *Eucymatoge scabiosata*, *Pygaera curtula*, *Odontesia camelina*, *Cerura vinula*, *Macrothylacia rubi*, *Cosmotriche potatoria*, *Cossus cossus*.

*Arctia villica*.—This is very common on Canvey Island in the

Spring. On sunny days quite a number can be collected as they crawl along the pathway on top of the sea-wall.

*Sarothrips revayana*.—This larva is beaten commonly from the oak trees in most of the neighbouring woods.

*Nonagria geminipuncta*.—The best time to look for this species is in mid-July. The larvae inhabit the stouter reed stems growing in the dykes, and affected stems can be detected by the "window." This is a small brown patch from which the imago will eventually emerge.

*Chariclea (Caradrina) umbra*.—I beat two larvae of this insect in 1935 from rest-harrow growing on the rough downland, only one of which I managed to get through to the imago state.

*Euproctis phaeorrhoea*.—This is a pest to gardeners on Canvey Island. Nearly every sloe bush has a nest of larvae and when food is scarce they transfer their affection to the plum trees and rose bushes. The larvae also occur on the mainland, but not so abundantly.

*Euchloris smaragdaria*.—I have only seen the imago once in a natural state. The larvae, however, are much more common than many people believe. Some little practice is required in searching, before the eye gets used to their appearance. I have found it as far up the Thames as Fobbing, and right round the coast to a little west of Creeksea on the River Crouch, and also on the opposite shore. In some parts the sea wormwood on which the larvae feed, is covered by the tide, and I have gone to a patch after the tide has receded and found the larvae still on the plant. I cannot find where they go in the winter. I think the latest date I have found the larvae is the 14th October, but though I have made many searches for the larvae in the winter I have never found any. I have not been much more successful in the spring, but have found two in May. The best time to collect the larvae is about the end of August, and sleeve them on a growing plant of southernwood. They come through the winter very well. The trouble in a London garden is to keep the cats away from the sleeved plants, as the southernwood does not grow well in a pot.

*Pygaera curtula*.—This insect is common in Shipwrights' Wood, between joined leaves of aspen.

*Palimpsestis or*.—This is also common in the early stages between joined aspen leaves, but one rarely finds a full grown larva. The larvae, however, are not difficult to rear, and grow very rapidly.

The Hawk Moths are rather scarce, but I have taken *Macroglossum stellatarum*, *Theretra (Deilephila) porcellus*, *Eumorpha (Deilephila) elpenor*, and *Amorpha (Smerinthus) populi*.

In 1934 two *Sphinx convolvuli* were noted. One that was found drowned in an ornamental fish pond was too damaged to preserve. The other was taken on the 17th September, 1934, in the roadway outside Shipwrights' Wood, by a cyclist, who was wheeling his cycle, when something made two or three darts at his head. He did not know what it was and was rather alarmed, so he hit out with a twiggy switch he was carrying, knocked it down, and then discovered it was a moth. Knowing my father was interested in insects, he took it to him, and I now have it in my collection. It is quite a good specimen in spite of the rough treatment it received.

(To be continued.)



### Orthoptera in 1936. (Continued.)

By MALCOLM BURR, D.Sc., F.R.E.S.

The weather characteristic of the season did its best to spoil a visit to Stroud on 29th July, when the Entomological Club was entertained by Dr. Eltringham. Our host lent his car to Mr. Bainbrigge Fletcher and myself for a run around, which gave me the chance of a quick visit to Haresfield, which is a promising spot. It is high limestone country, edged with woodland, and covered with low grass and herbage, about three miles north of Stroud, at an altitude between 700-800 ft. The wind and drizzle were very discouraging, but *Stenobothrus lineatus* was there. I have never yet taken this prettiest of our grasshoppers off the limestone, and here, as in East Kent, it was associated with the "Marbled White" butterfly. *Chorthippus bicolor*, of course, was there too, with *Ch. parallelus*. I have no note that we found *Omocestus viridulus*, but I feel sure it was there. In a corner on the other side of the open area were *Myrmeleotettix maculatus*. I have always associated this pretty little species with sandy soil, but I daresay it occurs just as commonly on limestone, if other conditions are suitable. An immature *Pholidoptera grisea* was enough to record his presence.

We then tried the slopes of Rodborough Common, on the other side of Stroud, in the hope of hearing *Gomphocerus rufus*, which is abundant there, together with *St. lineatus*, but a thunderstorm spoiled sport. *Ol. viridulus* occurs at Rodborough Common too, but Mr. Fletcher tells me it is by no means common. Neither has he found *G. rufus* elsewhere. It is a very localized species. The only place where I have taken it in this country is in Folkestone Warren, but not in every year.

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### NOTES ON COLLECTING, etc.

MICRO COLLECTING.—The larvae of most of the *Coleophora* are easily found owing to their manner of feeding. The larva bores a hole in the membrane of a leaf (usually the underside) and eats the green substance of the leaf between the upper and lower membranes as far as it can conveniently reach without leaving its portable case; it then moves to a fresh portion or to another leaf. The eaten portions show up as pale or white blotches or spots which are quite noticeable.

The imagines of some of the species of this genus are difficult to identify, particularly if not in perfect condition, but the cases of all species are characteristic and the student should have no trouble in identifying his specimens if they are accompanied by the cases. The spring feeding larvae can be obtained during May by searching the various food plants—*ardeipennella*, *lutipennella* and *palliatella* on oak, *ibipennella* on birch, *anatipennella* on blackthorn and hawthorn, *hemerobiella* on apple and hawthorn, *viminetella* on sallow, *bicolorella* (*binderella*) on hazel and alder, *fuscedinella* on elm, hazel, birch and other trees, *saturatella* on broom and *Genista tinctoria*, *troglydytella*, *inulae* and *conyzae* on *Inula dysenterica*, the last also on *I. conyza*; *albitarsella* on ground ivy and many others.

The larvae of *ardeipennella* and *ibipennella* are reputed to feed both on oak and birch, but so far as my experience goes the former is confined to oak and the latter to birch. Possibly there has been some confusion between the two species as the imagines and the cases of

each are very similar. The case of *ardeipennella*, however, stands erect on a leaf; that of *ibipennella* is almost recumbent. Both species feed on the upperside of a leaf and seem to prefer bushes up to 8ft. in height rather than large trees, but perhaps this preference is only apparent as the cases are more easily found on bushes.

The larva of *hemerobiella*, when feeding on hawthorn, prefers the larger bushes and is seldom found at a height of less than 4ft. from the ground. It makes rather large blotches (on 4 or 5 leaves) distinctly larger than the blotches made by *fuscedinella*, which is very abundant on hawthorn. A little practice enables one to distinguish the blotches made by *hemerobiella*.

The cases of *viminetella* are best obtained when the willow leaves are very small. It is an early feeder and spins up about the middle of May.

The larva of *bicolorella* feeds rather high up making a number of small round blotches on one leaf, easily distinguished from the larger and more or less rectangular blotches made by *fuscedinella*. When full fed the larva spins the case at the end of the shoot bearing the leaf on which it has fed, where it is not at all easy to find owing to its close resemblance to a leaf-scale.

The larva of *albitarsella* feeds only in very sheltered situations, e.g., at the bottom of a hedge, or on the sides of a ditch. I have never found the larva in an open situation.—L.T.F.

\*HYPONOMEUTA STANELLA.—In May of last year Mr. H. W. Daltry kindly gave me some larvae of this species. The imagines duly emerged about the middle of June. I enclosed a male and female in a celluloid cylinder (see my note on breeding cages *Ent. Rec.* Vol. 48, page 61) placed over a plant of *Sedum telephium* and hoped for the best. By August there were a number of minute larvae feeding on the stems of the plant at the base in slight silken tubes, spun from the stems along the surface of the soil and into the soil. The tubes from the base of a stem to the point at which they entered the soil were about  $\frac{1}{2}$  to 1 inch in length. The larvae were very active and when disturbed moved rapidly along the tubes into the soil. They are now (Easter) feeding on the new shoots and the largest is nearly  $\frac{1}{2}$  inch in length. Presumably under natural conditions this species does not pass the winter in the egg stage but hibernates as a larva.—LEONARD T. FORD. St. Michaels, Bexley. 26th March.

---

\* Latreille in 1796 wrote *Yponomeuta*.—T.B.-F.

## CURRENT NOTES AND SHORT NOTICES.

We see by the report in the *Irish Nat. Jr.* that our able correspondent, Mr. Thos. Greer, J.P., has been elected President of the Tyrone Naturalists' Field Club of which he has been the Hon. Secretary since the formation of the club.

Messrs. Philip Allan and Co. have published a small book of 80 pages entitled "Introducing British Butterflies," by Harold Bastin. It is what its title states and very good at that. In fact rarely does one find so much suggestive information in so small a compass. First the butterfly is considered as an insect, "names" are discussed, "species" and "breeding" come next, the main groups are then defined with the

species they comprise. "When and where to look for butterflies" consists of a table of all the species with English and scientific names, Time of appearance, Habitat, Food-plant, Hibernation stage. Life-histories with illustrations of eleven species are succeeded by "Round the year," "what to do" each month with "what to look for" at the proper season. Ample space is reserved, both in portions of the text and at the end of the book, for notes. An admirable little book on quite a novel and effective plan to attract a beginner to the real study.

A few earnest students have of late taken up the study of the very neglected group of insects, the Psocoptera, so much neglected that entomologists generally are not acquainted with perhaps more than an *Atropos* and a *Psocus*. A short introduction to the taxonomy of the group by Mr. J. V. Pearman has recently been published in the *Proceedings of the Royal Entomological Society*.

There has recently been founded in S. Kensington a "Society for the Bibliography of Natural History." A copy of the bye-laws lies before us. It is the intention to publish a Journal at least twice a year\* and to maintain a card index catalogue of references to all published papers on bibliographical subjects relating to natural history.

Will readers please send us short notes on collecting, and on any breeding experiences which may be of use to other entomologists. Descriptions of any special forms and local races of Noctuid species for including in the Supplement would be very welcome. Shortly we shall be dealing with *Agrotis lucerneae*, *A. simulans*, *A. obscura*, *A. hyperborea*, *Lycophotia strigula*, *Actebia praecox*, and the species of the genus *Triphaena*.

The *Ent. Zeits.* and *Int. Ent. Zeits.* continues its information on the ova of the *Noctuidae*. The current number contains a plate (coloured) of the side and vertical appearance and shape of 18 species. Other articles are, the Macro-lepidoptera of the Mid-Rhine area by G. Warnecke; O. Bang-Haas describes 3 new species of Palaearctic Lepidoptera.

Parts 1-2 of Vol. XII. of the Spanish *Revista Espan. de Ent., Eos.* has just reached us from Madrid. The revision of the families of the Orthoptera is continued; a new *Decticus* (Orth.) from the Canaries is described; a study of the Hymenoptera of Madagascar; and a full investigation of the various forms of the Spanish moth, *Episema trimacula*, with a plate of 24 figures of imagines and another plate of genitalia.

The entomological matter in the *Ann. Volume of Nat. Hist. Mus. in Vienna* consists of two articles on the Coleoptera of the Argentine and one on the sub-antarctic Diptera, with a long memoir on fossil insects by the late Dr. Anton Handlirsch.

The well known firm of Messrs. Staudinger is issuing an important Catalogue of Palaearctic Lepidoptera (see enclosed leaflet). Apparently it will bring up to date in many respects the famous "Staudinger" of 1901, and will contain the systematic list of all the species hitherto found in the region, and include the subspecies, geographical races, and aberrations. The price is moderate. We have not yet seen a part but from the leaflet announcing its appearance it would appear to be a most useful addition to our reference literature.

---

\* Two parts have already appeared.—T.B.-F.

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*Desiderata*.—*Hyale*, *Welsh aurinia*, *Polychloros*, *Tiphon Agathina*, *Lunigera*, *Lucernea*, *Neglecta*, *Diffinis*, *Populeti*, *Gothica v. gothicina*, *White Leporina*, *Tridens Putrescens*, *Littoralis*, *Typhae v. fraterna*, *Rurea v. Combusta*, *Gilvago*, *Fulvago v. flavescens*, *Liturata v. nigrofulvata*. *Harold B. Williams*, Woodcote, 36, Manorgate Road, Kingston Surrey.

*Desiderata*.—Urgently wanted for research work at the Royal College of Science, Pupae normal form of *Hemerophila abruptaria*.

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*Desiderata*.—*M. aurinia* (artemis) Larva English, Irish and Scotch.

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*Duplicates*.—Numerous. Please send list.—*B. W. Adkin*, Highfield, Pembury, Kent.

*Desiderata*.—Entomological Pamphlets and Separata.—*R. B. Janson*, 44, Great Russell Street, W.C.1.

*Desiderata*.—Exotic Lepidoptera in papers.

*Duplicates*.—Exotic Lepidoptera in papers.—*Capt. J. C. Woodward*, R.N., The Red House, Bordyke, Tonbridge, Kent.

*Desiderata*.—Wanted: Leech, J. H., Butterflies from China, Japan and Corea, 3 vols., Lond. 1892-94, w. map, views and 43 colour pl.—*Dr. Max Cretschmar*, Celle, Germany.

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## MEETINGS OF SOCIETIES.

**The Royal Entomological Society of London.**—41, Queen's Gate, South Kensington, S.W. 7., 8 p.m. May 6th, June 2nd.

**The South London Entomological and Natural History Society**, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. May 10th, 24th.—*Hon. Secretary*, S. N. A. Jacobs, "Ditchling," Hayes Lane, Bromley, Kent.

**The London Natural History Society.**—Meetings first four Tuesdays in the month at 6.30 p.m. at the London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C.1. Visitors admitted by ticket which may be obtained through Members, or from the Hon. Sec. A. B. Hornblower, 91, Queen's Road, Buckhurst Hill, Essex.

**Entomological Section, Birmingham Natural History and Philosophical Society.**—Evening Meetings. On the third Monday of each month; 7.45 p.m., at 55, Newhall Street, Birmingham. Visitors welcomed. Those who would like to attend or exhibit please apply to—P. Siviter Smith, Pebworth, Stratford-on-Avon.

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Communications have been received from or have been promised by Capt. K. J. Hayward, (the late) Rev. C. R. N. Burrows, H. Willoughby-Ellis, Hy. J. Turner, D. G. Sevastopulo, A. J. Wightman, T. Greer, T. Bainbrigge-Fletcher, Dr. Malcolm Burr, Rev. R. E. E. Frampton, L. T. Ford, H. Donisthorpe, Wm. Fassnidge, R. W. Attwood, P. B. M. Allan, Dr. Bytinski-Salz, and Reports of Societies.

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Dr. B. M. Hobby, M.A., D.Phil., F.R.E.S., Hope Dept., University Museum, Oxford, President of the Society for 1937, will preside, and will deliver his Presidential Address. A number of interesting Papers will be read and discussed; the collections of the University Zoology Museum, of the Reading Municipal Museum, and the Exhibits brought to the Congress, will be available for inspection; there will be a *Conversazione*; a Dinner and two Luncheons in Wantage Hall; a Field Meeting at Pamber Forest with an *al fresco* Tea; and perhaps other items.

Visitors are invited to bring Exhibits, for the display of which facilities will be provided in the University Zoology Dept.; it is suggested that exhibits might be selected to illustrate work which the exhibitor has in hand.

Any person having a matter of importance which they wish to bring before the Congress should let the Hon. Secretary have particulars at the earliest possible moment. The Council will endeavour to provide an opportunity for this to be done, and if desired for a Resolution on such matter to be voted upon.

Accommodation in College buildings (for both sexes, but separately) will be available at low rates, and may be reserved when completing the Form of Application to be issued with the Programme. The cost of attending the Congress need only therefore be small.

A detailed Programme with full particulars and directions will be available shortly, and **a copy will be sent to any name and address on receipt of a postcard.** The Hon. Secretary will be pleased to answer enquiries, and to render every possible assistance.

The Council hope that every British Entomologist who can do so will attend the Congress so that it may be thoroughly representative.

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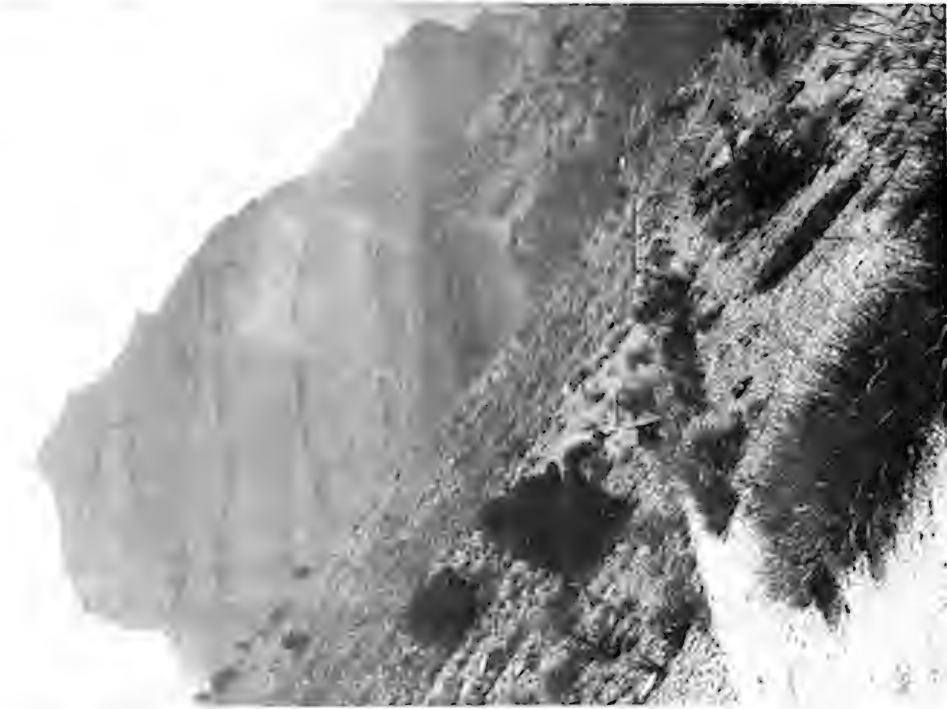






*The Entomologist's Record.*

GORGE DE ST. PIERRE, BEAUVEZER.



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## Dieulefit, Digne, and Beauvezer in July and August, 1936. (With Plate.)

By H. G. HARRIS, M.D.

(A paper read before the Society for British Entomology.)

I feel rather diffident in referring to Digne, as this district has in the past been so adequately discussed in the *Entomologist's Record* and other periodicals, but I felt that a few notes might not be amiss.

I left London on 25th July, 1936, accompanied by my son, Mr. J. H. Harris who although not an Entomologist is quite keen with the net, and like many novices secured probably the best specimen of the tour, and also provided the photographs accompanying this paper.

My objective this year was to obtain imagines of:—*Melanargia (Satyrus) galathea* var. *leucomelas*, M. (S.) *cleante*, Bdv., *Polygonia egea*, Cram., *Pieris manni*, Meyer., *Satyrus fidia*, L., *Polyommatus (Lycaena) admetus* var. *ripartii*, Esp., larvae of *Papilio alexanor*, and most of all *Erebia scipio*.

DIEULEFIT, situated in the department of Drôme is easily reached from London in twenty hours, via Paris and Montélimar. As its name implies it is a pleasantly situated village, mostly flat with a gentle incline up to the Valley of St. Maurice, which is surrounded by hills thickly covered with scrub and trees. This district is one of the few where Protestantism has continued to flourish since the revocation of the Edict of Nantes in 1685.

There is only one hotel, the Hotel du Levant, an unpretentious Inn but quite comfortable. Rain greeted us on arrival and reminded us of home, but it soon cleared up and in three weeks we saw no more except for a half hour's deluge at Beauvezer.

This was my second visit to Dieulefit, having stopped there three nights on my way to Mont Dore in 1935. On that occasion I netted one ab. *leucomelas*. This year I was only able to find one other specimen there, but I was two weeks later, and this insect was going over and the clover and lucerne had been cut, making collecting less easy.

*P. egea* was not abundant, as only two were seen, and being in a private garden escaped capture.

The *Satyridae* were well out and especially *Satyrus circe*, Fabr. was seen in numbers. It was interesting to note that on the road leading to Bordeaux where numerous Buddleia are planted, *S. circe* has departed from its usual habit of settling on tree trunks and crowds on to these bushes, a score or so at a time, but in the Valley of St. Maurice such flowers are not available, and here *S. circe* has to be swept off the tree-trunk with a sharp upward movement.

In 1935 I caught an interesting abnormality of *circe* in which the apical ocellus is reproduced of similar size lower down about the centre of the fore-wing as it is in the forms *vandalusia* (S. Spain) and *major* (N. Africa) rather pointing to the fact that *circe* originally is derived from the N. African races. Out of a large number examined this year I could find no more showing this extra ocellus.

*Satyrus alcyone*, Schiff. and *S. hermione*, L.—were also found in this valley, but *alcyone* was found at a higher altitude.

*Papilio alexanor*, Esp.—It was of course too late to expect to come across this insect but I was surprised at finding no larvae. I had been

successful in discovering them on 6th July the year before, but searching for them on *Sesile montanum* here and at Digne and Beauvezer was without result.

*Pieris manni*, Mayer—was found in fair numbers at only one spot—a large lavender garden.

*Leptidea sinapis*, L.—was well out and in good condition.

*Polyommatus (Lycaena) coridon*.—I had in 1935 caught a very pale male about 6th July and hoped this year to find this insect in numbers, but not more than six males were caught, all very pale with narrow black borders.

These I showed to Mr. P. M. Bright, who referred them to *ab. pallidula*. Probably I was too early for its emergence in numbers, but the date of emergence of *coridon* in France seems much later than in the South of England; for at Dompierre-sur-Mer in 1935 I was told that its flight did not occur till 15th August or even later.\* On 3rd August not one was visible there.

Burnets were practically absent, though this district usually is noted for their abundance.

DIGNE. After four days at Dieulefit we left for Digne and were interested in finding the Graf Zeppelin circling around Montélimar waiting to pick up mails. We found a new route for Digne, viz. train to Avignon and thence by motor-bus. The line is run by a private company and takes four hours.

The Hotel Mistre was of course our objective, but I was rather disconcerted in finding that the widow of the former proprietor only remembered Rowland Brown out of the numbers of Entomologists, who have made this hotel their headquarters.

The only local collector except M. Melchior Cotte appears to be Monsieur Coulet, but being a gendarme he naturally has but little time for entomological pursuits.

In order to familiarize myself with them I procured two specimens of *E. scipio* and a *cleante* from him, and was offered a var. *honoratii* of *Zerynthia (Thais) medesicaste* in poor condition for 700 francs (about £7); this specimen of course did not change hands.

During the week that I was at Digne, I paid several visits to the Eaux Thermales district, which can conveniently be reached by the Spa bus, and also to the Dourbes road, but regret that I never got up as far as Villard or stopped the night there, whence it is possible to reach the mountains called Les Dourbes, where to quote Rowland Brown "*E. scipio* is fabled to fly."

Two of the insects I wished especially to find were captured on the Dourbes road, viz. *S. fidia* which is easily secured when it settles on the hard stony road, but is a different proposition when it frequently alights on the rocks, and also *S. (M.) galathea* of the *leucomelas* variety.

Butterflies were not in great abundance but the weather was not to blame as there had been no rain since 1st July.

Having been advised by our Honorary Treasurer (Mr. W. Fassnidge) to ascend the Cousons in search of *Polyommatus (L.) admetus* var. *ripartii*, I toiled up a terribly rough and steep path only to find that I had taken a direction to the left instead of the right. On finally reaching

\* Possibly this was an *aragonensis* double-brooded colony. I gen. from about 1st June. II gen. last week of August into September.—Hv. J. T.

an open spot I found only one *admetus*, also two *Thymelicus acteon* and one male *Gonepteryx cleopatra*.

Other specimens of *admetus* were later taken near the Eaux Thermales district but in very poor condition.

*Polyommatus meleager* was another insect which took a lot of finding, and I only brought back three males; no females were seen.

Here I renewed acquaintance with *S. dryas* which I had last taken at Strasbourg but here it was very scattered. *S. arethusa* was no uncommon.

Before leaving the subject of Digne I must refer to the Museum, which contains the collection of Monsieur Duponchel; the late Mr. Ashby in a paper in the *Entomologist's Record* for 1924 states that it was in a neglected condition, and thirteen years more have not improved matters. The drawers are displayed on the walls, exposed to the light, and this doubtless is the cause of numerous bleached specimens of *jurtina* and *semele*.

Another Museum, which should be visited, is in the Hotel Hermitage, in which is housed a most interesting and comprehensive series of Napoleonic relics. Napoleon of course marched through Digne after escaping from Elba.

CRUIS. In the *Entomologist's Record* of 1926, there was an excellent paper by Mr. Haig Thomas describing his excursion to the Mont de Lure.

Cruis is about 35 kilometres from Digne and can only be reached by motor-car. It is off the main bus routes.

From Cruis one should be able to reach the summit of the Mont de Lure, 5994 feet, in about 3 hours. I tried to find my way up what Mr. Haig Thomas calls a gorge, but which I could only describe as a ravine. Perhaps I never found the gorge, anyhow after three hours I left the ravine, which was lined with wild lavender on both sides, and found myself in a dense scrub with no signs of open ground where Mr. Haig Thomas found *E. scipio* and *M. (S.) cleanthe*.

Time being of consequence I had to relinquish any idea of reaching the "open ground" and on my way down had to be content with several specimens of *S. (M.) galathea* ab. *leucomelas* and my son captured one *galathea* with the white replaced by yellow. This I imagine is to be referred to ab. *flava*, Tutt.

*Brenthis hecate*—is also found here earlier in the year and also *Melitaea dictynna*.

*Hipparchia briseis*—at times a not uncommon insect, was only found once.

*Strymon (Thecla) spini* was in good condition, *S. (T.) acaciae* was very worn. Lower down whilst sitting beside the village Inn I caught my only *P. egea*.

*Limenitis rivularis (camilla)* was just emerging in perfect condition, the whole route up the mountain was lined with wild lavender and hours could have been profitably spent in this excellent locality.

On returning home I found that another entomologist had been to the summit of the Mont de Lure at the same date, but he had found the easiest route was from St. Etienne les Orgues.

*M. cleanthe*—was found in numbers by him but *E. scipio* was not seen so that the end of July and early August was in 1936 too early a date for its emergence.



Leaving Digne on 6th August we travelled by motor bus to Beauvezer, alt. 4,000 ft.: about 60 kilometres from Digne.

BEAUVEZER.—The Hotel Alp where we stayed is charmingly situated amongst a forest of pine trees and the approach to it reminds one very much of our New Forest roads.

Here we were dogged by misfortune for my son developed a gastric attack and I just managed to ward one off.

Grand weather continued, but the nights were rather cold and very few moths were attracted by the numerous electric lights.

Here just across the river, *Erebia neoridas* was emerging in numbers, also *Melitaea phoebe* past its best, *T. spini* and *Aporia crataegi*, a few tattered specimens, and also *Melitaea didyma* with numerous ab. *alpina* varieties.

*Erebia scipio* was again my chief objective. In the last letter that Mr. Ashby wrote to me, he said that Beauvezer was the place for finding *scipio*, so I hoped to find it here (vide photo No. 1), and following Mr. Haig Thomas' description of his journey through the Gorge de St. Pierre (vide photo No. 2) we set out and found the correct spot but no signs of *scipio*.

A stiff and narrow path winds up the gorge for about two miles till one crosses the torrent and one enters on a zigzag path with trees on either side.

Here we met with a few specimens of *Erebia euryale*, *E. adyte*, *E. gorge* and one freshly emerged *E. tyndarus*; by one o'clock without any water and a fierce sun overhead we had to turn back without reaching the snow level where *E. pluto* should have been captured.

I again visited the entrance of the gorge on the next day, but again no signs of *scipio*.

Finally we spent two more nights at Digne on the way back. *E. neoridas* was only just emerging and a second attempt for *P. admetus* var. *ripartii* met with no success.

Conclusions.—The season in my opinion was a late one and emergencies very poor. The only insects in any real abundance were *E. neoridas* at Beauvezer, and *M. galathea* var. *procida* at Cruis, and *S. circe* at Dieulefit,

The weather was grand, very different from that experienced in Switzerland and northern Europe during the same period.

The nomenclature used is that by Seitz.

## Notes on Collecting at South Benfleet, Essex, 1930 to 1936.

By R. W. ATTWOOD.

(Concluded from page 49.)

In general collecting, such as searching tree trunks, plants, beating and dussing, I have taken the following moths:—

*Amphipyra tragopoginis*, *Hydroecia* (*Caradrina*) *micacea*, *H.* (*H.*) *nictitans*, *Miana* (*H.*) *bicoloria*, *Cucullia umbratica*, *Xylocampa* (*Polia*) *areola*, *Charaeas* (*Cerapteryx*) *graminis*, *Hecatera* (*Melanchra*) *serena*, *Rivula sericealis*, *Plusia moneta*, *Plusia chrysitis*, *Leucoma* (*Porthesia*) *chrysorrhoea* (*similis*), *Ptychopoda fuscovenosa*, *Calothyranis amata*, *Euchloris pustulata*, *Lobophora halterata*, *Chesias* (*Eucestia*) *legatella*

(*spartiata*), *C. (E.) rufata*, *Calocalpe undulata*, *Cidaria (Hydriomena) fulvata*, *C. (H.) miata*, *C. (H.) sordidata*, *C. (H.) immanata*, *C. (H.) silaceata*, *C. (H.) suffumata*, *C. (H.) corylata*, *C. (H.) badiata*, *C. (H.) nigrofasciaria*, *C. (H.) albicillata*, *C. (H.) affinitata*, *C. (H.) decolorata*, *C. (H.) bilineata*, *Operophtera brumata*, *Asthena albulata (candidata)*, *Oporinia dilutata*, *Ortholitha chenopodiata (Xanthorh e limitata)*, *O. (X.) bipunctaria*, *Cidaria (Xanthorh e) didymata*, *C. (X.) ferrugata*, *Alsophila aescularia*, *Brephos parthenias*, *Opisthograptis luteolata*, *Chiasmia (Semiothisa) clathrata*, *Boarmia repandata*, *B. gemmaria*, *Erannis (Hybernia) leucophaearia*, *E. (H.) marginaria*, *E. (H.) aurantiaria*, *E. (H.) defoliaria*, *Phigalia pedaria*, *Biston strataria*, *Lomaspilis marginata*, *Theria rupicaprararia*, *Aspitates ochrearia*, *Cabera pusaria*, *C. exanthemata*, *Angerona prunaria*, *Selenia bilunaria*, *Selenia lunaria*, *Phalaena syringaria*, *Colotois pennaria*, *Ennomos alniaria*, *Ennomos erosaria*, *Crocallis elinguararia*, *Phalera bucephala*, *Saturnia pavonia*, *Drepana falcataria*, *Lasiocampa quercus*, *Poecilocampa (Eriogaster) populi*, *Zygaena filipendulae*, *Zygaena trifolii*.

*Plusia moneta*.—I was interested in taking this moth flying around wood sage, some distance in the wood. The nearest garden was some three hundred yards away and neither monkshood nor delphinium were growing there. I have never taken this insect away from gardens before.

*Ptychopoda fuscovenosa*.—This moth was very common along the sea wall, last July. They were mostly on the seaward side.

*Euchloris pustulata*.—I had a curious experience with this insect. On the 29th June, 1930, I was dusking alongside Shipwrights' Wood. It was a lovely warm still evening and quite light. I saw a number of moths flying up and down and round and round in a small circle, not higher than about two feet from the ground, beneath an overhanging oak branch. I made a sweep with my net and took about eight or nine imagos of *Euchloris pustulata*. About a hundred yards further on, beneath another oak tree I found another group of *Euchloris pustulata* flying in a similar manner. I took both males and females. When I have taken this insect on other occasions, it has always been singly, flying with a rather purposeful flight about eight feet from the ground. I have not seen this insect here since, although I beat the larvae from one of the trees, last year.

*Lobophora halterata*.—This moth is common among the aspen trees in May, and seems constant from year to year.

*Chesias (Eucestia) rufata*.—I have taken three examples of this species, all at light. One flying to my lantern and the other two around a street lamp.

*Calocalpe undulata*.—This insect I have only taken twice, both in the day time, disturbed from low growing willow bushes.

*Ortholitha (Xanthorh e) bipunctaria*.—It is strange to find this insect in the district. There is no chalk hereabouts and the ground on which it occurs is a sandy clay. The moth is browner and the markings are not so distinct as the usual chalk form.

*Aspitates ochrearia*.—This moth is common on the rough downland and also occurs along the sea wall.

Some of the butterflies occurring in the neighbourhood are rather local. The following is a list of those I have taken or seen:—*Argynnis (Brenthis) euphrosyne*, *Melitaea athalia*, *Vanessa c-album*, *Vanessa urticae*,

*Vanessa io*, *Vanessa atalanta*, *Vanessa cardui*, *Limenitis camilla* (*sibilla*), *Melanargia* (*Satyrus*) *galathea*, *Pararge megera*, *Epinephele tithonus*, *Epinephele jurtina*, *Aphantopus hyperantus*, *Coenonympha pamphilus*, *Thecla rubi*, *Aricia astrarche* (*medon*), *Heodes phlaeas*, *Lycaenopsis argiolus*, *Polyommatus* (*Lycaena*) *icarus*, *Colias croceus*, *Gonepteryx rhamni*, *Euchlœe cardamines*, *Pieris napi*, *Pieris rapae*, *Pieris brassicae*, *Adopoea thauwas* (*flava*), *Adopoea lineola*, *Augiades sylvanus* (*venata*), *Hesperia malvae*, *Erynnis tages*.

*Melitea athalia*.—This butterfly was very common in 1936 in its restricted area. Unfortunately this ground is scheduled for building and I understand that, in consequence, several local entomologists are endeavouring to establish this insect elsewhere, in the hope of retaining this species in Essex.

*Vanessa c-album*.—I saw this insect in Benfleet for the first time in 1936, settled on a michaelmas daisy bloom. I had heard of it being seen further east, at Leigh, in 1935, but had not observed it myself in the district.

*Vanessa cardui*.—I have only once seen this species in August. All other visitations have been in May.

*Limenitis camilla* (*sibilla*).—This is a newcomer to the district. I saw the first one in 1934 and in 1935 two more, but on the 14th July, 1936, I counted over thirty that visited a particularly fine bramble in full bloom, just outside the garden. It was a lovely sight to watch them floating down to the blossom, and I am hopeful that the butterfly has now established itself here.

*Satyrus* (*Melanargia*) *galathea*.—This is very common on the downs and occurs sparingly along the sea wall.

*Maniola* (*Epinephele*) *tithonus*.—This insect occurs everywhere in the district.

*Aphantopus hyperantus*.—This species frequents most of the woods in the neighbourhood, but I have not noticed any particular variation.

*Aricia astrarche*.—I find this butterfly to be rather local and to be confined to one particular part of the downs.

*Lycaenopsis argiolus*.—This insect varies considerably in numbers. I saw very few in 1936.

*Colias croceus*.—I generally see one or two each year. From my records I find I have seen it every year since 1930, with the exception of 1932. I saw three in 1936.

*Adopoea lineola*.—The district is noted as being the headquarters of this butterfly. It is still as abundant as ever along the sea wall and marshes.

While beating rest-harrow in 1935, I took three larvae of *Polyommatus* (*Lycaena*) *icarus*. I had never seen the larva before, and on mentioning this to several very experienced entomologists, I found that only one of the party had seen it. He saw it for the first time in 1935 on rest harrow in the Isle of Wight. It is curious that the larvae of so common a butterfly should not be more frequently met with. One larva pupated in the tin before I got back to London, the other two died. The pupa was not attached to the leaves of the food plant, but was loose in the box. It may possibly have become detached during my journey back to London. The imago duly emerged.

It was at the Field Meeting of the South London Entomological Society, at Benfleet, on the 16th July, 1933, that Dr. K. G.

Blair captured and recorded the second appearance in England of the macropterous form of the local grasshopper, *Metrioptera roeselii* (*diluta*). Since then I have been interested in this species and the following dates may be of interest to Orthopterists. In 1934 I saw the first specimen on the 1st July and by 15th July they were exceedingly common, including the macropterous form. In 1935, the first two *roeselii* were seen on the 14th July, both immature. I made several searches in August but only found nine, none macropterous. The insect was very scarce. There was a particularly severe frost in May, 1935, and this may have contributed to their scarcity. In 1936 I found four on the 13th July and in the next few days five more, but it was not until August they occurred in fair numbers, although not commonly as in 1934. I have not seen the macropterous form since 1934. My visits to Benfleet being intermittent, I can only give the latest date on which I have met this species and that was the 3rd September, 1934. There is no doubt that it persists for some time later, as the insects on that date were very active.

Another local grasshopper that is sometimes very common here, particularly on the rough fields along the top of the downs, is *Phasgonura viridissima*. It frequents the thick thistle clumps, but it also has a fondness for sunning itself, in the morning, on wooden posts. A friend was telling me about the numbers of "Green Locusts" that she found in her garden and to my dismay told me that she made a point of collecting them, as her ducks were so fond of them! On asking if she took many, she said mostly only one or two, but once she took fourteen and several times from five to ten. She collected them in the mornings off the chestnut fencing around her land. The earliest date on which I have seen this species is the 2nd June and the latest 18th November, 1934. This latter was sunning itself about 6 feet from the ground on a telegraph post and although it appeared lethargic, was quite active when I tickled it with a grass stem.

Another local grasshopper, which is fairly frequent on the landward side of the sea wall, is *Conocephalus dorsalis*. It is not so easy to distinguish in the field as *roeselii*, as one is apt to confuse and lose sight of it among the myriads of *Stauroderus bicolor*, that are so abundant hereabouts.

On two occasions while sugaring, I have seen the grasshopper, *Meconema thalassinum*, ovipositing on the trunks of oak trees. One was ovipositing when I saw it, the other I saw insert her ovipositor into the bark. It was on the 15th September, 1935, I had examined the patch of sugar and was looking up and down the sides of the tree for any stray moths, when I saw the grasshopper *Meconema thalassinum*, some distance from the sugar and about six feet from the ground. It was crawling up the tree and as I saw it, it stopped, then using its hind legs to obtain a purchase, it forced its body backwards against the hind legs, using the two middle legs first and then the two front ones alternately (exactly as *bicolor* does on a grass stem when it is preparing to leap). Instead of dropping off the trunk as I expected, she bent her ovipositor downwards and by further backward movements of the front legs, inserted it to about half its length into the bark of the tree. She stayed in this hunched up position for about a minute and then withdrew and crawled further up the tree. I tried to find the crevice into which she had oviposited, but with only the light from my lantern was unable to find it.

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## NOTES ON COLLECTING, etc.

CAPTURES OF LEPIDOPTERA IN THE ISLE OF WIGHT.—While on holiday in the Island last August I discovered a fresh locality for *Evetria purdeyi*, Durr., between Cowes and Gurnard. The moths were easily disturbed from the branches of some young firs (? species), and a series was taken on 13th August both by Mr. H. G. Jeffery and myself, but they were getting worn. This species has been previously recorded from Freshwater. *Pyrausta asinalis*, Hubn., occurred at Ventnor, beaten out of the hedges along the cliff top, together with one *Xanthorhoe olivata*, Borkh. *Stomopteryx anthyllidella*, Hubn., occurred in great numbers among *Anthyllis vulneraria* in the same locality and the larvae were found among flowers and seedheads as well as between spun leaves. Larvae of *Peronea comariana*, Zell., were common on *Potentilla palustris* at Appleford Wilderness, the imagines being bred from 31st August to 4th September. This species does not appear to have been previously noted in the Isle of Wight. *Peronea boscana*, Fabr., was also common in the larval state on elm growing in roadside hedges at Osborne, a fine variable series being bred from 13th to 19th September. Other species taken were: *Cacoecia pronubana* (one larvae at Ventnor); *Cnephasia osseana*, Scop. (Appuldurcombe); *Endothenia oblongana*, Haw. (Gurnard); and *Chorentis myllerana*, Fabr., and pupae of *Orthotaelia sparganella*, Thunb., in stem of *Sparganium* (Appleford Wilderness).—S. WAKELY, 4, Auckland Road, S.E.19. 14th April, 1937.

A NEW LOCALITY FOR LIANGELANDIA ANOPHTHALMA, AUBÉ.—On 27th February last I discovered this extremely local beetle in some numbers in soft decayed wood and wood-mould in the partly hollow interior of the trunk, almost in the roots, of an elm recently blown over, in Windsor Forest, Berks. The only other British localities are in Kent: for many years it was known to occur only at St. Peter's, near Broadstairs, where it was discovered by the Rev. Canon Theodore Wood in his garden, in decaying seed potatoes underground (Fowler, *Brit. Col.* Vol. III. p. 193), and taken there since by a few collectors: but in August 1935 it was found by Mr. J. A. Stephens by sifting earth in his garden at Chatham, and subsequently in numbers. The occurrence of this species at Windsor shows that it is not confined to the extreme south-east of England, as it previously seemed: and it is the first instance of its having been found in rotten wood in this country.—A. A. ALLEN, 63, Blackheath Park, S.E.3. 18th April, 1937.

[I was to have gone with Mr. Allen, but my unfortunate accident prevented it. He however kindly brought me a bag of frass from the tree, and with the little sieving I was able to do, with the help of Miss Kirk, we managed to find 9 specimens.

Reitter says—"This species lives under rotten wood buried in the earth, and under large, deeply imbedded stones. Perris found the larvae in the rotten wood of old piles sticking in the earth, and suggested that they lived on the rejectimenta of other wood-boring larvae."—HORACE DONISTHORPE.]

TWO "NORTHERN" BEETLES IN KENT.—When looking through some back numbers of this journal I came across a note by Mr. Donisthorpe on his capture of the weevil *Magdalis carbonaria*, L. at Crowthorne,

Beds. In this connection it may be of interest to record my capture of this usually northern species in a still more southerly locality, viz. Swanley Wood near Farningham, North Kent, where I beat one example of each sex off birch in May 1933. Curiously enough in the same locality a few weeks previously I had taken another (and much more strictly) northern species—*Cis punctulatus*, Gyll.—not recorded, to my knowledge, from any British locality South of Cumberland. About half a dozen specimens occurred in small dry Polypori (probably *P. abietinus*) on the trunk of a dead standing pine. Though often searched for, neither species has turned up again since.—A. A. ALLEN.

COLLECTING NOTES FOR LATE SUMMER, 1936.—It is not a matter of much moment, perhaps, but the specimen of *Danaus archippus* (*plexippus*) was observed at Salcombe on 16th September, not 24th as mentioned by Dr. Kettlewell (p. 45).

I have not seen *Lasiocampa trifolii* from the Cornish mainland, but I have some bred from Scilly Isles larvae and they are nothing like as rich and dark as male *quercus*. The forewings are lighter outside the band than inside and the hindwings are noticeably lighter than the fore-wings, which are about the same shade as the more chocolate brown males of *O. potatoria*.—C. NICHOLSON, Tresillian, Cornwall.

ARGYNNIS LATHONIA (?) AT MONK'S WOOD, HUNTS.—Seeing a note in *The Field* of the observation of two brimstone butterflies, a large fritillary and a small fritillary about the size of a tortoiseshell butterfly on 22nd October last, I wrote to the writer, Dr. Charles Mathias, of Romsey, Hunts, sending him good coloured plates of the large fritillaries and *lathonia* and he duly replied as follows: "The larger fritillary was without a doubt a "high brown." The smaller one certainly not a "comma," as I have caught specimens of them in years gone by. It must have been a "Queen of Spain," as it corresponds with the plate, and I saw it quite close settled on a leaf with its wings outspread as No. 4 on South's plate No. 63. . . . I regret I had not the means of catching the specimens." Assuming the determination of the specimens to be correct, is its occurrence in Hunts a new record? It has occurred in Cambridgeshire, and as that also is an inland county, both are noteworthy for a butterfly the vast majority of whose representatives in our islands have been taken or seen on or near the coast.—C. NICHOLSON, Tresillian, Cornwall.

PLUSIA MONETA ON HOLKER MOSS.—Can Captain Parsons say whether these larvae (p. 28) feed on Monkshood in a wild state, or on Delphinium in gardens, and was the valerian that attracted the moths wild or cultivated?—C. NICHOLSON, Tresillian, Cornwall.

[Many English Entomologists seem to be unaware of the fact that the larvae of *Polychrysis moneta*, also feed sometimes on *Artemisia*, from which I have reared this species in a wild state in Switzerland and in my garden at Rodborough.—T. BAINBRIGGE FLETCHER.]

LARVAE OF CALLIMORPHA DOMINULA EATEN BY CUCKOOS.—A paragraph signed E.W. in the *Hampshire Chronicle* of 16th May last induced me to write for further information and I received a reply from Miss Ethel M. Williams, of Oxford, which may be summarized as follows, combined

with the newspaper article. "Judging by my own experience I should say that there is no better spot in which to find cuckoos than somewhere near a breeding place of the Scarlet Tiger moth. The larvae of this moth are full grown in May and ready for the cuckoo to eat before he has any chance of finding his best loved "Woolly Bears," the larvae of the Common Tiger. The best place that I know for Scarlet Tigers and for cuckoos is a reed bed near Winchester where I have seen cuckoos pulling up from the soft ground objects that appeared to be the larvae; they were short dark objects pulled out of old damp masses of the reeds of former years, and, seen through field glasses, appeared to be caterpillars. I may mention that a water-bailiff once told me that he had on one occasion counted 23 cuckoos feeding at the same time on a reed bed, where many Scarlet Tigers were wont to congregate. My informant's reed bed was some distance away from mine and he was a perfectly truthful man, who knew what he was talking about, and I do not for a moment doubt that his account of the cuckoo-assembly was correct. Scarlet Tigers were abundant in those reed beds in their season."

This seems to be a very interesting observation and makes one wonder whether the cuckoo may be responsible for similar depredations in other localities, such, for instance, as in the well known Deal and Dover district.

Are reed-beds a well-known habitat of this species? South says in *Moths of the British Isles*, Series I. page 167, that it seems "partial to marshy ground," but the food-plants he gives on p. 165 do not grow in marshy ground, with the exception of sallow. Owen Wilson (*Larvae of the British Lepidoptera*) gives a much larger list, including Comfrey, Forgetmenot, Meadowsweet and Willow, as others growing in wet places, and I should think that forgetmenot is the most probable of these to be found in a reed-bed, It seems difficult to believe that these larvae would feed naturally on sallow and willow, excepting perhaps *Salix repens*, which is commonest on heaths.—C. NICHOLSON, Tresillian, Truro, Cornwall.

[In the Stroud District *C. dominula* occurs on a very dry hill-top, the larva feeding most commonly on bramble, but it seems to be polyphagus, occurring commonly on beech, sloe, white-beam, wild pear, honeysuckle, *Eupatorium*, etc.—T. BAINBRIGGE FLETCHER.]

## CURRENT NOTES AND SHORT NOTICES.

Mr. W. G. Sheldon has just reminded me that the month of May is the time to make the Annual Appeal for funds to aid the upkeep of that portion of Wicken Fen, which is reserved as a sanctuary for marsh-loving plants, insects, birds, etc. Some readers may not know that permits are given to naturalists who wish to collect or observe the wild life indigenous to that class of habitat. The care of the Fen is under the supervision of an influential Committee for whom Mr. Sheldon acts as Treasurer, and he would be pleased to receive subscriptions and donations at "West Watch," Oxted, Surrey. Last year, he tells me, the amount collected was £120 13s. 6d.

Part 64 of the *Supplement to Seitz Palaearctic Noctuidae* Vol. III. consists of 3 sheets of the Appendix to this Supplement, and contains descriptions of more than 40 new forms, which have been noted to about 30 species occurring in the British Isles. Incidentally it is pointed



out that the name of the genus in which *strigilis*, *latruncula*, *bicoloria*, etc. have been placed should be *Procus*, Oken (1815) in place of *Oligia*. This action will probably be ignored by British authorities, who have turned down Oken's work, in spite of the fact that the work is much more comprehensively thorough than is the work of Fabricius. The *Agrotis* groups, *Hadeninae*, *Cucullinae*, *Amphipyridinae*, and the *Erastrinae* in part are dealt with.

Parts 65 and 66 of the *Supplement* deal with further *Palaearctic Geometridae* in 6 sheets and 1 plate. Mr. Prout writes of the *Larentiinae* (*Hydriomeninae*) and in treating of the huge genus *Cidaria* makes the following remark "Concerning the genus (or rather supergenus) *Cidaria*, I remain firmly convinced that many of its elements really represent natural genera, but I have not thought it necessary to force this view upon the reader and therefore continue to deal with them as subgenera." The 48 pages contain some 140 additional names to the 34 British Geometers included. The one plate contains 64 figs.

Of the Main Volumes 8 parts of the American Bombyces comprising 6 sheets with 3 plates mainly of American *Aegeriidae* grouped as in Junk's *Catalogus* is adopted and the figures, owing to the deterioration of specimens, are copied from the works of Oberthür and Beutenmüller. Also 2 parts of American Noctuae, one sheet and 5 plates (nearly 400 figures) have recently appeared.

Under the editorship of Prof. J. W. Heslop-Harrison, D.Sc., F.R.S. an extensive survey of the *Natural History of the Isle of Raasay* and of the adjoining islands has recently appeared as a part of the Proceedings of the University of Durham Philosophical Society. A considerable portion of the book gives a survey of the Geology and a List of the Plants found with notes on most of the species with numerous plates of views and several maps. The remaining pages prepared by Prof. Harrison and his son give the results of numerous visits of groups of students who had worked on the Lepidoptera, Trichoptera, Cecidomyiidae, Hymenoptera, Psyllidae and Hemiptera-Heteroptera of the islands. 329 species of Lepidoptera are listed; in the other Orders the species observed were not numerous but no doubt further visits and more concentrated work on them will result in many further discoveries and will enlarge the lists. The book is a thoroughly good record of the work which has been done and a good basis for further survey in each department. The plates, 17 in number, and 2 maps are a great help to the understanding of the character of the ground worked.

As one may judge, in a measure, from our supplement on the British Noctuae, the varietal nomenclature in Lepidoptera is, to an extent, far beyond the views of the early pioneers in the study of species variation. But when one looks through the new Staudinger List just issued one is appalled by the number of the form names already published to each of the butterflies indigenous to the British Isles. *P. machaon* has 48. *A. crataegi* has 24. *P. brassicae* has 22. *P. rapae* has 26. *P. napi* has 47. *E. cardamines* has 19. *G. rhamni* has 15. *C. hyale* has 36. *C. croceus* (*electo?*) has 18. *L. sinapis* has 30. *V. epiphron* has 23. *E. aethiops* has 40. *M. (S.) galathea*, has 80. *S. semele* has 37. *P. aegeria* has 25. *P. megera* has 35. *A. hyperantus* has 18. *E. tithonus* has 19. *E. jurtina* has 41. *C. pamphilus* has 48. *C. tiphon* has 13. *A. iris* has 24. *L. camilla* has 6. *V. atalanta* has 13. *V. cardui* has 16. *V. io* has 19. *V. urticae* has 36. *V. polychloros* has 14. *V. antiopa* has 13. *P. c-album* has 22. *M. aurinia* has 36. *M. cinaia* has 23. *M. athalia* has 64. *B. euphrosyne*

has 21. Some of our readers will remember that in the case of *E. cardamines* 19 does not include all, for one of our contributors Dr. H. B. Williams dealt with nearly 30 forms in a paper he contributed to the *London Naturalist* some years ago. In fact, the compilers of this List say that "Only the best known aberrations are included." As far as it goes this List will be of immense use in preventing a great deal of duplication in the re-naming of forms which have already been noted and described. The literature from which the names have been extracted is cited, such as Seitz, Warren, Oberthür, etc.

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## OBITUARY.

### Hugh Parry Jones, F.R.E.S. 1893-1937.

Mr. Hugh Parry Jones died on 7th February from pneumonia after only a few days illness. He was in his forty-fourth year, having been born on 11th July, 1893, at Cambridge, where his father was in practice as a solicitor. He was educated at the Perse School, Cambridge, but a breakdown in health stopped him from entering the University and also prevented his serving in the war. In 1919 the family removed to Lymington, and later to Brockenhurst; this effected a great improvement in Mr. Jones' health and enabled him to indulge to the full his passion for collecting and studying insects of all orders. His favourite groups were the Hemiptera and Aculeate Hymenoptera of which he had a very thorough knowledge. In mounting his specimens he displayed a degree of skill rarely equalled, and his extensive collections (which he afterwards presented to the Nottingham Museum) are most beautifully arranged. He was a talented artist and made a large series of coloured drawings of Aculeates which he intended to publish in a series of monographs on the group.

In 1923 Mr. Jones was appointed assistant-curator of the Nottingham Natural History Museum, and here his ability in naming and arranging the insect collections found full scope. In 1931, on the retirement of Professor J. W. Carr, he became curator.

Mr. Jones' published work included a guide to the Museum, a "List of the Aculeate Hymenoptera of Hampshire and the Isle of Wight," "An Account of the Hemiptera Heteroptera of Hampshire and the Isle of Wight with additional Notes on British species not recorded from the County." This valuable paper, which was issued as a Supplement to the *Entomologist's Record and Journal of Variation*, extends to 87 octavo pages of small type and is illustrated by two structural plates; it is really a full synopsis of the British genera and species of the Heteroptera. As recently as January this year he published in the *Entomologists' Monthly Magazine* an account of a new British species of "Mason-Wasp" (*Microdynerus exilis*, H.-S.), which he redescribed in great detail. He had made extensive notes for a monograph on the British Odyneri, and had he lived would doubtless have made important contributions to our knowledge of the Aculeate Hymenoptera. It is a great pity that his extensive knowledge of these cannot be made available to his fellow workers. He was a Fellow of the Royal Entomological Society, which he joined in 1929.

Mr. Jones married a daughter of Mr. W. A. B. Ferris of Brockenhurst and grand-daughter of Canon Ferris of Nottingham. She and a son survive him, and the sympathy of all entomologists will go out to them in their bereavement.—J. W. CARR.

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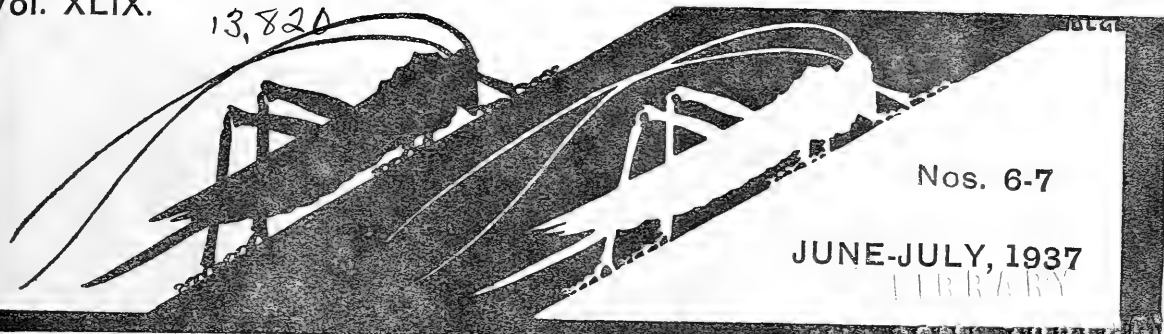
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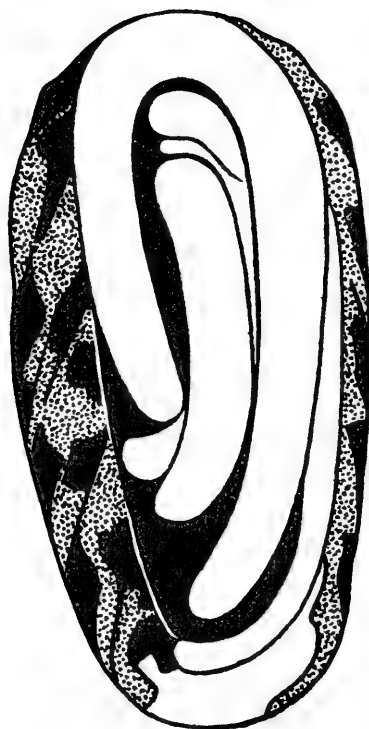
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*The Entomologist's Record.*

NEMATODE WORM IN A WASP.

Actual size  $10 \times 5$ mm.

## Mermis Thread Worm (Nematode) in Wasp (*Vespa vulgaris*).

(With Plate.)

By RICHARD BECK.

On the 19th October, 1932, I was asked to take a wasp's nest in a narrow lane off Durleigh Road, Bridgwater, as the wasps were interfering with tradesmen delivering goods by horse-drawn vehicles. It was situated in a difficult position in a bank composed of loose earth. I gave it a good dose of petrol and covered the hole with a sod. In removing the nest, which was ten inches in diameter and had nine "platforms," I lost a good many of the wasps, but secured the greater part of the nest.

In sorting out the wasps from the comb and loose earth I was surprised to see the large number of what I thought were queens—301 altogether—but on dissecting some of them found the spermatheca abortive, very small or entirely absent. I sent a large number to Dr. A. D. Imms of the Zoological Laboratory, Cambridge, who replied:—"Towards the end of the season worker wasps often become fertile and closely resemble queens, in fact there is no way of separating very large workers from queens other than by dissection. Workers are therefore only able to lay unfertilized eggs and they die at the end of the season."

I set to work and commenced dissecting these large worker wasps and queens, but was astonished to find Nematode worms occupying in many instances the entire abdomen. Out of 31 dissected 8 had Nematode worms.

With regard to the life-history of the Thread Worm, Dr. Imms writes me:—"The Mermis ultimately leaves the wasp and makes its way into the earth where it becomes sexually mature and lays eggs. When the larvae hatch from the eggs they make their way into various insects and come to live in the body cavity of the latter. I have never come across such an intense parasitization of a wasp population by Mermis before."

The accompanying illustration shows the worm in situ in the abdomen. One of them I uncoiled and it measured  $3\frac{1}{2}$  inches long. I mounted three of these abdomens, with the worms exposed, in formalin so as to keep a record. As the worms increased in size the tracheae and digestive organs appear to have been squeezed against the inner wall of the abdomen and were scarcely visible. Whether these large wasps were able to fly I am unable to say. The nest was only three minutes walk from my house; we had plenty of the ordinary size worker wasps visit us during the autumn, but none of the large workers.

[It is of considerable interest to note that the presence of nematode worms in *worker* wasps has the same effect as in *worker* ants, *i.e.*, increasing the size, etc. See *Guests of British Ants*, pp. 218-21.—HORACE DONISTHORPE.]

---

## Some Notes on Assembling Moths.

By P. B. M. ALLAN, M.A., F.S.A.

### PART I.

"The Aurelians," wrote Moses Harris in 1766, discussing 'The Great Egger,' "take this moth by Sembling. Their Manner is, to go out with a live Hen in a Box, which is covered down with Gauze or Crape; when they are come to the appointed Place, where they are pretty certain there is a Brood, they set the Box on the Ground, and stand ready with their Nets. The Cocks will quickly come and attempt to get at the Hen. . . . Not only Eggers and Vapourers, but any Moth may be taken by Sembling. As to the other large kinds of Moths, the usual Method is to tie the Hen to a Tree, Bush, etc., lightly fastened round the Body with a Piece of sewing Thread, and there to be left all Night; and in the Morning, when you return, you will almost be certain to find Madam accompanied by her Spark, who will not desert his Mistress, though her Favours be ever so easily obtained."

For many years, then, lepidopterists have made use of the attractive powers of female moths to enrich their collections, and not a few have recorded their experiences in print; but the scientific literature of the subject is not large, and, so far as I am aware, no one has yet produced what could be called a 'standard work' on assembling. Yet chemotropism in moths is a subject of infinite interest, and apart from its biological aspect it plays a certain part in the geographical distribution of species. For example, in the case of those species which emerge in the autumn and require a period of hibernation to mature their ova, the females may travel considerable distances from the place of their eclosion before they are ready for pairing. They must therefore have the power to attract males to the new locality.

In 1935 some pupae of *Saturnia pavonia*, collected in mid-Wales, were brought to me in West Essex. On 30th April the following year, a female moth (whom I will call ♀ No. 1) emerged, and the following day, although she was in the shade and a cold East wind was blowing, she began to 'call' at a little before noon. She had not moved at all from the position she had taken up to expand her wings on emergence from the pupa. She continued calling until dusk.

Next day, 2nd May, she was taken, in an assembling cage, by car to a spot some miles away, where it was hoped *S. pavonia* occurred. The welkin was overcast all day, and there was a very cold East wind. She did not call. Nor did she call the following day, 3rd May, which was even colder.

On 4th May the weather improved, and at 9.0 a.m. (all the times mentioned in this paper are S.T.) I placed her in a large larva cage beneath the eaves of a heavily thatched barn facing East. *S. pavonia* has been recorded in this district only twice in the last thirty years (there are two entomologists who have lived here for that period), and I did not expect that my female would attract any male. She began calling shortly after noon, and continued calling all day. There was a light breeze from the east.

At 5.0 p.m. a male *S. pavonia* (♂ No. 1) appeared on the ridge of the barn and fluttered down the thatch directly above the female. The thatch at the eaves was  $2\frac{1}{2}$  feet thick, and the cage was on a shelf

right up under the eaves, against the wall of the barn. The barn was about 60 feet long and 18 high, and the cage containing the moth was roughly halfway along it. The amount of scent that was blown *over* the roof of the barn could not have been very great. There were a wall, a large house, elm trees and a ridge rising some seventy feet, behind the barn. Beyond the ridge was open rolling country (all arable) for several miles.

The male found the cage, and, on the door being opened, entered; but he made no attempt to pair. An hour later the female was still calling, the male sitting on the opposite side of the cage and paying no attention to her.

At 9.0 p.m. the female flew about the cage and buffeted the male vigorously, as is the custom with all the larger moths of this Group when the males spurn their advances. The male made no reply. He never paired, and died on the evening of 6th May.

At 8.0 a.m. on this same day (4th May) another ♀ *S. pavonia* (♀ No. 2) emerged, and the following day she began to call shortly before 11.30 a.m. At noon both females were calling vigorously, their cages being side by side under the eaves of the barn.

At noon I placed Male No. 1 in the cage containing the second female. Again he declined to pair.

At 4.0 p.m. on 5th May a second male (♂ No. 2) appeared on the roof of the barn. He was netted and placed in the cage with Female No. 1. At 5.5 p.m. he paired with her. They remained paired until 7.0 p.m., when they separated, the female then dashing violently about the cage. The second male was also placed, next day, in the cage with the second (virgin) female (♀ No. 2.) He did not pair again and died at 5.0 p.m. on the following day, and when I removed his corpse from the cage at 7.30 p.m. it was stiff and brittle.

At 9.0 p.m. (still 5th May), two hours after separating from the male, Female No. 1 began to lay eggs. She laid a row about half an inch wide, moving her abdomen from right to left, then crawled a wee bit backwards and laid another row *behind* the first row, and so on, always laying from right to left. All this time her wings were held upright, and quivering. At 9.15 p.m. she finished laying and dashed violently against the cage, which she continued to do at intervals for more than an hour. At 10.30 p.m. she settled down and began to lay another batch of eggs. At 11.15 she was immobile, her abdomen resting on the last laid batch of eggs. I did not visit her again that night; but she laid no more eggs, and next morning she was still in the same position. She never moved again and died at dusk on 9th May.

The following day, 6th May, the second female (♀ No. 2) began to call during the forenoon, and at 4.0 p.m. a third male (♂ No. 3) appeared on the roof of the barn. He was caught and placed in the cage containing the calling Female No. 2 and Males Nos. 1 and 2. He at once paired.

I must here interject that the presence of the two males had caused this virgin female to lay four eggs in the course of the morning. Sexual excitement very often has this effect on female moths. A female *Notodonta dromedarius*, placed in a cage with three males, laid eggs all over the cage floor, when none of the males would mate with her. Eggs laid in this manner are practically always infertile. I say

'practically' because I believe that once, with a ♀ *Amphidasys betularia*, this sexual excitement started the nuclear division which is the prelude to parthenogenesis. The male with her refused to mate, yet all her ova hatched. And after she had laid them she 'called' and attracted further males. However, I have dealt with this most interesting problem at some length in a recent book.\*

At 6.0 p.m. this second couple (♀ No. 2 and ♂ No. 3) separated, and, like her sister, the female laid eggs that night. (The first one laid 180, the second 198). All these ova hatched—from noon to 2 p.m. on 3rd and 4th June, though a batch kept indoors hatched at noon and 1.45 p.m. on 26th May.

Female No. 2 died on 11th May, the Male No. 3 on 8th May.

Now, these female *S. pavonia* began to call in the forenoon; yet it was 4 p.m. before a male appeared. And my previous experience has been that, with a light breeze, in a locality which is known to harbour the species with which you are experimenting, male moths commonly begin to approach the assembling cage, from across, say, 40-acre ploughed fields, ten minutes after the moth has begun to call. And *S. pavonia*, I have said, has been recorded here only twice in the last thirty years. Surely, then, these three males who came to my calling females must have travelled many miles?

But conclusions are dangerous things, and this is not the conclusion to which I have come. For I do not believe the assertions of those enthusiasts who claim that a male can be attracted from several miles, though I think it is possible that under extremely favourable conditions a female oak eggar, emperor moth or other large moth of the group *Bombycina* (Barrett) could attract a male from the best part of one thousand yards. When I say 'one thousand yards' I am thinking of the rifle ranges at Bisley, and I bear in mind what a considerable distance a thousand yards is. A correspondent of *The Times* (3rd June, 1936) tells us that he has assembled male *pavonia*—"marked males released"—from a distance of two miles. I hope that his experiments were carried out with scientific precision and that the possibility of error was eliminated by laboratory methods. Without such precautions one could easily be misled. On being released, the marked males might well have begun "ranging" upwind in that search for the female of the species which is their biological destiny; and then, when within half a mile or less of the caged female, have picked up her scent and made a bee-line for her. The mere fact that the marked males *eventually* reached the calling female would not constitute a proof acceptable to science that they had picked up the scent two miles away. On the great expanses of moorland in Scotland and mid-Wales the male foxmoths and emperors do not confine their ranging to a few hundred yards; they travel miles against the wind in their search for a female's scent. How near they must be to a calling female before they can become aware of her presence yet remains to be proved.

I believe there is nothing more esoteric in the four hours' delay of these male *pavonia* to find my females than this—that the position of the cage prevented normal diffusion of the scent. The males were searching the hedgerows within a thousand yards (or perhaps very much less) of my barn, and had the assembling cage been in the open,

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\* *A Moth Hunter's Gossip*, Chap. VI.

they would have found it long before 4 o'clock. The facts that this moth is extremely rare here and that I attracted no more males when a cage containing a fresh calling female was, later, placed in a more propitious site, merely show, to my mind, that it is possible for a species to maintain, unseen by entomologists, a foothold in a district generally unfavourable to it. In this connection I may mention that *N. dromedarius* was unknown in this district until I attracted, one evening, three males to a calling female.

These experiments also afforded one more confirmation of a theory which I have held, rightly or wrongly, for many years, namely that with many species a male moth which has paired is unable to pair again, though he is always attracted by the female's scent. I have made many experiments on this point, all of them confirmatory, and I shall welcome any assertions, based on experiments conducted in a way that will satisfy science, to the contrary. A friend once told me that he had kept a male *Amorpha populi* at stud; but unfortunately he did not record his observations and I have failed to reproduce his experiment. I do not assert that this theory applies to *all* species but only to those with which I happen to have experimented (*viz.* certain of the *Sphingidae*, *Notodontidae*, *Lasiocampidae*, *Endromidae*, *Saturniidae*, *Arctiidae*, some of the *Noctuidae*, and the *Boarmiinae*). I should add, in parentheses as it were, that I have prefaced the word 'attracted' by 'always' because I have never known a hale and hearty moth not to be stirred—if not to dithyrambs, at least to a state of mild interest—by the scent of a female of his species. A male *betularia* that has recently paired will fly into the lee of a calling female, and, holding tightly to a leaf, use his wings so vigorously that he raises the leaf up and down, ever and anon turning round and bobbing just like a courting pigeon in your yard. But he will content himself with performing these antics within three inches of the female and will never, so far as I have observed, make any attempt to pair.

Another conclusion, from these experiments, which it seems fairly safe to draw, is that in a wild state the female *S. pavonia* flies some distance between the phases of ovipositing. The first female laid two batches of eggs, the second one five; others with which I have experimented have laid three and four. All the eggs were laid in one night. The bodies of both these females were found to be empty of eggs after death.

A series of observations have shown me that the females of the larger moths in the group *Bombycina* (Barrett), whether fertilised or not, do not fly again just before dawn, as is stated in some text-books. My experience with such species as *G. quercifolia*, *S. pavonia*, *B. versicolor*, *L. quercus*, *M. neustria*, *M. rubi* and *C. potaloria* is that 11.30 p.m. is the latest hour at which the *females* fly. I should be glad to hear the experience of other entomologists on this point.

(To be continued.)

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### A few Random Thoughts on mass movement of Lepidoptera or Pseudo-Migration.

The so-called "Migration of Insects" is a subject, which occupies a deal of valuable space in an ever increasing number of our current magazines, but, in spite of the large number of observations recorded, our knowledge of the urge seems, as a member of the South London Entomological and Natural History Society said to me the other week to have "got no forruder." Doubtless the consideration of this biological question has been hampered from the first by the adoption and misapplication of the term "migration"; a term which was bred and born in association with vertebrate, sentient organisms, and an utterly unsuitable term to use with its mass of associations, in dealing with questions relating to the non-vertebrate Orders. The term cannot be used without implying instruction (from parents, etc.), observation, experience, reason, etc., coupled with a duration of life to acquire such equipment necessary for true migration in the vertebrate sense.

Now look at the vast majority of (I almost said all) the records. They are bald, naked, simple facts of occurrence, unconnected observations and are practically useless. Let me give an example or two. It has been recorded by several observers that an extremely abundant swarm of *Plusia gamma* appeared at Hastings coming in from the sea. That was the bald fact alone, except that the individuals dispersed or disappeared in the course of some days. Whence did they come? Whither did they go? The swarm was met on the shore of Hastings and we have no evidence of the extent of the swarm along either the east or west of Hastings. Did any one record them during their journey from the French coast? Where on that coast did they breed? Such a huge mass if reared in a limited area should have left traces of the larval feasts. Or did they assemble at some suitable spot from surrounding areas? and what induced them to take on this conspicuous mass movement? It could not be want of food; it could not be parental instruction (imitation). Which way was the prevailing current of air at that time? Insects are well known not only to be carried by the wind but to fly against it. The lights of Hastings could not have been an initial start of the movement at that distance, but they may have been a secondary factor, which caused the mass of the individuals to converge upon the shores of the town. For "whence" then we find nothing but conjecture. Whither did they go? The report tells us that the mass of individuals more or less rapidly passed on. But where, how and whither? Among the numbers of nature lovers in the S.E. Counties of England how many recorded sections of this mass in their progress inland? I think I am correct in saying that less than half a dozen observations of *P. gamma* were made in the week or two succeeding the advent of this swarm. When organisms have, from some cause or other, become massed, as soon as congenial circumstances arise they proceed to separate, to disperse. That is what took place in the case of this Hastings incursion. Dispersal pure and simple, strongly evidenced by some going away seaward again, which action caused the erroneous observation that it was a "return migration," implying by the use of the term "migration" that they were conscious of the purpose of their effort. We get no further from

this observation because it is not accompanied by a host of prae- and post-observations to carry it further.

Now let us take another class of observation. A number of examples of *P. gamma* are observed in a suburban garden hovering over flowers, wind S.S.E., about midday. They pass off from W. to E. I take it that these *P. gamma* flew over to the next garden, not over the house, that the road ran E. to W. and that the garden faced S.; apparently the *gamma* were not all together but at times during an hour or two. This was in Morden, Surrey, 19th June. This observation is of no use unless previous and subsequent chains of records are obtained on that and other close dates.

It is not inferred that such observations should not be recorded but that to be of use they must be reinforced by a great many more observers and widely spread, such as children in our schools. But do not let our investigation be prejudiced by the use of the misnomer "Migration." We are dealing with a phase of the natural dispersal of organisms just as the student of physical phenomena deals with the massing and dispersal of particles of inert matter under the forces of attraction and repulsion.—HY.J.T.

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### New Finnish race of *Scolitantides orion*, Pall., compared with the others of the species.

By ROGER VERITY, M.D., F.R.E.S.

A fine series of *S. orion*, collected by H. W. Brandt, during the first days of June, 1936, in the neighbourhood of Sordavala (Serdobol), in southern Finland, affords a strikingly peculiar aspect and is by far the most lovely race of the species known to this day. Its closest ally is form *ornata*, Stdgr., but it differs from it by not being smaller than the nominotypical *orion* of Russia, by the far greater extent and the lighter tinge of the blue on upperside and by the total, or nearly total, obliteration of the orange band on underside. It is the only race in which the upperside can be described as entirely blue in both sexes, with large, black marginal dots surrounded by bluish-white rings, so that it somewhat recalls the aspect of male *baton* and *vicrama*; its tone is also lighter and clearer than usual, as in the two latter, but it is, either very slightly or more thickly, especially in the female, suffused with black scales (they are often dense on the hindwing) and there is a row of faint and shaded black, praemarginal, spots before the whitish rings, which are the remnants of the continuous black band always present in the other races, including *ornata*, as figured, for instance, by Seitz and as represented from Turkestan in my collection. It is noteworthy that there is always a large, black, discocellular spot on the forewing, but in none of my males are there any dots of the discal row and a few are present only in one female out of six. The other very peculiar feature, I see in no other *orion*, consists, in the aforesaid disappearance of the characteristic orange band, on the underside: in some specimens there are no traces of it left, in others a few, pale, russet scales are perceptible, here and there, where the band usually is, whilst, in others still, the latter is represented by a continuous, but narrow area, sprinkled with scales of that colour, mixed with black ones, which give it a dull, dirty, look. I propose naming this extreme



degree in the variation of *orion*, standing opposite *metioche*, Frhst. and the entirely black form *nigra*, Gerh., race **ultraornata**, nom. nov. As I have already remarked, the degree which comes next is *ornata*, followed by *telephii*, Esp. = *lariana*, Frhst., which, in reality, is only the *ornata* of Europe, already recorded by Staudinger himself as occurring there, singly or locally, but which one might usefully designate by another name, because it is, as a rule, less blue than the most highly characterized *ornata* of Asia and it is connected by transitional individuals to the further degree of melanism, one can take to be Pallas's nominotypical *orion*, described originally as follows: "Wings, above, fuscous; disc sprinkled with blue; periphery of wings blackish, with white chequered fringes, with a chain of bluish marginal rings and with a black lunule in the middle of the disc." The statements that the disc is only "sprinkled" with blue and that the periphery of the wing gives the impression of being, on the whole, black, serve admirably the purpose of fixing the grade of development of the black pattern in the nominotypical form, which is evidently greater than in *telephii* = *lariana*, whereas, on the other hand, the well developed bluish marginal rings place it before the more melanic *metioche*, Frhst., culminating in the entirely black *nigra* female form. Pallas gives "Sisranum," in Latin, as the locality of his *orion*, observed in May, and his book deals with several provinces of the Russian Empire, but which that town is in I am unable to find out. As to Frühstorfer's *lariana*, it seems to me it is nothing but a synonym of *telephii*, Esp. as the original figure of the latter, pl. 41, fig. 2, clearly represents the form with most blue ever found in Europe, both in the original edition of Esper's work and in Charpentier's later and very much rougher reproduction; we are informed, at page 164, that it came from the mountains of Kreuzburg (presumably that in Saxe Weimar), collected in July; he distinguishes it from *orion* and I do not see how *lariana* can be brought in besides those two ancient names. Already there existed the third very ancient name of *battus* in Schiffermüller, from Vienna, described as "dark blue, chequered with black" and *ornata*-like individuals are quite frequent in that region, whence I have some, but, in this case, the description is so inclusive that the name can only be done away with, as a specific synonym of *orion* in general, its being impossible to apply it to any special form.

It will be useful to conclude that facts, in connection with this species, are simpler than might seem by the confusion which has been created by these various synonyms. Frühstorfer's *metioche* from some valleys of the Alps, such as those of his original description, in the Valais and the Upper Adige (Südtirol), and others, such as the Anzasca one and Lake Maggiore, and from other regions, such as Mt. Olympus, in Macedonia, is, in reality, a distinct, melanic, race, but *lariana* is not; even on the lake of Como, whence it was described from Bisbino, there also exists the darker form, referable to nominotypical *orion*, as described by Oberthür, who collected it at the Villa d'Este and states in his *Et. Lép. Comp.*, IV. p. 288, it is exactly similar to Hübner's figures 801-2, pointing out how different these figures are from those numbered 328-30 in the same work, and that it is intermediate between the latter and the race of the Valais; now, the latter figures represent the much more blue *telephii* = *lariana*, so that on the lake of Como, as in my series from Vienna and as in most regions, *telephii* and

nominotypical *orion* both exist together. The only region of a certain extent, in which *telephii* seems to exclude, or nearly exclude, the latter, seems to be the south of France, where, according to Oberthür, both sexes are constantly broadly blue, both in the Pyrénées Orientales and in the Alpes Maritimes. Frühstorfer, too, includes females from la Turbie, near Monaco, in his *lariana*, showing this name is a synonym of *telephii*, the Como and the French form evidently being equivalent, even to his mind, but he having overlooked the fact that the latter is perfectly similar to the one of Central Germany, as figured under the name of *telephii* by Esper and by Bergsträsser on his plate 56 (he also figures the nominotypical *orion* from the same county of Hanau on pl. 60) and as figured by Hübner from Austria, under Schiffermüller's name of *battus*, in his figs. 328-30, included, in his text, in the same paragraph as figures 801-2 of *orion* and with the same habitat, just as specimens from Vienna do, as a matter of fact, exhibit this variation from *telephii* to *orion*.

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## Effects of Radiant Heat on the Development of some Butterflies.

By ORAZIO QUERCI.

In the breeding experiments that we have made in these last few years, we have inquired into the effects of temperature, humidity, atmospheric pressure, wind and alimentation on the development of some Lepidoptera. As the results of every experiment since almost none were in accordance with those of the other trials, we suspected that another factor was influencing the larval stages of the insects.

Last summer, while collecting on the Macedonian side of the Olympus Mt., we rented a piece of ground with a source of water, and several kinds of plants for larvae were planted there. By the end of July 1936 the country was barren, while in our field the vegetation was luxuriant; then we put on the plants many eggs of different species of insects.

Having seen that the frail shell of the eggs and pupae preserve the vitality of those living things even when it is hot, we built some shelters, with different sorts of material, in order to note the behaviour of the larvae in the shelters, while the larvae in the open were injured by heat.

When some eggs had hatched and everything was ready for experiments, the Police invited us to leave Greece and to exchange some American gold, although we had duly declared our money before landing in this country. Besides that the Government stated that everybody leaving Greece must pay 20,000 drachms for the visa to the passport; thus we should have been obliged to pay £76 for my wife and I.

We made a petition to H.M. the King of Greece, and we were allowed to remain here keeping our gold; however during that troubled time our expensive experiment was lost. Now we must give up with Entomology and get another job, but before doing that we will summarize what we have observed about the influence of radiant heat on the development of some butterflies. Recently we have learnt that the fatal effects of these rays have been proved by experiments, as a

strong source of radium destroyed the vitality of some caterpillars, and they were killed.

In the *Encyclopaedia Britannica* we read the following words, which have given me the idea—"The rays resemble other specifics, which are beneficial in small, but harmful in large amount, when applied to living things."

*Radiant Heat and Eggs.*—When heat was intense the eggs hatched in a short time; when heat was moderate the eggs either hatched rapidly, or delayed longer than we expected, or never hatched. At Lisbon (Portugal) the weather was lovely by the end of December, 1932; some *Pieris*, *Pontia*, *Euchloë* and *Colias* emerged in the country, and we took a few mated females which laid many eggs that we kept in a room where the temperature never was below 50°. In January 1933 the radiation became feeble and all those eggs dried inside. On the other hand at Philadelphia, Pa., while the radiant heat was strong in July 1932, some eggs of *Pieris* hatched after a fortnight in a refrigerator at 45° to 50° (*Ent. Rec.*, XLIV. p. 170, 1932).

*Radiant Heat and Larvae of Pieridae.*—When the larvae hatched and the radiant heat was very strong, they dropped on the ground and died almost at once (*Ent. Rec.*, XLVII. p. 125, 1935). Sometimes the larvae in our broods fed, moulted and pupated at a temperature of 91° (*l.c.*, p. 87) as radiation was moderate; on the other hand they died, even at 89° (*l.c.*, p. 74) if the rays were strong, and when the larvae died at room temperature they collapsed also in the subsoil of a big building, where the temperature never rose above 80°, and in an ice-box at about 60°. Only below 50°, confined in an ice-box, the larvae were not injured by the strong rays.

In our broods the larvae grew well, even at a moderate cold, if radiation was suitable, while they remained inactive until they collapsed if, in spite of the mild weather, the rays were feeble for a long time.

Only those larvae that met with favourable conditions of radiation, heat and food during their short larval stage succeeded in pupating; otherwise they died.

I must record that at Philadelphia some larvae of *Pieris rapae* often formed their pupae in a week, while at Tangier, in Portugal, Spain and Greece they never became mature in less than a fortnight.

Having seen that the larvae of the *Pieridae* almost always died above 90°, and that sometimes they were injured at 60°, we were surprised when at Salonika we saw that in March 1936 many caterpillars fed actively, moulted and pupated rapidly in an incubator at 110° in spite of the little aeration, moderate light and high vapour pressure. In such conditions the larvae rotted only when we fed them with a poor quality of food (*Ent. Rec.* XLVIII. p. 110, 1936).

Last December we took a worn female of *Colias croceus*, which laid many eggs upon a plant of clover. The larvae that hatched were put into an incubator of the University of Salonika, at a temperature of about 100°, and I daily went and set a fresh plant to replace the faded ones. In January 1937, on account of the prevailing influenza epidemic, I was unable to supply those larvae with food, and they remained for ten days in that hot room with dry plants only. When I looked again at the breeding-cage I saw that some larvae were still living, and a few

had formed pupae, which produced adults in a few days, while the sun was shining.

I believe that in both experiments, which I have recorded above, the larvae resisted intense heat because the radiation was feeble.

*Radiant Heat and Larvae of Papilio.*—The larvae of a few species of *Papilio* that we have reared never were injured by a strong radiation. If radiant heat increased while they were feeding they were overcome by stupor, but became active again if a fan was set going near them.

The larvae which started to moult with a suitable amount of radiation succeeded in casting their skins in a short time; on the other hand if the Millikan rays became intense, the moulting larvae remained long dormant and they cast off their skins with difficulty, after radiant heat decreased.

If radiation was suitable, the larvae that had finished feeding hung up at once and in a perfect manner. At a very feeble degree of radiation the mature larvae were overcome by stupor; at a high degree they became excited and afterwards dormant. Often those weakened larvae hung up imperfectly, and sometimes remained on the ground but did not die.

The larvae which had hung up in a short time formed pupae in a few hours, and those *active pupae* emerged in a few days if radiation continued to be suitable. However if radiation either increased or decreased considerably while the active pupae were *nearing their physiological change* they delayed emergence (*arrested pupae*) until after the environment became settled for several days near the optimum range for the emergence of the pupae of the *Papilio*.

Sometimes the arrested pupae emerged when the climate was lovely, but at other times they did not. I must confess that I am still very far from being able to explain what are the complex causes of the emergence of the pupae.

The mature larvae, that had laid dormant became feeble and even under the most favourable conditions, needed some days to recover and so form *dormant pupae* that never emerged in the same year in which they were formed.

*Records about the Emergence of a few Kinds of Pupae.*—It is well known that the emergences of every kind of pupa are arrested by cold and scanty radiation. Radiation is the most important factor, as is proved by the fact that, in winter, the pupae rarely emerge even if they are in a hot room. We record that some pupae of *Papilio machaon* and *Zerynthia rumina* emerged in full winter, in our rooms warmed by a stove, at Madrid, Tangier and Salonika. That happened with the combined efforts of heat and radiation; however in winter we never succeeded in producing a premature emergence of *Pieridae*.

The pupae of the *Pieridae* are more or less active, as their larvae die from any sensible fluctuation of the rays. The pupae of *Pieris rapae*, *Pontia protodice*, *P. daphnidice*, *Colias eurytheme* and *C. croceus* (which we have handled in America, Europe and Africa) never were arrested by strong radiations. The emergence of some pupae of *Pieris brassicae* was once arrested, at Lisbon, although on that day the temperature never was over 75° (*Ent. Rec.*, XLVIII. p. 38, 1936.) However, the radiant heat was so exceptionally strong that some men and horses were harmed in the City. Those pupae emerged three or four months after. When at Salonika we tried to arrest by heat the pupae of *P.*

*brassicae* we did not succeed as those experiments were made in March and April, and the radiation was not sufficiently strong.

The pupae of the second brood of *Euchloë belemia* and *E. ausonia* emerged in a few days until the radiation had a moderate strength; otherwise they delayed emergence until the following year, or after two years.

At Philadelphia we reared larvae of *Papilio polyxenes* of the third, fourth and of the last mongrel brood. The active pupae emerged in a few days, except those of the last brood, which were arrested when the temperature fell, in October 1932, but they emerged, in a cabin of the steamer at 75°, both at Boston and near the Azores Islands, while the sun was shining. A few arrested pupae of the third brood emerged at Philadelphia, in mid-August, after the radiant heat had decreased; the other arrested pupae of the third brood produced adults in September together with those of the fourth brood. All the dormant pupae remained. We took them with us, and they emerged in Portugal and Spain from May to July of the following year.

The pupae of *Papilio machaon*, from our broods at Lisbon and Cuenca (Spain) emerged partly in a few days. Some emerged in winter in a warm room at Madrid, and the others at Tangier in the spring of the following year.

At Tangier we reared *P. machaon* from May to December 1934 and obtained pupae of the second, third and fourth brood and of the last mongrel brood. Both active and arrested pupae produced adults in Morocco; the dormant ones were taken with us when we came to Greece. Most of them emerged at Salonika from May to September 1935; the others from May to October 1936.

In Greece we have not been able to rear *P. machaon*, as this species is very scarce here and our African specimens never mated in our cages.

CONCLUSIONS.—The various kinds of rays have a different influence over living things according to their degree of intensity, and in accordance with the climate of the place where the plants and animals live.

Man can live in a cold environment until the rays are strong; he does not suffer at a relatively high temperature if the rays are very feeble; he fits well at any intermediate temperature provided that radiation is balanced by the other factors of the climate.

The vital limits of the human kind are wide, and man can endure strong deviations from its optimum range. Only when the rays are either very intense, or very feeble in relationship to the environment, it seems that epidemics spread.

The fertility of the insect is formidable, and if it were not for the "balance in nature," most of them must die in the larval stage when their genitalia are not yet formed. So, the limits of vitality of the insects are reduced, and their eggs, larvae and pupae die at any slight deviation from the suitable range.

I believe that it will be hard to state by figures in any particular case what the suitable range is, as the combinations of the different kinds of rays with the other climate factors are endless, and every species of insect has a different vital range in each of its stages.—  
SALONIKA, 20TH APRIL, 1937.

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## Argentine Notes. I. Papilionidae.

By KENNETH J. HAYWARD, F.R.E.S., F.R.G.S., F.Z.S.

Probably the height of every schoolboy collectors' ambition is to possess a "swallow-tail," at least it was in my school days, but although I was reputed to have more than my share of beginner's luck, it was never my fortune to obtain a specimen, nor in fact have I ever seen the British insect alive.

My first introduction to the Papilios was on the southern range of the Island of Cyprus, where a form of *P. machaon* (which is I believe known as ssp. *asiatica*), flies sparsely over the wild country below Platres, along the road to Troöditza and on the bare summit of Troödos, the reputed "Olympus of the Gods." Its capture was more a matter of strategy and patience than a straightforward chase, as the nature of the ground prevented rapid movement. I captured a fair series, and every capture gave me a fresh thrill, possibly because they were my first Papilios, or it may have been their likeness to the British form of my schoolday dreams, then not so long left behind me.

But be it what may, they are the only members of their Family, whose capture has ever caused me the slightest elation. I suppose it is that they are mostly large and well known and rarely difficult to catch that this is so, but the fact remains that I get far more satisfaction out of the successful netting of a small dingy Hesperid, or an unusual *Pieris* than from the finest of Papilios.

In the only published list of the Argentine *Papilionidae* I have at hand, 49 species or forms are noted as occurring in the country, but the list must be slightly longer since there are species not mentioned, that I have seen or captured.

My first introduction to the Argentine species of this Family was in the Parks and Gardens of Buenos Aires, when I first landed, and where *P. thoas* ssp. *brasiliensis* flies commonly. This insect seems to be common in all parts of the country north of Buenos Aires, and at the moment of writing a pair are disporting themselves amongst the orange trees before the window, shadows of the "orange dogs" to follow. Some of them reach as much as 7 or 7½ inches wing spread, the males especially being generally on the large side.

From Buenos Aires I went almost immediately to the northern portion of the Province of Santa Fé, a province whose area exceeds that of Greece. Here I remained for 5½ years, collecting, when time permitted, in the vast quebracho forests that comprise the Chaco-santafecino.

The range of Papilios found here was not great and of these, three only were common. *P. thoas* ssp. *brasiliensis* haunted equally our gardens and the forest picadas,\* and floated gracefully along the forest edge. The other two common species remained very closely in their selected haunts. Of these, *P. hellanichus*, generally considered a rare species and which is but sparsely represented in Argentine collections, favoured the woodland edge, seldom venturing far into the forest or straying to any great extent into the bordering cultivation. Like certain other insects, it was wont to resent the intrusion of other species into

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\* Forest paths or roads.

its domain, and would fly at them and buffet them in the most approved Charaxid-like style. As the earlier stages appeared to be unknown, I decided to find their larvae, but although the adult was so common and so localized that it appeared an easy task, nearly three years was to elapse before I achieved my end and then only by spending many hours watching the insects in flight till they finally betrayed their food-plant, a not uncommon but little suspected *Berberis* (*B. ruscifolia*). I have since learnt that *Papilio argentinus* also feeds on a *Berberis* sp.

*Papilio perrhebus*, on the other hand, was always to be found in the flower covered glades along the rivers, especially in the spring, when the scent of the wild petunias was almost suffocating. It is an insect twelve years' collecting has led me to associate with the vicinity of rivers. It flies freely in the virgin forest at Punta Lara to the south of the city of Buenos Aires, a stretch of woodland that has miraculously escaped the vandal hand of man where many unusual species have been found, brought down from Paraguay and Brazil on the floating camalotes by the two great waterways of the country, the Paraná and the Uruguay. In Misiones and Corrientes I have only found it along the banks of the Alto Paraná or by the larger arroyos,\* and in Entre Rios the riverine forests are its home.

Of the remaining species that I took in the Chaco-santafecino, all were scarce. I do not remember taking the male of *L. lycophron* but it must have been present since one or two specimens of the female forms *oebalus* and *pirithous* were captured. The *pomponius* form of *P. lysithous* was also found and *Euryades duponcheli*, the former unrecorded I believe from this country.

Then after a short time in Buenos Aires, whose bricks and mortar were far from my liking, I found myself in the Province of La Rioja (equal in area to Portugal), and here I was able to collect freely without the restraint of Office hours.

Undoubtedly the commonest of the Papilios in the north west is the elsewhere scarce *Euryades duponcheli*. It is a beautiful insect and in the summer of 1930-31 it was excessively common both at Guayapa (near Patquia) and in the small area of cultivation that nestles amongst the Mogotes, those curious sandstone cliffs and canyons that form the southern extension of the small range of sierras known as Los Colorados. Amongst these sandstone valleys, filled with scrub and the giant candelabra cactus, I spent many pleasant days collecting insects and cacti, or searching for a lost Indian burial ground. Apart from the rare Chaco-santafecina records, I have only seen *E. duponcheli* (excluding the northwestern provinces) at a spot on the Rio Lujan, an hour's train journey north of Buenos Aires, where I found it not uncommonly in March of 1930, finding at the same time the *damocrates* form of *P. perrhebus*. The foodplant of *E. duponcheli* is *Aristolochia lingua*.

Rare specimens of *Euryades corethrus* are sometimes taken, and in the villages or towns, where there happen to be Citrus plants, or flowers, one sees the ubiquitous *brasiliensis*. *P. polydamas* is not uncommon and I have taken it as high as 7500 feet in the Nevado de Famatina on the Cerro Negro Oveno. Most of my collecting in La Rioja and in the adjacent portions of the surrounding Provinces, San Juan, San Luis, Córdoba and Catamarca has been off the beaten track, and in the

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\* Small streams.



wilder portion, where *Papilionidae* are less likely to be found, and I think the only other species I took in those parts was *damocrates* though I believe that five or six other species are to be found. During the summer of 1933-34 I spent six months collecting in my old haunts of the Chaco-santafecino, along the north of Corrientes and the Alto Paraná litoral of Misiones. It happened to be one of the worst seasons ever recorded here, due to the excessive cold of the previous winter, followed by prolonged drought. My stay of a month in the Chaco-santafecino did not produce a single *Papilio*, though I searched assiduously for *P. hellanichus* in its favourite haunts. In Corrientes only two species were to be found, and it was not till I entered Misiones at Posadas that the season began to wake up. Here in some woodland bordering the river I had the pleasure of making my acquaintance in the life with several well known butterflies and three *Papilios*, *polydamas*, *perrhebus* and *lamarckei* were taken, and another unknown to me, probably *P. capys*, successfully evaded every attempt to capture it, confining itself to the denser woodland, where the net could not be used.

Later on in the more northern portions of the Territory and on the Brazilian borders, the *Papilios* became some of the commonest insects. In all 19 forms were taken and on one occasion at Puerto Bemberg, where the road through the villages was in places lined with beds of zinnias and other flowers, no less than ten forms were present at the same time at one of these beds, including the rare *P. scamander*, of which I only obtained three specimens in all.

Here on these flowerbeds was variety, but on the damp sand along the river's bank, on the muddy patches by the arroyos, and sometimes after rain at the puddles on the roads, was quantity. On sunny days from about ten in the morning till late afternoon *P. thoas* ssp. *brasiliensis*, *P. lamarckei*, *P. lycophron* and sometimes *P. androgeus*, clustered in dense masses of from a few inches to several feet in diameter, differing from the similarly grouped *Catopsilias* in that the species intermingled. Sometimes odd specimens of the beautiful *P. stenodesmus* would appear, or of *P. capys*. But whatever species were present all would be males. They would remain quiescent for a few minutes, their bodies throbbing as they sucked up the moisture, which was from time to time discharged from the anus in large drops, their wings erect, quivering with the slightest of movements. Now and again an insect would make an impatient gesture with its wings, a quick flip, withdraw its proboscis and move to another spot, or perhaps leave its fellows and taking to wing circle over the spot till it had spied out some new opening amongst the crowd, and dropping down walk around till it found a place that pleased it.

To collect from such patches, one had only to approach quietly, sit down, and select what was required with a pair of forceps.

I had hoped to obtain a long series of the beautiful diaphanous *P. protesilaus* group, of which four species are known from Misiones, *P. protesilaus*, *P. autosilaus*, *P. telesilaus* and *P. stenodesmus*. At times they assemble in patches, like the species just mentioned, but it was not my luck to see them thus. In fact only *P. stenodesmus* was taken, the rest, if seen, escaped (they cannot be distinguished on the wing and even at rest it is difficult), and I learnt from other collectors that they were absent from all their usual haunts that season.



At the foot of the Igazú falls, probably the most colourful falls in the world, stretching in a great semicircle for 2700 metres and falling either directly, or as a double fall for 263 feet in a green setting of tropical forest, the beautiful *P. nephalion* flew in the spray-drenched forest, whilst in the drier forest above, the *rurik* form of *P. lysithous* was found, and a single specimen of the form *brevifasciata*.

Both the female forms *oebalus* and *pirithous* of *lycophron* flew together in numbers early in December, whilst probably the commonest of the *Papilios* throughout the season was *P. hectorides*. *P. polystictus* was also not rare, but *P. laodocus* was never very plentiful except for a few days on a flower patch on the main picada between Puerto Aguirre and Puerto Iguazú. A few *P. anchisiades* were also taken.

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### Early Stages of Indian Lepidoptera.

By D. G. SEVASTOPULO, F.R.E.S.

(Continued from Vol. XLVIII., p. 100.)

#### SPHINGIDAE.

*Rhyncholaba acteus*, Cr.

Ovum.—Yellow green, ovoid and small for the size of the insect. Hatched 25.ix.31.

1st instar.—Head yellow-green, body blue-green. Horn thin, about half the length of the body, black with yellow base. Moulded 27.ix.31.

2nd. instar.—Head yellow-green, body blue-green. A large white subdorsal spot on the 4th somite and a series of smaller oval white spots outlined in dark blue from the 5th to the 10th somite, the posterior spots being less conspicuous than the anterior. Horn as in previous instar. The thoracic somites begin to assume the typical tapering Choerocampid shape. Moulded 29.ix.31.

3rd instar.—Very similar to the previous one. The spot on the 4th somite develops a dark pupil. The base of the horn orange. Moulded 1.x.31.

4th instar.—Head blue-green. True legs orange-pink. Body blue-green. Thoracic somites tapered with a dark dorsal and a pale subdorsal line. 4th somite bearing a subdorsal ocellus consisting of a yellow-green ring edged internally and externally with white containing an indigo blue spot anteriorly, the posterior portion being bright green dotted with white. A series of seven indistinct oblique white lateral stripes. A series of six elongated yellow subdorsal spots outlined with dark blue from the 5th to the 10th somite. Horn about half an inch long, the base orange followed by a narrow black, a wide white and a wide black ring, the tip white. The whole carried erect and curved slightly forward. Moulded 3.x.31.

Final instar.—Similar to the previous one except that the horn is orange-pink, short, thick and curved downwards. Pupated in a slight web among leaves on the surface of the ground 8.x.31.

Pupa.—Brown with a dark dorsal line and lateral stripes. Ventral surface white, a black central and two dark brown lateral stripes. Wing cases pinkish-brown the edges darker. Tongue case free and circular. A male emerged 20.x.31.

Foodplant.—*Caladium*.

Described from a batch of six larvae from ova found in Calcutta. Of these, one assumed a pinkish ground colour after the first ecdysis,

another after the second and three after the third, these all produced the brown form of larva described below. The sixth remained green throughout. All wild larvae that I have seen have been of the green form.

Final instar.—Brown form.—Head and ground colour tobacco-brown. The subdorsal thoracic line yellow. The ring of the ocellus on the 4th somite very dark brown edged internally with white and externally with yellow. The spots on the 5th to 10th somites very conspicuous the centres bright yellow-green. Other markings the same as the green form.

Hampson describes the horn as yellow and does not mention the brown form. He also appears to have been ignorant of the shape of the pupa as one of the characteristics given for the *Chaerocampinae* is "Pupa without external sheath for proboscis." Seitz's description is "Young larva green, later on often dark brown, in front very pointed; on the 4th ring a very large expressive fictitious eye, surrounded by yellow and above shaded with dark; on the other rings lateral light ovals and below them dark oblique patches. Horn very small."

Hamps. *Moths. Brit. Ind.* I. 100: Moore, *Lep. Ceylon*, II. pl. 88. 1, 1a: Seitz. *Indo-malay Bomby.*, X. 568.

#### LIMACODIDAE.

*Natada suffusa*, Moore = [*Macroplectra nararia*, Mr., f. *cosmiana*, Swb. (= *suffusa*, Mr.)].

Head brown and retractile. Ground colour green. A purple-brown dorsal stripe, broad anteriorly and narrowing to a line on the 7th somite, from which it again broadens posteriorly. A yellow spot on each side of the dorsal stripe on the 7th. somite. A series of 11 lateral projections with urticating bristles, the 1st and 2nd short red and directed forward, the 3rd long, red and directed sideways, the 4th to 10th short, green and directed sideways and the 11th long, green and directed backwards. A double dorsal row of tufts of very short urticating bristles. In some examples the dorsal stripe is almost obsolete.

Cocoon.—Spherical, purplish brown.

Foodplant.—*Lagerstroemia indica* (Crape Myrtle).

Described from a full fed larvae found in Calcutta, 25.xii.31, pupated 28.xii.31 and a male emerged 19.i.32.

Hampson describes the larva of *N. nararia*, Moore, which he makes conspecific with *suffusa*, as "yellowish-green above, pink below; a yellow or pinkish dorsal band; a subdorsal series of red tipped spinous tubercles; a sublateral series of larger whitish tubercles with very short spines, the tubercles at each end being long, those at the posterior end longest."

Hamps. *Moths Brit. India*, I. 381-2; Moore *Lep. E. I. Co.* pl. 21. figs. 8, 8a: Hering-Stz. *Ind. Mal. Bomb.* X. 716.

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### The Genetics and Status of *Xylomania (Xylomiges) conspicillaris*, L. and *ab. intermedia*, Tutt, and *ab. melaleuca*, View.

By E. A. COCKAYNE, D.M., F.R.C.P.

I was much interested to hear that in 1933 Mr. G. B. Coney bred a large number of *X. conspicillaris* from a wild female taken in Somerset and that he obtained types and intermediates as well as *ab. melaleuca*, View. The proportion of types and intermediates in the Taunton district is very small, so much so, that doubts have been cast

on their occurrence there. In Gloucestershire, though the species is rarer, there is a much higher percentage of these two forms.

In answer to my enquiry about his brood Mr. Coney kindly told me that the wild female was *ab. melaleuca* and that he had bred 107 *melaleuca*, 22 *ab. intermedia*, Tutt, and 17 types. I had been under the impression that *intermedia* was the heterozygote and that *melaleuca* and type were the two homozygotes. His information showed that this could not be so, but the numbers he gave did not agree with any simple Mendelian ratio. I noticed however that the ratio of *melaleuca* to types and *intermedia* together was nearly three to one, and after puzzling over it for some time I thought that possibly there was sexual dimorphism and examined the sex of such as were available. The 7 types were all males and the 12 *intermedia* were all females. Mr. Coney was good enough to examine those still in his possession and found that his 6 types were males and his 6 *intermedia* were females, and that both sexes were represented in his *melaleuca*. To confirm the view that types are males and *intermedia* females I examined the continental series in the British Museum and found that the 14 types were males, as I expected, and the 8 *intermedia* were females. Mr. H. B. Williams examined his specimens and found that his 2 types and 4 *intermedia* alleged to come from Taunton were males and females respectively, and that his type from Worcester bred by Hancock in May, 1908, was a male. Taking them all together the 30 types were all males and the 30 *ab. intermedia* were all females, and there can be no doubt that the species is sexually dimorphic and that *ab. intermedia*, Tutt, is merely the female of the plainer grey type. Even in *ab. melaleuca* there is some sexual difference, the females being more distinctly black and white than the males.

Reverting to the brood bred by Mr. Coney, there were 107 *melaleuca* to 39 type and *intermedia*, which is in close agreement with the ordinary 3 : 1 ratio, though there were three too many type and *intermedia*. There can be little doubt that the wild female parent was heterozygous for the pale sexually dimorphic form and must have paired with a male of the same constitution, and in view of the rarity of this form in Somerset it is probable that the male was a brother of the female parent. The grey type form then is the male and the variegated *ab. intermedia*, Tutt, is the female of the pale form, which is recessive to the common black and white *ab. melaleuca*, View. I have found a good many records of broods of *melaleuca* bred from wild females of the same form, but I have been unable to find any record of a brood like that of Mr. Coney, or of one with *intermedia* as the female parent.

Seitz gives figures of all three, and says that *melaleuca* is the commonest and that *ab. intermedia* is commoner than the type. It is unlikely that there is any difference in the numbers of the two sexes, but more females than males may be found owing to the difference in their appearance or to some difference in their habits.

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### Description of the Larva of *Mallocephala deserticola*, Berg. (Arctiidae).

By KENNETH J. HAYWARD, F.R.E.S., F.R.G.S., F.Z.S.

Length 35-38mm.

A greyish larva with a white dorsal and a greyish lateral stripe, ringed on each segment with tufts of short brown hairs and longer darker hairs, the head brown.

Head, argus brown (Ridgway III. 13.m), frons of the same colour, the clypeal suture white. Antennae, mandibles and palpi white, ringed or marked with brown. Thorax and abdomen white speckled with black, the speckling irregular in shape and size and much reduced on the ventral parts. A pure white dorsal stripe and a greyish lateral stripe, the latter formed by reduction of the dark speckling.

Prothoracic segment with a brown dorsal pad speckled with minute brown warts from which rise tufts of short light brown hairs or longer sparser darker brown hairs, all these hairs closely spined with tiny up-pointing spines. Apart from this dorsal pad there are a pair of posterior trapezoidal tubercles slightly posterior to the pad and laterally two more prominent tubercles. All the tubercles carried by the larva are covered with the minute brown setose warts. The meso- and metathoracic segments with rings of eight similar tubercles. The 1st and 2nd abdominal segments carry anterior and posterior trapezoidal tubercles and in line with the latter a ring of tubercles comprising suprspiracular, subspiracular, lateral and marginal and on the ventral portion of the larva a pair of very small ventral tubercles and between this pair and the marginal tubercle a somewhat larger ventral tubercle. The leg-bearing abdominal segments are the same except for the lack of the ventral tubercles and the 7th and 8th segments correspond to the 1st and 2nd. On the 9th abdominal segment there is a pair of large dorsal tubercles or pads with a single lateral tubercle. The 10th segment has two defined but smallish tubercles on the dorsum and a posterior ridge but the whole segment is lightly covered with the small dark brown warts. Below the anus are two very feeble tubercles.

The prolegs are externally brown, darker at the joints, internally brown and white, the final segment dark brown. The claws are simple but near the end of the final segments are two short bristles. The legs have a half ring of the brown setose warts on each segment.

The abdominal and anal claspers are light brown with numerous brown setose warts and the hooks are placed in a line with a secondary row of very minute hooks behind.

The larva appears to be a general feeder, having been taken on about ten different foodplants at Concordia (Entre Rios) in October 1934.

## NOTES ON COLLECTING, etc.

SINGLE BROODED *POLYOMMATUS ICARUS*; SHEFFIELD.—The common blue is by no means a common butterfly in the Sheffield area, but from time to time, small colonies appear in new places and then disappear again as suddenly as they came.

In South Yorkshire, about 12 miles from Sheffield, there is a belt of Magnesian Limestone on which *P. icarus* is widespread and abundant. There, two broods are produced every year, one in June and the other in August, and occasionally a third brood occurs. A third brood, for instance, was produced at Maltby in late October 1934. The specimens were extremely small.

In North Derbyshire, there is an extensive area of Carboniferous Limestone, the nearest point being about ten miles from Sheffield; and in the valleys and dales, among the Limestone hills, *P. icarus* is to be

found. It appears to be always double-brooded there, but I have no record of specimens of a third brood.

Between these two Limestone areas, Sheffield is situated; on coal-measure shales and gritstones; and it is on this geological area that *P. icarus* is scarce and erratic in appearance.

On a hillside near to Sheffield there is established a very strong colony of *P. icarus*, which is remarkable for being perfectly single brooded. This locality consists of a few acres of abandoned land on which are outcrops of coal-shale, containing a large percentage of sulphur and iron. On this land, the few plants which thrive include Birds-foot Trefoil—the "blues" food plant.

The locality faces South-East and is sheltered from the Northern and Westerly winds, and the altitude ranges from eight hundred feet, to eight hundred and fifty feet above sea level.

The butterflies begin to emerge about the fifth day of July and are never early or late by more than a few days. They are in full flight during the second week in July and by the beginning of August, the last few specimens are fluttering about with tattered wings.

I have never found a specimen of a second brood, though I made many careful searches during the very fine summers of 1933 and 1934.

The specimens of this colony are very large, many of the males reaching 1.75 inches in expanse, whilst few of the females expand below 1.50 inches.

The underside variation is slight, but the tendency is towards diminution in size and number of the spots and markings. Var. *icarinus* is quite common, and I have seen a few modifications with the number and size of the spots much reduced. I found one male variety, which had the row of markings along the edges of the underside of the forewings absent, giving a peculiar streaky effect.

The females provide many fine upperside forms. Beautiful large specimens of var. *caerulea* occur, and females with the veins of the hind wings streaked with blue are common. The brown form showing no trace of blue also occurs, but is always smaller in size.

The best form I have found, has the hind wings and half the fore wings bright—but not shiny—blue, and has a conspicuous white dot in the centre of each wing.—F. D. FEARNEBOUGH, Uppertorpe, Sheffield.

CIDARIA (THERA) OBELISCATA AND C. (T.) VARIATA IN CORNWALL.—Referring to my remarks on p. 26, I am glad to be able to add that another wing found in our verandah was quite distinct from either the grey or the brown form of *obeliscata* there recorded, and on my sending it to Dr. Cockayne at our Editor's suggestion, the Doctor returned it with the welcome and unexpected information that it was the true *variata*. At the same time he very kindly sent me 3 specimens of the latter species from the New Forest, of which the largest specimen resembles those mentioned on p. 26 as *obeliscata* but is more fuzzy and none of them resembles my single wing, which was much blotched with fuscous grey and had the dark squarish mark in the inner marginal end of the central fascia very black. It is thus extremely interesting to find that both grey and brown forms of *obeliscata* and a dark grey form of *variata* occur here. As the latter species feeds only on spruces, I conclude that it must have come from the big spruces on Pencalenick estate, or from young trees planted at the same time and in the same damp

meadow as the young larches already referred to on p. 26, and I hope this year to find the respective larvae of these species, as well as the imagines, in due season, having never paid special attention to the *obeliscata-variata* group. I may add that the above notes about the wing of true *variata* are in the past tense because the wing no longer exists having met with an accident that rendered it useless! I hope to be able to report further developments this year.—C. NICHOLSON, Tresillian, Truro, Cornwall.

UNUSUAL PUPATION SITE OF MIMAS (*DILINA*) *TILIAE*.—My friend Mr. Clifford Craufurd tells me that his son recently found a last year's bird's nest against the trunk of an elm tree, some two feet from the ground, and brought it home for identification. On pulling it to pieces they found, in a loose cocoon underneath the nest, a pupa of *D. tiliae*. The moth is common in this town, where limes abound, but neither of us has yet found its larva here on elm, though elm is a common food-plant in other districts.—P. B. M. ALLAN, 4, Windhill, Bishop's Stortford.

*LIMNOPHORA SIGNATA*, STEIN:—I think it worth putting on record the capture of a small series of this Anthomyiid fly at Mudeford, near Christchurch, Hants, on 19th and 20th August last year. The specimens were swept amongst marshy growth on the foreshore. I recognized the genus at the time of capture, but failing to identify the species by means of Mr. Collin's monograph on the British Species of *Limnophora*, in the *E.M.M.* Vol. LVII. (1921), I gave types to him at the Verrall Supper this January. He subsequently wrote naming the species as above and adding that the only previous British record known to him was that of 2 ♂ taken at Milnthorpe, Westmoreland, on 23rd June, 1929, by Mr. H. Britten. In his letter Mr. Collin mentioned an amusing incident in that the day after the Verrall Supper he met Mr. Britten (who had come to town for it) at the British Museum and in the course of conversation asked if he had taken any more specimens "little realizing that there were some in my hand-bag."

*L. signata* has been described as regards the ♂ by Mr. Collin in his paper "A revision of the Greenland species of the Anthomyiid genus *Limnophora*" in *Trans. Royal Ent. Soc. Lond.* Vol. LXXVIII. pp. 278-9. The ♀ have been hitherto unknown, but Mr. Collin tells me that, like the male, they need comparison with *L. veterrima*, Zett. only, to which species they would run down in his Table of females, but may be primarily distinguished by their narrower build and the presence of some indication of darker patches on the (not so pale grey) abdomen; if the frontal characters are overlooked, the biserial acrostichals in front of suture would lead one to *T. biseriata*, Stein. which however is a darker grey insect with obvious round dark spots on abdomen and no spines to ovipositor.—H. W. ANDREWS, (F.R.E.S.).

MOLE CRICKETS A GARDEN PEST IN HANTS.—Mole crickets are sufficiently numerous in parts of Hampshire to be a garden pest. I have received an account from Mr. R. A. White, of Sandhills Lodge, Mudeford, Christchurch, who informs me that they are infesting an area of about twelve acres, chiefly kitchen garden, but with some

flower borders. The soil is rather on the light side, but always wet in winter. The plants that suffer most are the tender ones, that have just been planted, and some potatoes have been eaten through, but the permanent flower borders do not seem to have suffered much. Mr. White writes that when several were kept in a tin together, they were partially, or completely, eaten, so they do not decline animal food when hungry. In one part, about 70 square yards which had not been dug for two years, Mr. White took no less than 82 mole crickets and it is to be noted that they were all in the wettest part, where some of the ground has been under water during the past winter.—G. FOX WILSON, Royal Horticultural Society's Laboratory, Wisley, Ripley. 8th May. 1937.

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## CURRENT NOTES AND SHORT NOTICES.

*The Transactions for the Society for British Entomology*, Vol. 3, 1936, was issued a while ago.—Perhaps the best remark one can make is that of a member of the South London Society when we met the other evening—"What a fine part the *Sy. Brit. Ent.* has just issued." And it is. The first paper is the filled-in paper, which was read by Dr. A. D. Imms, M.A., F.R.S., as the Address to the Congress of the Society held at Cambridge in June last. An exposition of the "Ancestry of Insects," a very clear statement of the present position, with references and completion of points which were so ably put in the abbreviated delivery at Cambridge, illustrated with eleven diagrams. Among the other eight papers included are F. Balfour Browne on the "Aquatic Coleoptera of Somersetshire"; G. J. Kerrich, "The Ichneumonidea of Wicken fen"; Rev. A. Thornley, part III. of a "List of Cornish Diptera"; J. H. Cook, "A Study of *Calosoma inquisitor* (Col.)"; G. A. Walton, "Oviposition in the British species of *Notonecta* (Hem.)"; etc. There are 171 pp. and 17 plates, besides numerous text figures. All the treatises form a very reliable addition to our knowledge of those British insects of the so-called "neglected orders" and their issue amply justifies the formation of such a Society with a definite object.

In the March number of *l'Amateur de Papillons*, VIII. p. 205, Herr Warnecke of Kiel returns to the question of the second brood of *Hylophila prasinana* which had been raised on p. 67 of the same volume a year ago by Messieurs Abbayes and Pesson. In the present article it is shown by breeding from the ova of *H. prasinana* taken in the early part of the year that a second brood has been obtained several times and that the resultant insects are what was described as a true species, *H. florii*, by Costantini in 1911. It seems that this second generation occurs only very rarely North of the Alps and even in the South is not always produced naturally.

Month by month the interesting and useful Belgian periodical *Lambillionea* adds to its store of photographic plates of aberrations of Lepidoptera, mainly of the Rhopalocera. Recently they have illustrated among other species named forms and "curiosities" (unnamed) of *P. machaon*, *E. tithonus*, *C. dispar*, *H. phlaeas*, *L. arion*, *P. coridon*, *A. hyperantus*, *P. aegeria*, as well as of numerous non-British species.

Another instalment, Pt. IV., of the wonderful store of matter on Leaf-Mining Insects collected and arranged by Prof. Hering of the



Berlin University *Die Blatt-Minen Mittel-und Nord-Europas*, has just appeared. It consists of 112 pages, 2 pls. and deals with the mines of over 560 species and illustrates nearly 150 mines (including Coleophorid cases) in the text and on the plates. Based on plant names this part treats of the tenants of from *Myrica* to *Rubus*. For instance *Quercus* has no less than 64 species recorded. In this case the distinction between the mines of the various species of *Lithocolletis* mining in oak leaves is extremely uncertain, and the author has given a special analysis of the colour, marking, etc. of the imaginal fore-wings on p. 429. Under *Pirus* (*Pyrus*) 51 mining species are given; under *Populus*, 39; under *Prunus*, 33; and so on. Details of the disposal of the frass, of pupation in the mine or on the ground, of partial miners like the case-bearers, etc. are all used in the differentiation of the various species. This work will be a most useful book of reference and save endless research particularly to lepidopterists, dipterists and hymenopterists so that all our biological libraries should contain a copy and we would point out that after completion the price will be considerably enhanced whereas now the parts can be obtained at a discount of 25% from the publishers Messrs. Feller, Neubrandenburg, Berlin.

Our request last month for notes on any hitherto unrecorded forms of species of Noctuidae occurring in the British Isles with which we are dealing in our supplement has produced a number of recently observed new forms for which we wish to thank our correspondent. Will others please follow his example.

The death is announced of the well known myrmecologist, Prof. Wm. Morton Wheeler of Harvard University, Cambridge, U.S.A., on 19th April at the age of 73.

Our colleague Mr. H. Donisthorpe has not yet recovered from his accident in February last when he was knocked down by a car near his home. He was insensible for five hours and has since undergone x-rays and had one or two minor operations in hospital. For some time he has to take things very quietly, not at all congenial to a busy man.

The *London Naturalist*, 1936, has just been published, recording the activities of the various subsidiary societies or sections into which the London Natural History Society is divided. About 16 pages are devoted to the various reports including a sympathetic obituary of our late colleague Rev. C. R. N. Burrows by L. P. Prout.. Mr. H. Burkhill contributes many notes on Plant Galls and writes the annual summary of the information sent in on the butterflies. An interesting paper was read on Predaceous Flies and a Summary of Notes on Dragonflies. We believe that South was the authority for the name *hyperanthus*, not Linné; nor was Linné the author of *egeria* and *phloeas*. This Annual is an admirable summary of the doings of the Society's members, is well edited, well printed and produced and a worthy addition to a long series of volumes.

In *L'Amateur de Papillons* for April M. le Marchand gives a short account of the family *Heliodinidae* of the Tineina, dealing shortly and analytically with the genera *Pancalia* (*leuwenhoeckella*, etc.), *Augasma* (*aeratellum*), *Heliodines* (*roesella*), *Strathmopoda* (*pedella*), and *Schreckensteinia* (*festaliella*), with characters analysed and figures added. The habits of the larvae are described, and the pose of the imagines when at rest. The larvae are for the most part miners in leaves, stems, roots or galls, and exotic species feed on coccids. They are considered to be very primitive forms.



We have received several separates from Dr. Hans Bytinski-Salz, including "A Contribution to the knowledge of the Lepidopterous Fauna of Sardinia" with a plate; and a pamphlet dealing with the "Nomenclature of Bastards," etc.

It is with much pleasure we notice that Prof. H. Beckwith-Whitehouse, M.Sc., F.R.E.S. has received the honour of Knighthood.

The belated volumes of the Russian *Rev. d'Ent. de l'U.R.S.S.* (*Rev. Russe. d'Ent.*) XXVI, for 1935 (pts. 1-4) and XXVII (pts. 1-2) have recently come to hand. They contain numerous valuable faunistic articles, unfortunately in characters which preclude the understanding of them, although in most cases a summary of an article is added in English, French or German. The numerous illustrations also give much help to the ordinary student. The special study of the influence of food plants upon vitality in *Loxostege sticticalis*, a pest on various crops and hitherto considered to be highly polyphagous. After several years of careful experiment and under varied controls the group of most favoured host plants was found to be actually small and chiefly of the order *Chenopodiaceae*. The summary of this article is in English. Perhaps the most interesting article is one describing the area of the vast plateau in the midst of the Khibines Mts., about 67° N. and 2° E. (?) giving the flora and fauna observed during the years 1930 to 1935, every year under snow for eight to nine months. One of the illustrations figures the chrysalis and just emerged imago in its natural surroundings, of *Argynnis polaris*, the larva of which is stated to feed exclusively on the flowers of *Dryas octopetala*.

Our sometime correspondent Dr. Skat Hoffmeyer, of Aarhus, Denmark, contributed an interesting note in *Lambillionea* for May on the occurrence of *Heodes (Chrysophanus) dispar* ssp. *rutilus* in Denmark, where it has been captured recently. There is a map of the distribution area of the species showing the main habitat to be Russia from Leningrad to the Lower Danube basin inclusive and northern Asia Minor, with outlying small areas N. Germany (the Oder basin), the Alps, Holland, Denmark, Belgium, near Bordeaux, etc.

The *Ent. Rund.* of May contains a continuation of Herr Draudt's notes on *Noctuidae*. This time a capital coloured plate is given of new *Agrotidae* (sens. lat.) from China.

In recent numbers of the *Ent. Zeit.* (*Int. Ent. Zt.*) Herr Hoffmann of St. Catharine, S. Brazil, is giving a series of biological notes on the lepidoptera of S. Brazil, including the life-history of species of *Morpho* and other species well-known as imagines, but whose earlier stages are, for the most part, desiderata. In the same periodical the genus *Zygaena* is one of a series of articles illustrated by no less than 21 figures mostly of newly described forms from Western Asia areas.

Part 1 of Vol. IV of the *Trans. Socy. for British Entomology* has recently been published. It consists of a very valuable memoir on the "British species of *Dacnusa* (Hym.) Fam. *Braconidae*," by G. E. J. Nixon, B.A., dealing, in a comprehensive way, with species of which little has hitherto been known, and of which the already known facts are very confusedly recorded. The paper deals with some 68 species and is illustrated with 22 plates. The dates of the works of reference 1839, 1885-9, and 1891 are sufficient evidence that this is a piece of work which has long wanted doing.

No. 2 of Vol. IV. of the *Arbeit ü. morphol. und taxon. Ent.* of Berlin-Dahlem, which comes regularly to hand, consists of 96 pages of matter mostly taxonomic, and is a wealth of facts necessary to all students of a country's fauna and to specialists working on limited genera or families.

It is announced that the VII International Entomological Congress will be held in Berlin in the August of next year (1938).

M. Ch. Boursin of Paris is also working on the *Agrotidae* (sens. latu.). In the *Ent. Rund.* for May, he commences a study of the species now placed in the genus *Athetis*, Hb. (*Caradrina*, Auct.) We also here acknowledge a series of separates on the *Noctuidae* which he has kindly sent.

*Melanismus, Albinismus u. Rufinismus*, by Herr. W. F. Reinig, 122 pp. over 80 figs. published by Messrs. G. Thieme at Leipzig, price M. 5.20 (less 25%) is an attractive work giving a summary of the theoretical and practical problems of genetics and allied questions. Melanistic colour is considered in three grades. 1. "Abundismus," perhaps best illustrated by the examples given, viz. *Spilosoma lubricipedium* and its var. *walkeri* or by the beetle *Adalia bipunctata* with 2 black spots and its var. with increased size of the spots. 2. "Nigrismus" illustrated by *Pieris brassicae* and its form *wollastoni* from Madeira. and 3. "Melanismus" s. str. by *Papilio machaon* and its completely black form *nigra*. Next the geographical distribution of the principle of Melanism is dealt with under Island-melanism, Mountain-melanism, Moorland-melanism, Industrial-melanism, and melanism which occurs in arctic areas, coastal areas and in oases. Another section deals with the genetics of melanism, summing the experiments of Federley, Tower, etc., as far as they concern melanism; and then considers melanism due to the influence of breeding modification quoting from Standfuss, Bacot, Prout, Porritt, Harrison and Main, Doncaster, Goldschmidt, etc. This section is fully and very well illustrated by excellent figures. Then the results of heat and cold in temperature experiments in relation to melanism, and also the bearing of chemical influence in causing melanism. A few words are given on hunger-melanism. Albinismus is then treated under Total, Partial and Irregular. This is succeeded by Geographical distribution of Albinismus, etc., and so on with Rufinismus. The matter is very well emphasized with examples in all Orders, but mainly with the Insecta and there is a good bibliography.

[There are some errors of nomenclature here in the examples given by the author.—EDS.]

Have any of our readers a light-trap? If so we should welcome some hints on its use and the resulting captures. Our own trap is more or less of a failure. 'Tis true we have used it only on what we have considered not unfavourable nights with results last year of odd specimens of *Hepialus lupulinus* from 16th May to 17th June, 17 examples in all. The total moths for 65 nights was 53 with a few flies of sorts.

Will subscribers please send us *short* notes, especially on microlepidoptera as soon as possible as we now have no matter in type for the next number. With a new printer it will be necessary to get all matter in earlier than we have in the past.

I quote the following effusion from the *Cactus and Succulent Journal of America* (from an Australian origin)—

Chelinigea, Cactoblastis  
Are the little chaps to deal  
With the Prickly Pear. The last is  
Also known as Cochineal.  
And tho' pests for long have racked us—  
They are the blokes to blast the Cactus.  
Tho' the Cactus crying "Mea  
Culpa" for compunction plead,  
Savagely Cheliginea  
Gobbles it with horrid greed.  
Till appears a passing fair land  
Where once spread a tangled pear land.  
So abandoning disguises  
Cactoblastis chews away,  
Till another problem rises  
To confront another day :  
When the pear pest in the past is,  
Who will blast the Cactoblastis ?

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18th June.

## NOTICE

Owing to the receipt of the following completely unexpected notice from the present owner of the firm which has printed this magazine for nearly 40 years, doubtless there will be a considerable delay in the next few issues, until we can find a suitable firm to carry on.

We trust our subscribers will be patient with us during the interval, if it occurs.

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May 19th.

Dear Sirs,

The owner of the above business has definitely decided to close down on July 31st next.

We regret that under the circumstances we shall be unable to print the "Entomologist's Record" after the June number. . . .

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P.S.—An endeavour will be made to issue an Aug.-Sept. number early in September.—Hv.J.T.



All MS. and EDITORIAL MATTER should be sent and all PROOFS returned to H. J. TURNER, "Latemar," 25, West Drive, Cheam.

We must earnestly request our correspondents NOT to send us communications IDENTICAL with those they are sending to other magazines.

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Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should be sent to Mr. H. J. TURNER, "Latemar," West Drive, Cheam.

*Desiderata*.—Ova of *D. oo. pupae* of *X. gilvago*, *D. caesia*. *A. J. Wightman*, "Aurago," Bromfields, Pulborough, Sussex.

*Duplicates*.—*Pyralina\**, *Salicis*, *Ianthina\**, *Orbicularia\**, *Repandata* in variety, *Doubledayaria*, *Black rhomboidaria\**, *Black virgularia\** and others.

*Desiderata*.—*Hyale*, *Welsh aurinia*, *Polychloros*, *Tiphon Agathina*, *Lunigera*, *Lucerneae*, *Neglecta*, *Diffinis*, *Populeti*, *Gothica v. gothicina*, *White Leporina*, *Tridens Putrescens*, *Littoralis*, *Typhae v. fraterna*, *Rurea v. Combusta*, *Gilvago*, *Fulvago v. flavescens*, *Liturata v. nigrofultata*. *Harold B. Williams*, Woodcote, 36, Manorgate Road, Kingston Surrey.

*Desiderata*.—Urgently wanted for research work at the Royal College of Science, Pupae normal form of *Hemerophila abruptaria*.

*Duplicates*.—Pupae of var. *juscata* of the same species offered in exchange.—*J. A. Downes*, 5, Trinity Road, Wimbledon.

*Desiderata*.—*M. aurinia (artemis)* Larva English, Irish and Scotch.

*Duplicates*.—Numerous, Ova, Larva, Pupa and Imagines.—*H. W. Head*, Burniston, Scarborough.

*Duplicates*.—*Argynnis liauteyi*, *Chrysophanus phoebus*, *Albulina ellisoni* and many rare species from Syria and Morocco.

*Desiderata*.—Rare British and European Macro-lepidoptera, especially Zygaenidae, Arctiidae, Agrotidae.—*R. E. Ellison*, Moccas Rectory, Hereford.

*Desiderata*.—Certain common Bombyces from Scotland, Ireland and Cornwall. *Sanio*, *Rubi*, *Trifolii*, *Potatoria*, etc., during the year.

*Duplicates*.—Numerous. Please send list.—*B. W. Adkin*, Highfield, Pembury, Kent.

*Desiderata*.—Entomological Pamphlets and Separata.—*R. B. Janson*, 44, Great Russell Street, W.C.1.

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*Desiderata*:—ova or larvae of *P. hippocastanaria*, *T. luridata*, *N. zonaria*, *A. hispidaria* (southern) *E. autumnaria*, and *O. rubiginea*.

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CHANGE OF ADDRESS.—*Dr. E. A. Cockayne* to 16, Westbourne Street, W.C.2.

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## MEETINGS OF SOCIETIES.

**The Royal Entomological Society of London.**—41, Queen's Gate, South Kensington, S.W. 7., 8 p.m. Oct. 6th.

**The South London Entomological and Natural History Society**, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. June 24th, July 8th, 22nd, Aug. 12th, 26th, Sept. 9th, 23rd.—*Hon. Secretary*, S. N. A. Jacobs, "Ditchling," Hayes Lane, Bromley, Kent.

**The London Natural History Society.**—Meetings first four Tuesdays in the month at 6.30 p.m. at the London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C.1. Visitors admitted by ticket which may be obtained through Members, or from the *Hon. Sec. A. B. Hornblower*, 91, Queen's Road, Buckhurst Hill, Essex.

**Entomological Section, Birmingham Natural History and Philosophical Society.**—Evening Meetings. On the third Monday of each month; 7.45 p.m., at 55, Newhall Street, Birmingham. Visitors welcomed. Those who would like to attend or exhibit please apply to—*P. Siviter Smith*, Pebworth, Stratford-on-Avon.

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Communications have been received from or have been promised by Capt. K. J. Hayward, (the late) Rev. C. R. N. Burrows, H. Willoughby-Ellis, Hy. J. Turner, D. G. Sevastopulo, A. J. Wightman, T. Greer, T. Bainbrigge-Fletcher, Dr. Malcolm Burr, Rev. R. E. E. Frampton, L. T. Ford, H. Donisthorpe, Wm. Fassnidge, P. B. M. Allan, Dr. Bytinski-Salz, Dr. Verity, O. Querci, and Reports of Societies.

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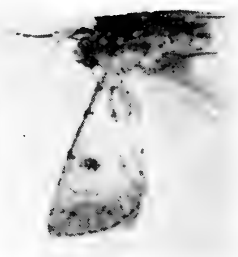
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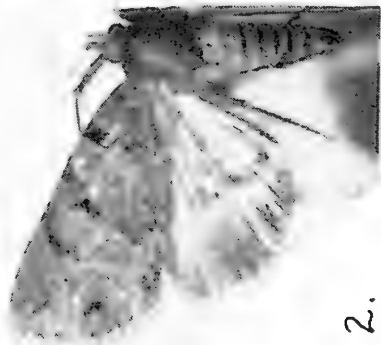
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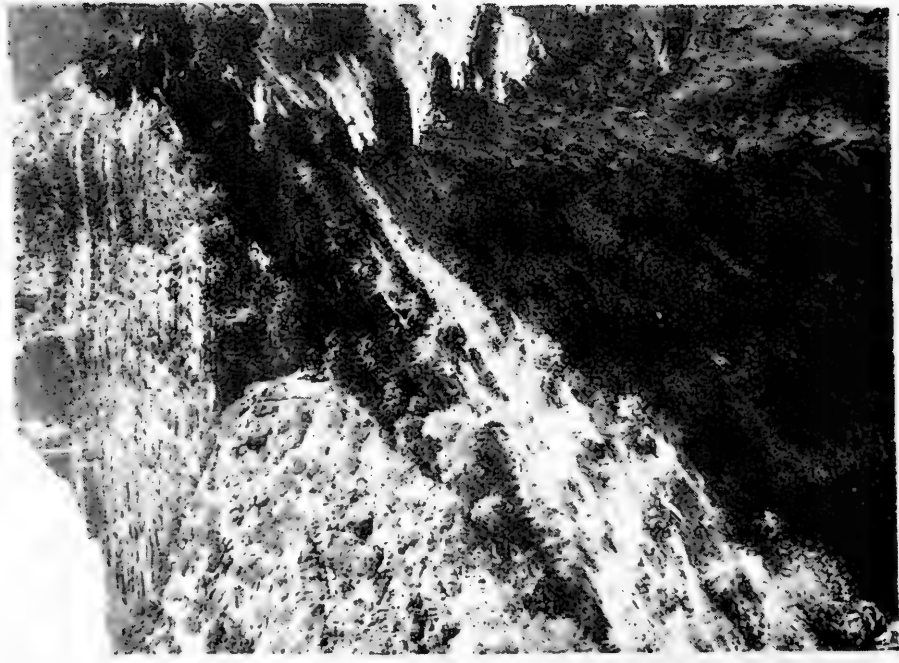
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## AUTUMNAL LEPIDOPTERA IN KURDISTAN.

## Preliminary Notes on Some Excursions in the Rowanduz Chai Valley, Iraq.

(Plate VII.)

By E. P. WILTSHIRE.

This article deals only with lepidoptera on the wing between late August and early October in a certain section of the Zagros range lying between Erbil and the (Persian) Urumiyah Plain. It has no claim to completeness, since much of the material is still undetermined. Continental collectors have been working recently in more western and northern parts of Kurdistan and Armenia†; these notes are of interest as being, I think, the first made in recent years about the south-easterly section of Kurdistan, whose faunistic affinities, still predominantly Pontic-Turanian, show also a partial Farsi-Baluchi character: in a word we have deserted the Taurus and Anatolia, and are concerned with the Zagros and the edge of the great Iranian plateau.

The parallel limestone ridges, running N.W.-S.E., of the Zagros range are often cleft by deep canyons or "tangs." One of the most remarkable of these is the Rowanduz Gorge, through which flow, under almost vertical cliffs two or three thousand feet high, the waters from the higher mountains further east, such as Kawdo and Algurd. Above, i.e., east of, the Gorge, the Mosul to Tabriz road follows the winding and gradually rising course of this little river up to its source at Rayat, the Iraqi frontier post, where the road climbs suddenly up from the village (c. 4000 ft.) over the last ridge of mountains (the pass is 6000 ft. at its highest point) before dropping down into the plain of Urumiyah. The Rowanduz Gorge itself is nearly ten miles long, and the waters in its ravine are not more than 1800 ft. above sea-level; yet the precipitous cliffs render it far cooler and shadier than other places of this low elevation in Kurdistan. Soon after leaving the Gorge, the Rowanduz Chai joins the Greater Zab, a tributary of the Tigris. Diana, a village 2800 ft. high, lies, in a mountain-hemmed plain, a few miles above the upper end of the Gorge. Berserini Gorge, less canyon-like than Rowanduz Gorge, but just as beautiful, is about fifteen miles upstream from Rowanduz, and, at the most, 3000 ft. high. It does not quite belong to the cooler upland region of Rayat. In July and August the heat at

†Vide:

- a. "Lepidopteren-Fauna von Marasch in Türkisch Nordsyrien." Osthelder and Pfeiffer. *Münch. Ent. Ges.* XXI, 1931, Heft II.
- b. "Weitere Beitrag zur Lepidopteren-Fauna Inner-Anatoliens." Wagner, *l.c.*, XIX, 1929. Nummer 1.
- c. "Einige neue Arten und Rassen aus den Ausbeuten des Herrn Ernst Pfeiffer." Wehrli, *l.c.*, XXVI, 1936, Heft I.
- d. "New Heterocera from Asia Minor." Bytinski-Salz. *Ent. Rec.*, Vol. XLVIII, No. 9, September 1936.
- e. "Zweiter Beitrag zur Lep.-Fauna Inner-Anatoliens." Wagner, *Int. Ent. Z.*, 23 Jahrg., No. 48 and Np. 2.  
"Dritter ditto ditto." 24 Jahrg., Nos. 46 and 47.  
"Vierter ditto ditto." 25 and 26 Jahrg., Nos. 47, 13, 14, 17, 18.
- f. "Beitrag zur K. der Noct.-Trif. Neue Cucullia und Athetis von Marasch." Boursin, *Münch. Ent. Ges.*, XXIII, 1933, Heft I.

these lower elevations is extreme though the air is dry and the nights pleasantly cool. Winters are snowy and wet, and there must be few or no insects stirring from December to March.

Rolling hills, clad with tall, honey-coloured grass and dotted with oak, often no more than scrub, and at its best forming woodland composed of trees not more than 20 ft. high—these characterise the scenery of this part of Kurdistan. Chief among the trees and shrubs are three kinds of *Quercus*, *Crataegus*, pistaccio, *Paliurus spina-christi*, and (in the streambeds) willow, oriental plane, ash and Persian poplar. Some conspicuous plants are hollyhock, spurge, mullein, liquorice, *Prosopis stephaniana*, *Aristolochia* and *Gypsophila*.

The soil and rocks are usually of an olive or a lilac-grey hue; and the typical colour-scheme of the moths of this area, a pale grey or white crossed by blackish bands, may be seen in all families, e.g.: *Paedia murina*, *Dichagyris singularis*, *Elaphria wiltshirei*, and *Leptarchis psologramma*. Where local races have formed, as in *Elaphria bodenheimeri* and *E. zernyi*, they are often characterised by pallor, smallness, and faint marking. But this is only so in some species: this distinction, for instance, separates the Kurdish and Mesopotamian from the Palestinian and Lebanese race of *bodenheimeri*, but *singularis* is the same in both Kurdistan and Palestine.

The following notes are the result of visits made as follows.—

- 28th August 1935—Rowanduz Gorge, evening.
- 14th September 1935—Rayat, evening.
- 25th September 1935—Rowanduz Gorge, evening.
- 26th September 1935—Rowanduz Gorge, morning.
- 6th October 1936—Diana, evening and daytime.
- 7th and 8th October 1936—Rowanduz Gorge, evening.
- 9th October 1936—Berserini Gorge, evening.
- 10th October 1936—Rowanduz Gorge, morning.

#### Abbreviations:

B.G.=Berserini Gorge.

det. B.=determined by Boursin (I am greatly indebted to M. Charles Boursin, of the Paris Natural History Museum, for his assistance in identifying my *Agrotidae*).

D.=Diana.

(p) (det. B.)=probably, according to Boursin.

R.=Rayat.

R.G.=Rowanduz Gorge.

Where no locality is indicated, it may be inferred that the insect occurs throughout the river valley. Roman figures indicate the month of the year.

#### RHOPALOCERA.

By the autumn, butterflies are very ragged. Satyrids, numerous in these parts, are still to be seen, but few are worth taking; they include *S. circe* ssp. *asiatica*, *S. briseis*, *S. roxelana*, *S. anthe*, *S. pelopea* and *S. fatua* ssp. *sichaea*, all of which continue on the wing into October; so does, where the oaks grow tall, *Zephyrus quercus* ssp. *longicauda*, Riley. *Argynnis maia* (= *pandora*) flies well into September, and *Tera-colus fausta* was seen in this month in Rowanduz town. Fresh *Gonep-*

*teryx farinosa* were taken in October in R.G. In general, however, this is not the best time for Rhopalocera.

#### HETEROCERA.

During the early part of August there is a lull in night-life, except at high altitudes. At the end of this month, with the drop in the temperature, the autumn moths suddenly appear in large numbers. They are most easily taken at light; sugar, of no appeal earlier in the year, now also begins to attract, but never very large numbers.

#### *Macro-Heterocera.*

*Marumba quercus*, Schiff. 2nd brood, 28.viii, R.G. Paler, with fainter markings than the first brood.

*Dysauxes ? famula-hyalina*, Frr. 2nd brood, v. common to light in ix and x, from R. to R.G.

*Drepana binaria*, Hfn. 9.x, B.G.

*Paedia murina* ssp. *cinerascens*, H.S. 7.x, R.G.

*Axiopaena maura*, Eichw. ix, x, R.G. and B.G. The range of this magnificent black tiger-moth extends southward to Baluchistan. Three were taken at light, and all have red collars and red anal patches in the hindwings' black band.

*Lymantria destituta*, Stgr. v, common in early summer as well as autumn.

*Lymantria lapidicola* ssp. *mardina*, Stgr. Scarcer than the preceding, 28.viii, R.G.

*Thaumetopoea solitaria*, Frr. R.G., ix-x. Fairly common. Lebanese examples are brighter and neater.

*Lasiocampa eversmanni*, Ev. Common to light, ix-x.

*Lasiocampa terreni*, H.S. Less numerous than the foregoing, with which it flies.

*Bryophila* ssp. *diversae*. This genus is richly represented in the Kurdish mountains especially in the more craggy and precipitous parts. R.G., shadier, moister, and rockier than other parts that I know, is a paradise for these little moths. Unfortunately the genus badly needs revising, and the following names, some of which cannot be considered final, do not cover all my material: *ravula*, Hbn. f. (det. B.), *tabora*, Stgr. (det. B.) (also at Mosul), *eucta*, Hamps. (p.) (det. B.) (also at Mosul) and *algae*, F. (p.) (det. B.).

*Euxoa vanensis*, Drdt. (det. B.). R.G., 25.ix. Known from Armenia and Marash, Taurus.

*Agrotis obesa*, B. ssp. *scytha* f. *fusca*, Cti. (det. B.). 9.x, B.G.

*Agrotis crassa-golickei*, Ersch. (det. B.). x, to light and sugar. Also from Mosul, Bagdad, and Syria.

*Agrotis radius*, Haw. (*puta*, Hbn.) ssp.? In the males, the purple-brown terminal shade makes a pretty contrast to the pale greyish ground colour; this race occurs as far south as Qaraghan, Iraq, x.

*Agrotis anastasia*, Drdt. Paratype, R.G., 25.ix. (The type came from Armenia).

*Dichagyris singularis*, Stgr. (det. B.). x, R.G. and B.G. Five examples of this rarity, to light. They do not differ from the Palestinian race.

*Rhyacia insignata*, Led. (det. B.). 24.viii and 14.ix, R.; 25.ix, R.G. (Also at Shaqlawa). One specimen, at B.G., 9.x, is *insignata-columbina*, Drdt. (det. B.).

*Rhyacia pontica*, Stgr. (bona sp. teste B.) f. *consenescens*, Stgr. (det. B.). R., 14.ix; R.G., 9.x. Paler ash-grey than Lebanese examples.

*Rhyacia semiramis*, Boursin (ined.). The three types of this new species were taken at B.G., on 9.x, together with large numbers of *Maraschia grisescens*, which it closely resembles.

*Rhyacia caerulea*, Wgnr. (det. B.) (bona sp. teste B.). B.G., 9.ix. Not uncommon to light.

*Rhyacia palaestinensis*, Kalchb. (bona sp. teste B.). x, to sugar. A dull, grey, large moth. Herr Grosse took the true *xanthographa*, Schiff. (redder) at Sheikh Adi together with this species, and it probably also occurs in this valley.

*Miselia oleracea*, L. 29.viii, Shaqlawa, to sugar; doubtless also in this valley.

*Cirphis syriaca*, Osth. (*Cirphis scirpi* ssp. *syriaca*, Osth.) (teste B. sp. distinct from *scirpi*; comes near *alopecuri*, Brsn.). x. Common, occurring also early in the year.

*Sideridis putrescens*, Hübn.-G. x. Common.

*Sideridis vitellina* ssp. *pallida*, Warr. ix-x.

Genera *Eumichtis* and *Dryobotodes*. B.G., one species in the former, probably *muscosa*; and two different species in the latter, of which Boursin considers one (*Dryob. longiclava* sp. n. Brsn. ined.), and perhaps both, to be new, adding, however, that the place that *longiclava* should occupy will be discussed in the description itself.

*Derthisa ledereri*, Chr. A long and variable series, taken partly at light, partly settled after dark on low herbage, at D., 6.x. Occurs in xi also at Khanikin.

*Palluperina dumerili-aequalis*, Schaw. (det. B.) (= *Episema indistincta* Rbl.). D. 6.x.

*Stilbina hypaenides*, Stgr. x. Very common, to light and at rest after dark.

*Hypeuthina fulgurita*, Led. The same remarks apply as to the foregoing.

Genus *Elaphria*, Hb. (*Athetis*, *Caradrina*). This genus is richly represented in Kurdistan, rather more in the hills and gorges than the plateaux and plains. My visits to the valley of the Rowanduz Chai have already produced three new species and two new subspecies, all given below, and other discoveries will probably reward further hunting.

*Elaphria (Hymenodrina) wiltshirei*, Brsn. (det. B.). R.G., late ix and early x. Not very common: there are, I believe, only 4 examples in existence, one taken by Herr Grosse of Prague and ♂♂ ♀ by myself. The wings are very delicate and soon become rubbed.

*Elaphria (Hymenodrina) parvaspersa*, Brsn. (det. B.). Holo- and allo-type, R., 14.ix, at 5000 ft.

*Elaphria (Hymenodrina) surchica*, Brsn. (det. B.). Holotype, R.G., 7.x. Herr Grosse, of Prague, is the first captor of this species, of which he obtained two in 1935.

(To be concluded.)

**SOME NOTES ON ASSEMBLING MOTHS.**

By P. B. M. ALLAN, M.A., F.S.A.

## Part II.

*(Continued from page 69.)*

A correspondence, on this subject of assembling, in *The Times* last summer elicited some remarkable information. Unhappily most of it did not accord with my own observations. But I was particularly struck by two assertions—one, that males usually come to the assembling cage downwind, the other that the wing vibration frequently observable during "calling" is the lepidopterous method of sending out wireless signals. I have not yet been so fortunate as to meet a male moth who could smell, from a quarter of a mile or so, a scent that was being blown away from him, and my experience of wing vibration is that it is only a manifestation of sexual excitement. The pussmoth presses her wings tightly to the roof of the assembling cage when calling, and "drops" her body so that the scent organ is pointing to the floor of the cage. There is then no wing vibration. And all the moths, which I have observed, indulge in wing vibration while ovipositing—provided they are free to fly about a cage and are not confined in a small box. I take it, that on these occasions there is no need for them to inform the males, by wireless, of their fecundity. Moreover, if you place a number of freshly emerged male and (virgin) female moths of the same species in a cage together, you will find a good deal of wing vibration going on if you visit the cage at the customary hour of pairing. One would have thought that the interference would have made reception somewhat difficult.

It is stated in some books that the female exposes the scent organ by retracting the integument of the anal segment. My own observations have shown me that although the integument is sometimes retracted somewhat during "calling," the scent organ is always extruded from inside the anal segment. I have observed no shortening or "humping" of the abdominal segments during extrusion of the scent organ. On the contrary, the abdominal segments are sometimes somewhat extended during "calling." It is not unreasonable to suppose that were this scent organ merely the posterior part of the vagina, exposed by retracting the integument, the length of the abdomen covered by the integument would be shorter. This, in each instance which I have observed, is not the case. When the scent organ of a ♀ *A. betularia* registered 5 mm. on a card, the abdomen remained the same length as it was before she began to call.

What, then, is this "scent organ" which some female moths extrude from the anal segment? Is it a diverticulum of the vagina? The histologist answers "no"; for if you kill a virgin female moth, cut off the anal segment and examine it by ordinary histological methods—that is to say, stain and embed it in paraffin wax, then cut longitudinal sections with a microtome—you will not discover any process which resembles the organ so obvious to the naked eye when the moth is "calling." And as the "organ" is extruded from the anal segment, the bursa copulatrix (which in most lepidoptera opens on the 8th sternite) would seem to be ruled out.



I do not know of any book which pictures or describes these particular scent organs of our British lepidoptera, though they are distinct in each family. For example, in some of the larger moths of the family *Boarmiinae* the organ resembles in shape the beak of a chough but is not so pointed, and when turgid measures 5 mm. in length. In *Gastropacha quercifolia* it is like a greenish pearl. In the Prominents, again, it is usually beak-like with a square tip.

The answer to my question would appear to be this: that the "scent organ" which is extruded from the anal segment of certain moths is a modified ovipositor. It is an elongation of the vaginal end of the common oviduct, and its extrusion is brought about by muscular effort. Imms has pointed out that the vagina differs morphologically from the common oviduct in that it is an invagination of the body wall. It is possible that the "scent organ" is an intussusception of the vagina, the innerfold being furnished with scent producing cells. Confirmation that the extruded scent organ is also the ovipositor in at least one species can be obtained by watching closely the ovipositing of a ♀ *A. betularia*—a species which deposits its ova in the slits and crevices of bark. As when "calling," the scent organ ovipositor is extruded to its full extent (a trifle over 5 mm.) and inserted into the chinks of a piece of bark. In certain other groups and families the scent organ is plainly visible during ovipositing, though not extruded to any extent; in the case of some of the Prominents I found it to be extruded about half-way. In yet other families, in which the scent organ is of appreciable length when "calling," it is invisible during ovipositing.

In a few groups of the British lepidoptera the ovipositor has retained its function of inserting the ova in crevices. In the case of those groups which deposit their ova on foliage it has ceased to be more than a canal. But in every group which I have observed (see page 62), it has become modified as a scent organ which is used for the purpose of attracting the male.

In addition to its modification as a scent gland by the development of scent producing cells, it has acquired, in a greater or lesser degree, in most of the species which I have observed, the property of dilatation and contraction, necessary for dispelling the scent. I have not, however, seen any accounts of the diastole and systole of these scent organs which take place during the excretion of the scent. These movements are usually rhythmic, though in many cases the movements are so slight as to be undiscernible by the unaided eye. In certain species, however (e.g. *Dasychira pudibunda*), there is no perceptible systole-and-diastole, the scent organ, which does not appear to alter in size, being bodily extruded and withdrawn right into the anal segment. In *D. pudibunda* the scent organ is remarkably small, globular and yellow, and it is extruded and withdrawn with a rhythm as regular as clockwork, and remarkably fast—120 "beats" a minute.

With some moths the rhythm is so automatic and persistent that it continues if you handle the assembling cage roughly and swing it about; with others, a slight vibration, or even the brief flash of an electric torch, will alter, slow it down, or stop it. It is necessary, therefore, to acquaint oneself with the habits of the insects with which one experiments.

Sometimes, *e.g.*, with *A. betularia*, the rhythm of diastole, systole and pause is fast—2 : 1 : 4 (seconds), the organ being orange when turgid, grey when relaxed. In other species, such as those which have more or less globular scent organs (*e.g.*, *G. quercifolia*), the rhythm is much slower and very difficult to determine, since there is little difference in size and colour of the organ during dilatation and contraction, the chief indication of systole being the appearance of a dent on the posterior surface. In still other cases, *e.g.*, *N. dromedarius*, diastole lasts about 60 seconds, at the end of which period the organ is withdrawn bodily into the anal segment. At 18-second intervals the whole abdomen is cocked up for 3-4 seconds; but the scent organ is not increased in size during this action. There is no wing vibration, the wings being in the penthouse position. The rhythm and the extent of dilatation often vary with the duration or virginity. Other factors, about the precise nature of which I am still ignorant, also cause a variation in the rhythm as well as in the extent of dilatation.

With regard to the change of colour which occurs during dilatation, this is possibly due to the inherent colour of the chemical substance (I deal with this in the third part of my paper) secreted by the scent-producing cells. If this be so, it would follow either that there is a sphincter at the distal end of the scent organ and that the secretion of scent-producing cells is pumped into the organ, swelling it out; or that dilatation is due merely to the accumulation of the secretion of the scent-producing cells situated on the organ itself.

Whether this specially modified prolongation of the vagina deserves the name "osmesome" ( $\delta\sigma\mu\acute{\eta}$  and  $\sigma\omega\mu\alpha$ ) or "osmadene" ( $\delta\sigma\mu\acute{\eta}$  and  $\acute{\alpha}\delta\eta\eta$ ) I leave to others to decide. But I would suggest that the term "ovipositor" is misleading in the case of a structure of which, in spite of its evolution, the prime purpose now is chemotropic. "Scent organ" is too general a term, and it would be a convenience for description if this organ could be denoted by a distinguishing name.

The function of the scent organs of male moths I take to be purely excitatory. As with the scent scales on the male butterfly's wings, their secretion acts upon the cells of the female's central nervous system and in some way hastens maturation of the ova. But it probably has other tonic effects which bring about the requisite accompaniments of pairing. A male moth kept in a cage with a calling female, but separated from her by gauze, will keep the integument of his anal segment retracted all day long. This I believe to be simply a reflex action. The cage reeks with the female's scent, and the effect of this scent on the male is to evoke the usual automatic response.

Whether a female moth can emit scent when she is too old to pair remains to be proved. On 15th May 1936, at about 4.30 p.m., a ♀ *D. vinula* emerged in my cages. On the afternoon of June 1st (she being 17 days old), I placed her, together with a male which had just emerged, in a fresh cage. The female, being feeble, lay on the floor; the male caught hold of the side of the cage to which I applied him, and resumed his nap.

At 9.41 p.m. the male awoke and erected his antennae, holding them at right angles to his body and at an angle of about 45° to each other, spreading his wings flat. At 9.49 he took wing and flew about the cage, settling on the ceiling every now and then to vibrate his wings. The female took no notice of him, and when, at 9.52, he found

her and crawled over one of her forewings she was still motionless. At 9.57 he settled close to her and vibrated his wings, but she gave no sign of recognition.

At 10.0 the male settled on the ceiling and closed his wings, and as he did not move again till 11.0 I went to bed at that hour. The female did not move all evening and indeed never stirred again. She died in the afternoon of June 3rd, aged 19.

Next morning (June 2nd) I found that the male was still on the ceiling but at a different spot; so perhaps he had flown again after 11 p.m.

This observation does not prove that an elderly female moth can excrete scent, and indeed the scent organ of this particular female was not visibly extruded after May 26th (aged 12), on which night, at 9.35, she "called" from the position she had been in all day. It shows rather that the scent lingers for some time after it has been expelled. There was no question, in this experiment, of the cage being saturated with scent, for I had placed both moths, during the afternoon, in a fresh cage. But I think the female was scented sufficiently to attract the male's attention, although she had not actively excreted scent, so far as I could see, for six days.

I have found that an unpaired female usually lives about twice as long as one that has paired. For example, an unpaired ♀ *A. betularia* (a species in which the tongue is atrophied, the perfect insect taking no food of any kind) will live for 22 days. Calling, with this species, continues nightly until three or two days before death. The paired ♀ *A. betularia* usually dies on the 8th to 10th day, sometimes sooner. It is possible that the shorter span of life in the paired female is due to nuclear division of the zygote. This may be accompanied by a certain chemical change or changes, the products of which, passing into the circulation, poison the central nervous system. By "poison" I mean cause gradual disintegration of the cells of the central nervous system, so that the animal must, presently, die.

Some writers have asserted that certain species do not call until midnight, or at least very late at night. The Prominents and *Ceruridae* are usually mentioned. My experience in the case of all those night-flying moths with which I have experimented (including both the above-mentioned families) is that the females begin to call at dusk; some at early dusk, some at late dusk. For example, on May 16th, a female *N. dromedarius* began to call at 10.12 p.m. (S.T.). The following night she began to call at 9.48 p.m. Most of them finish calling by half-past eleven, though occasionally I find one still calling when I go to bed at midnight. Such occasions, however, are rare. They occur chiefly with the geometers. Those which finish early sometimes call again an hour before dawn. The bombyces with which I have experimented do not, nor do the commoner Prominents.

(To be continued.)

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## VARIATIONS OF EUMENIS ALLIONII, G.-H. = FATUA, FREYER.

By ROGER VERITY, M.D., F.R.E.S.

The generic name of this species has not yet been established as definitely as would be desirable. Since the omnibus genus *Satyrus* has been split up, the group *fidia*, including *statilinus* and *fatua*, has been united by some authors, such as Wheeler, as far back as 1902, to the *fagi* group and in my own articles I had, till now, done so too. I have, however, come to the conclusion that it should be grouped with *semele*, for its Jullien's organ belongs to the same types as the latter's: the bunch of rods of the two sides of the abdomen are placed, close together, near the centre of the dorsal surface and not lower down, on the sides of the abdomen, because the tergite of the VIII segment is quadrate and narrow and not spread out into two broad wings, as in *fagi*. This difference has been illustrated by Dampf in the *Entom. Zeitschr.*, xxii, p. 77 (1908). Therefore, the *statilinus* group belongs to the genus, now, called *Eumenis*, whereas the *fagi* genus is the one called *Hipparchia*; *circe* is an *Aulocera* and the *actaea* group remains the genotypical one of *Satyrus*, according to the resolution of the International Committee of Zoological Nomenclature, who has examined this particular case in one of its last meetings, at Lisbon.

The next remark to make, concerning this species, is that the specific name of *fatua*, it is usually known by, cannot be used validly, according to the definite, modern, Rules of Nomenclature. Geyer's name of *allionii* has precedence over it by several years and the reason for which it had been discarded, during more than a century, may seem very practical, but has no foundation in the aforesaid Rules. That reason was that it resembled too much Fabricius' name of *allionia*, given to a variety of the closely allied species *statilinus*, Hufn. Now, in the Rules of Nomenclature, differences of spelling, which do not interfere with the action of the Rule of homonymy, have been explicitly made out and consist, for instance, in a *y* instead of an *i*, or in an *ae* instead of an *e*, or, that is to say, in recognised equivalents, whereas the difference between *allionii* and *allionia* is small, but quite definite, so that it quite excludes the application of the aforesaid Rule, and leaves *allionii* perfectly valid.

Another fact to be noted is that Freyer's figures do not, in the least, represent the form of the species, which is considered nominotypical and which is, on the contrary, exactly the one figured by Geyer. Freyer figures a couple of large and boldly and heavily marked insects, corresponding to the Syrian and Palestinian form, which Lederer named *sichaea* a few years later, in 1857, so that, anyhow, some sort of correction would have been required, and we must, as things stand, make the two together, as follows:

Race *allionii*, G.-H. = *fatua*, auct. nec Freyer.

Race *fatua*, Freyer = *sichaea*, Led. et auct.

The relationship between these two forms seems to be of a simple racial degree, as transitional forms and local races have been noticed and described by various authors, beginning by Staudinger in 1871, who records some from Smyrna and from the Taurus, mixed with a majority

of nominotypical *allionii*, or *fatua*, as he calls them, in the *Horae Soc. Ent. Ross.*, vii (1870), p. 73.

That author also mentions, there, that the *fatua* of Amasia exhibit the peculiarity of a more or less pronounced obliteration of the three transverse dark streaks, which cross the hindwing, respectively, near the base, beyond the end of the cell, and along the external margin on the underside; in some individuals there is no trace of them left at all, and the only *fatua* females he has seen entirely devoid of pattern on the underside are from this locality, whereas in *statilinus* such a form often occurs in the south; he also adds that this race is not as large and striking as the examples from Greece. No other author since those days seems to have noticed that local form, but specimens from Amasia in my collection agree perfectly with his remarks and suggest that, nowadays, when local forms are worked out and compared, this one is well worthy of being defined and named race **elineata**, nom. nov. According to Staudinger, it is the extreme northern form of the species, corresponding to nominotypical *statilinus*, whereas *sichaea* is the southern caloric-petal one, corresponding to what was, in those days, called, in a general way, *allionia*, F.

Another still more distinct and striking race is the most eastern one, which had been noticed since last century at Askhabad, in the Achal-Tekke region, as being of a clearer and lighter grey on the underside. The series brought back by Brandt from above Keredj, in the Elburz mountains, at m. 1500 to 1600 (end of August), exhibit this feature to its highest degree, and, furthermore, exhibit others which strongly recall the *pisidice*, Klug, described from high altitudes on Mt. Sinai and usually accepted as a distinct species, proper, besides this mountain, to the Lebanon and other mountains of Syria. The underside pale colours and effaced patterns of *pisidice* are certainly very different looking from the more usual ones of *allionii* = *fatua*, and, still more so, from those of *fatua* = *sichaea*, and stand to them exactly as those of *stulta*, Stdgr. stand to *parisatis*, Koll., but the race of the Elburz mentioned above raises serious doubts as to the reality of that specific distinction, for it seems to constitute a very complete transition from *allionii* to *pisidice*, which one would be at a loss to have to refer to either one or the other exclusively, so that the latter appears to be an extreme eastern form of nominotypical *allionii*, standing opposite to *fatua* = *sichaea*. Of *pisidice* all my specimens from the Elburz mountains have, in fact, the characteristic, entirely white, fringes, on both fore- and hind-wing, and the basal and discal black streaks of the underside of both wings, much straighter than in *allionii* = *fatua*, owing to their much smaller sinuosities. Apart from the *pisidice* features, this race is, on an average, smaller than any other *allionii* one and especially striking by the amount of white on the underside, which is very pure and broadly uncovered, on account of the particular minuteness, paleness and partial effacement of the capillary grey streaks; also on the upperside the black tends to be greyish and, between the submarginal streak and the outer margin of the hind-wings, it is still lighter, and, in some examples, even decidedly white, somewhat recalling the aspect of *E. stulta*. I name it **persiscana**, nom. nov.

Finally, I must mention that Turati, in the *Archivio Zoologico Italiano*, xiii (1929), p. 180, has named *insularis* specimens of *allionii* =

*fatua* collected in the Italian islands of the Greek Archipelago, but neither his description nor his figure seem to indicate any peculiarity by which to distinguish it from the widespread race of Asia Minor, to which belongs the form figured by Geyer. I am sorry to have to note that Turati is very much mistaken in stating again, in that article, as Curò and the old authors used to do, that *allionii* = *fatua* exists in Central Italy. No specimen, or authentic record, of it exists at all, although it has been looked out for, particularly during the last fifty years, in all sorts of localities of Peninsular Italy and in Sicily.

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### NOTES ON COLLECTING, &c.

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THE SEASON.—It was a bad Spring here (Newton Abbot, Devon), and hibernated *io* and *c-album* in a very battered condition were still seen right into the early days of July, but some produced young earlier than these could, as I saw freshly emerged *c-album* and *io* about a week ago here in Newton. Larvae of the latter taken from a large brood nearly full grown were 50 per cent. diseased—bacteria not hymenoptera.—R. C. L. PERKINS, 23.vii.37.

EARLY STAGES OF INDIAN LEPIDOPTERA (*ante*, pp. 80-81).—The larva and pupa of *Rhyncolaba acteus* were also described by Dudgeon (*Bombay N.H.S. Journal*, XI. 414-415: 1898), who gave the foodplant as *Colocasia*. At Pusa the larva was found on *Pythonessa wallichii* and the larva and pupa were described and figured in *Pusa Bulletin*, No. 89, pp. 67-68, fig. 39 (1919). The life-history of *Natada nararia* was described and figured by E. Ballard and Rao Sahib Y. Ramachandra Rao in *Proc. Fourth Entl. Meeting, Pusa*, pp. 153-156, tab. 26 (1921); the larva occurred on *Pithecolobium dulce* at Coimbatore.—T. BAINBRIGGE FLETCHER, Rodborough, 27th July, 1937.

CACOEZIA PODANA ON LAUREL.—A larva found rolling Laurel-leaves in my garden at the beginning of June emerged on 29th June as *Cacoecia podana*. This species has a very wide range of food-plants but, so far as I know, is an addition to the list of species whose larvae feed on Laurel with impunity.—T. BAINBRIGGE FLETCHER, Rodborough, 27th July, 1937.

LOZOPERA BEATRICELLA IN GLOUCESTERSHIRE.—On 22nd June I bred a specimen of *Lozopera beatricella* from a pupa found at Rodborough on 23rd May in a stem of hemlock (*Conium maculatum*). This interesting extension of its known range in England is due to Mr S. Wakely, who noticed the affected stem whilst on a brief visit here. It has been recorded from Somersetshire by Hayward (*Entom.* LXVIII. 30: 1935) and should be looked for in other counties where, as Mr Meyrick observes, it is "probably overlooked."—T. BAINBRIGGE FLETCHER, Rodborough, 27th July, 1937.

RECORD OF MACROLEPIDOPTERA FOUND IN A LONDON GARDEN.—From time to time lists have appeared in these pages of species taken in various localities. For the greater part of the last 25 years my duties have kept me within the Metropolitan Borough of Lambeth. I have

held two Benefices at different times in this area, and in each case the Vicarage was situated in a district which is almost entirely built up with small houses. The garden in each case was larger than those of my immediate neighbours; in the present instance it comprises nearly half-an-acre and contains several old trees (lime, hawthorn, apple, pear, and plum). There is also an adjacent garden which has been allowed to run to waste and is overgrown with weeds of all kinds. Some of this property was once a part of the former estate of Brockwell Manor.

During the four years I have been here I have kept a careful record of every new species I observed in and around the garden itself. On a very few occasions I have used "sugar." Many of the species recorded below have come to light at my study window. All cases named have been observed by me, except where otherwise stated, and with one or two exceptions, also noted, all have been recorded since September 1933.

Two of the most noteworthy records are the taking of a specimen of *H. abruptaria*, var. *brunneata*, Tutt, on the fence in May 1935, and the occurrence of a fine *S. vespiformis* on an American Pillar Rose on 5th July of this year. I believe the former is the first recorded instance south of the Thames. *S. myopaeformis* breeds regularly in both apple and pear in this garden. I have never taken it elsewhere. It is perhaps worth noting that two specimens of *A. atropos* were taken during the last week of June this year in this immediate neighbourhood; one within a hundred yards of this door.

As an example of peculiar times of emergence, it is perhaps worthy of record that I took a male *C. quadripunctata* at my window on 10th February of the present year.

List of Species recorded:—

RHOPALOCERA.—*Pieris brassicae*, *P. rapae*, *P. napi*, *Euchloë cardamines*, *Gonepteryx rhamni*, *Polygonia c-album*, *Aglais urticae*, (*Nymphalis* (V.) *antiopa* was observed by a neighbour in a garden half-a-mile distant, in August, 1935), *Vanessa io*, *V. cardui*, *V. atalanta*, *Maniola jurtina* (*janira*), *Pararge megera*, *Heodes phlaeas*, *Polyommatus icarus*, *Lycaenopsis argiolus*, *Augiades sylvanus* (*Ochlodes venata*).

HETEROCERA. SPHINGES.—*Mimas tiliae*, *Smerinthus ocellata*\*, *Amorpha populi*, *Eumorpha elpenor*. (One specimen of *Herse convolvuli* was taken by me in a garden in this district some years before I came to reside here.)

BOMBYCES.—*Dicranura vinula*, *Pterostoma palpina*\* (a pair in cop.), *Lophopteryx camelina*\*, *Phalera bucephala*. *Orgyia antiqua*, *Porthesia chrysorrhoea* (*similis*), *Spilosoma menthastri*, *Diacrisia lutea* (*lubricipeda*), *Hipocrita jacobaeae*, *Habrosyne derasa*\*, *Cilix glaucata*.

NOCTUAE.—*Acronicta aceris*, *A. megacephala*, *A. psi*, *Metachrostis* (B.) *perla*, *Agrotis segetum*, *A. puta*, *A. nigricans*, *A. exclamationis*, *Noctua c-nigrum*, *N. xanthographa*, *N. rubi*, *N. plecta*, *Triphaena pronuba*, *T. comes* (*orbona*), *T. fimbria* (this was bred from a pupa dug up in the garden), *T. janthina*, *Barathra brassicae*, *Mamestra persicariae*, *Mamestra oleracea*, *M. trifolii*, *Xylophasia monoglypha*, *Dipterygia scabriuscula*, *Euplexia lucipara*, *Leucania lithargyria*, *Leucania pallens*. *Phlogophora meticulosa*, *Mania maura*, *Hecatera serena*, *Apamea secalis*, *A. ophiogramma*, *Miana strigilis*, *M. bicoloria*, *M. fasciuncula*, *Naenia typica*, *Helotropha leucostigma*, *Caradrina morpheus*, *C. quadripunctata*, *Rusina tenebrosa*, *Taeniocampa stabilis*, *Orrhodia vaccinii*,

*Cucullia umbratica*, *Plusia moneta*, *P. chrysitis*, *P. iota*, *P. gamma*, *Abrostola triplasia*, *A. tripartita*, *Catocala nupta* (often common), *Zanclognatha grisealis*, *Hypena proboscidalis*.

GEOMETRAE.—*Acidalia* (*Sterrha*) *seriata* = *virgularia*, *A. (S.) fuscovenosa* = *interjectaria*, *A. (S.) aversata*, *Anaitis plagiata*, *Operophtera* (*Cheimatobia*) *brumata*, *Euphyia silaceata*, *Thera obeliscata* (the nearest firs are in Brockwell Park close by), *Xanthorhoë ferrugata*, *X. fluctuata*, *Ochyria designata*, *Calostigia* (*M.*) *didymata*, *Gonodontis bidentata*, *Eupithecia oblongata*, *E. pulchellata*, *E. linariata*, *E. assimilata*, *E. vulgata*, *E. subfulvata*, *E. succenturiata*, *E. pumilata*, *Chloroclystis rectangulata*, *Pelurga comitata*, *Abraxas grossulariata*, *Metrocampa* (*Campaea*) *margaritata*, *Deuteronomos alniaria*, *Selenia bilunaria*, *Crocallis elinguaris*, *Euphyia bilineata*, *Ourapteryx sambucaria*, *Opisthograptis luteolata*, *Lycia hirtaria*, *Biston* (*P.*) *betularia* and form *carbonaria* (*doubledayaria*), *Hemerophila abruptaria* and f. *brunneata*, Tutt, *Boarmia rhomboidaria* (*gemmaria*), *B. repandata*, *Itame wauaria*.

*Cossus cossus*, *Zeuzera pyrina*, *Synanthedon* (*Sesia*) *vespiformis* = *cynipiformis*, *S. myopaeformis*, *Hepialus humuli*, *H. lupulinus*, *Hemitea aestivaria* (*strigata*).—(Canon) T. G. Edwards (*M.A., F.Z.S.*).

\*Those marked were taken in W. Norwood between 1925 and 1929. The garden has since been covered with a block of flats.

“CORNISH NOTES.”—*Re* Mr Nicholson’s note on p. 61, *P. moneta* was attracted by presumably cultivated valerian, as it was in a cottage garden and there was no other sign of it that I noticed within miles around. I have no knowledge of the natural habits of the larva as I have only met it once, received through the post.

I should be interested to know if Mr Nicholson has taken *Eurois prasina* in Cornwall, as I found the larvae common at Mawgen, N. Cornwall, this spring, where Mr Siviter Smith records he took them in 1932.

If there is in existence a fairly up-to-date list of Lepidoptera for Cornwall I should be grateful if someone would enlighten me.—(Captain) C. Q. PARSONS, Alma Marceau, Seaway Lane, Torquay.

LEUCOPTERA LOTELLA, STAINT. IN HAMPSHIRE.—Mines of this species were found in leaves of *Lotus major* at Cracknore Hard during the fourth week of June 1937. The foodplant grows luxuriantly among huge clumps of sedge and the mines occur chiefly on the lower leaves in very secluded situations. *Lotus corniculatus* occurs on the same ground more sparingly, but only a few mines were found on this plant. The tiny white cocoons were found at the end of the month on the underside of the leaves of *Lotus*. The first moths emerged on the 18th July. Although this is the first time that I have found this insect it is probably widespread wherever the foodplant occurs, for I found mines on the occasion of the visit to Pamber Forest on the 11th of July arranged by the Society for British Entomology at its third Annual Congress at Reading this year.—WM. FASSNIDGE.

MOMPHA OCHRACELLA, CURT. NEAR SOUTHAMPTON.—Imagines of this species are fairly common most years in large clumps of *Epilobium hirsutum*, but are always difficult to obtain in good condition. I have



frequently sought for the larvae, which feed in the roots, but without success. This year, on 5th May, at Bitterne Park, near Southampton, I found the cocoons plentiful, spun up on the mid-rib of the lower leaves of the foodplant in very sheltered situations, especially where stinging-nettle grows mixed with the *Epilobium*. In less sheltered situations the vast majority of these pupae were found to be picked out by birds. From a considerable number of pupae brought home not a single parasite was bred; every pupa produced a moth. The proper time to seek these pupae is the first fortnight in May. A slight pucker is visible normally on the upper side of the leaf, especially where the larvae have mined along the mid-rib to near the end; but, if well-grown plants of *Epilobium* in very sheltered situations are cut close to the ground, then every leaf can be examined and the pupae easily seen if present.—Wm. FASSNIDGE.

*EPICHOPTERYX RETIELLA*, NEWM. IN HAMPSHIRE.—Males of this Psychid occurred in fair numbers on the salt marsh at Cracknore Hard on the 29th of May this year. The weather was calm and sunny, and the moths flew freely from 3 p.m. till 6 p.m., and settled with outspread wings on many species of grasses where they could be easily seen and captured. Large numbers were noted floating with outspread wings on the surface of salt water pools, and this would betray the presence of the insect. Cracknore Hard is situated on Southampton Water, opposite the new docks. When I visited this locality again on 1st June I could not find a single specimen, though crowds of *Bucculatrix maritima*, Staint. were flying among Sea Aster and some *Aristotelia brizella*, Treits. were taken by sweeping the flower heads of Thrift.—Wm. FASSNIDGE.

*PLATYPTILIA TESSERADACTYLA*, L. IN EAST TYRONE.—On 23rd June 1937 several colonies of this very local Plume were discovered on an area of rocky moorland, north-west of Cookstown; the imagos resting and feeding on the flower-heads of *Antennaria dioica*, the mountain Cudweed, growing in sheltered spots amid the rocks. The moth is very sluggish, keeping close to the foodplant, and not flying far when disturbed, except when carried by the wind. Another colony was found late in the evening many miles away to the west, where the foodplant grows abundantly on high "eskera" (gravel ridges), accompanied by stunted *Erica cinerea* and *Calluna*. Barrett writes "That the moth flies in the late afternoon and evening among *Gnaphalium* (Cudweed) at road sides and dry banks at the edges of bogs. It was first met with in these islands in June 1895 at Clonbrock, Co. Galway, by the Hon. R. E. Dillon and Mr W. F. de V. Kane." In the west of Ireland the moth occurs on the limestone; in East Tyrone the localities are all on Metamorphic rock.—THOMAS GREER, "The Bungalow," Sandholes, Dungannon, 26th June 1937.

"ROBBER FLIES" ATTACKING *TORTRIX VIRIDANA*.—At the South London Entomological Society's Field Meeting at Ashted on the 12th June last a number of "Robber Flies" (*Neoitanus cyanurus*) were noted preying on the hordes of *Tortrix viridana* imagos which infested a section of the Oak woods. The flies were carrying their victims upside down, head foremost, the wings clasped between the legs of the flies and held

in position by the natural out-thrust of the moth's wings. The green of the *viridana* moths made the flies conspicuous and gave a curious gliding effect to their flight.

On netting a fly the moth was immediately dropped and the fly made determined efforts to escape. In each case examined the *viridana* moth was dead and did not appear to be crushed in any way.

From the curious position in which the moth is carried it would seem as though the moth is killed or numbed first and then arranged by the fly in the most convenient way for carrying.

It would be interesting to know whether the fly sucks the juices from the body of the *viridana* moth whilst carrying it, or whether the moths are carried off for the fly to deposit near its ova for the purpose of supplying food for the resulting larvae.

I am indebted to Mr H. W. Andrews for the name of the fly. I had not a specimen for him to examine but from my description he was able to trace the fly and show me the specimens in the South London Society's collection.—R. W. ATTWOOD, 36 Tannfield Road, Sydenham, S.E.26.

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### CURRENT NOTES.

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We have received, from Herr Fritz Hoffmann, of Sta. Catharina, S. Brazil, a series of about 30 separates on Brazilian Lepidoptera, which he has written for various entomological periodicals during the past few years. These papers record his observations on the life history of many species, giving both interesting biological facts and scientific details of all four stages of each, ascertained by his breeding experiences. He has also listed and noted on the species of the different lepidopterous families in the area he has worked. At the same time he has added much detail as to distribution as given by Seitz's work, extending and criticizing the areas of occurrence given in that work. No doubt Herr Hoffmann would be pleased to hear from anyone interested in the Lepidoptera of S. America; at present we know of no one in this country who has more than a passing interest in the S. American faunal area.

In a recent number (*Fasc.*, 4, 1936) of the *Mémoires du Muséum royal d'Histoire naturelle de Belgique*, Professor F. Carpentier describes an elaborate examination of the thorax and its appendages and of the wings and leg of the mole crickets and certain creatures considered to be related to them, and assesses the mutual affinities of *Gryllotalpa*, *Tridactylus*, and *Cylindrogaster*. He finds that the curious Australian *Cylindrochetidae* are not connected with the mole crickets, the outward resemblance being due to convergence. He connects them rather with the *Tridactylidae*, the small, very active little crickets that are found in swarms on wet mud in the tropics and subtropics, and allots to both a common origin neither with the *Gryllotalpidae* nor with the *Gryllidae*, that is the true crickets, but near that of the *Tetrigidae*, which have been removed by Zeuner away from the *Acrididae*.—M.B.

PESTS OF ORNAMENTAL GARDEN PLANTS, by G. Fox-Wilson, N.D.H., F.R.E.S., F.L.S. (Bull. 97. Ministry of Agriculture and Fisheries.) Published by H.M. Stationery Office, S.W.1. Price, 3/6 (postage extra).

—The wonderful spread of the cult of the home garden during the past twenty years has called for a comprehensive book, such as the present, treating of the sources of the various troubles, which we garden lovers are continually meeting more or less. Books and pamphlets dealing with particular pests with which the commercial grower has to contend exist in plenty, but the home gardener's problem of control will be hardly the same, and in some neighbourhoods neglect in a small garden may spread to the commercial grower near-by. Prevention as well as cure is considered by the author. The book commences with "Control Measures": 1. Cultural including Drainage, Cultivation, Weeds, Rubbish, Manure and Prevention of Pest Introduction; 2. Mechanical including Handpicking, Trapping, Shaking, Pruning; 3. Chemical methods, etc. The next portion, which is very fully illustrated, deals with the "General Pests," Slugs, Snails, Woodlice, Millepedes, Aphides, Cutworms (caterpillars), Chafers (beetles), Wireworms, Leatherjackets, and the ubiquitous Ant. Finally these pests are dealt with from other aspects, viz., the Lawn, the Rose Border, the Herbaceous Border, the Annual Border, the Rock Garden, Bulbs and Corms, Trees and Shrubs, the Glasshouse. There are 120 illustrations, some with multiple figures, and the book concludes with an adequate Index. That the author is the talented expert of the Royal Horticultural Society's Gardens at Wisley may be taken as a guarantee that the matter and advice are the best that can be given at the moment. The binding is strong and serviceable and the work should be of more real and helpful value than some of the existing compilations by non-practical writers.

A meeting of The Entomological Club was held at 1/5 Albany, Piccadilly, on 21st April, 1937, Mr R. W. Lloyd in the chair. Members present, in addition the Chairman, were Mr H. Willoughby Ellis, Mr Jas. E. Collin, and Dr Harry Eltringham. Visitors present were Major E. E. Austen, Dr A. D. Imms, Dr Karl Jordan, Dr S. A. Neave, Dr Hugh Scott, and Mr W. H. T. Tams. The members and guests arrived soon after 6.30, and after preliminary refreshment were entertained in the various rooms of the Chairman's enlarged house, which is full of works of art of absorbing interest, including a unique collection of Turner's drawings, a further addition to which has recently been made; a large collection of prints and Oriental Objets d'Art. Dinner was served at 7.30, after which the Chairman's collection of British Beetles and Lepidoptera was inspected, and provided reminiscences of the earlier collecting days, where the originals of many interesting records were to be found. The company remained until a late hour, after having spent a most delightful evening.—H.W.-E.

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"Aurago," Bromfields, Pulborough, Sussex.

*Duplicates*.—*Pyralina*,\* *Salicis*, *Ianthina*,\* *Orbicularia*,\* *Repandata* in variety,  
*Doubledayaria*, *Black Rhomboidaria*,\* *Black Virgularia*\* and others.

*Desiderata*.—*Hyale*, *Welsh Aurinia*, *Polychloros*, *Tiphon*, *Agathina*, *Lunigera*,  
*Lucernea*, *Neglecta*, *Diffinis*, *Populeti*, *Gothica v. gothicina*, *White Lepo-*  
*rina*, *Tridens*, *Putrescens*, *Littoralis*, *Typhae v. fraterna*, *Rurea v. com-*  
*busta*, *Gilvago*, *Fulvago v. flavescens*, *Liturata v. nigrofulvata*. Harold B.  
*Williams*, *Woodcote*, 36 Manorgate Road, Kingston, Surrey.

*Desiderata*.—*M. aurinia* (*artemis*) Larvae, English, Irish and Scotch.

*Duplicates*.—Numerous, Ova, Larvae, Pupae, and Imagines.—H. W. Head, Burnis-  
ton, Scarborough.

*Duplicates*.—*Argynnis liauteyi*, *Chrysophanus phoebus*, *Albulina ellisoni* and  
many rare species from Syria and Morocco.

*Desiderata*.—Rare British and European Macro-lepidoptera, especially *Zyga-*  
*nidae*, *Arctiidae*, *Agrotidae*.—R. E. Ellison, *Moccas Rectory*, Hereford.

*Desiderata*.—Certain common Bombyces from Scotland, Ireland and Cornwall.  
*Sanio*, *Rubi*, *Trifolii*, *Potatoria*, etc., during the year.

*Duplicates*.—Numerous. Please send list.—B. W. Adkin, *Highfield*, *Pembury*,  
*Kent*.

*Desiderata*.—Exotic Lepidoptera in papers.

*Duplicates*.—Exotic Lepidoptera in papers.—Capt. J. C. Woodward, R.N., *The*  
*Red House*, *Bordyke*, *Tonbridge*, *Kent*.

*Desiderata*.—Wanted: Leech, J. H., Butterflies from China, Japan and Corea,  
3 vols., Lond., 1892-94, w. map, views and 43 colour pl.—Dr Max Cretschmar,  
*Celle*, *Germany*.

*Desiderata*.—Wanted: Back Volumes of "The Entomologist."—F. Gaillard, 5  
*Cité du Midi*, *Paris*, 18me, *France*.

*Desiderata*.—Ova or larvae of *P. hippocastanaria*, *T. luridata*, *N. zonaria*, *A.*  
*hispidaria* (southern), *E. autumnaria*, and *O. rubiginea*.

*Duplicates*.—Larvae of *N. lapponaria*.—Dr Edward Smith, "Highroyds," Men-  
ston, near Leeds.

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## MEETINGS OF SOCIETIES.

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THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON.—41 Queen's Gate,  
South Kensington, S.W.7, 8 p.m. October 6th.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY  
SOCIETY.—Hibernia Chambers, London Bridge. Second and Fourth Thursdays  
in the month, at 7 p.m. August 26th, September 9th, 23rd.—Hon. Secretary,  
S. N. A. Jacobs, "Ditchling," Hayes Lane, Bromley, Kent.

THE LONDON NATURAL HISTORY SOCIETY.—Meetings first four Tuesdays  
in the month at 6.30 p.m., at the London School of Hygiene and Tropical Medi-  
cine, Keppel Street, Gower Street, W.C.1. Visitors admitted by ticket which may  
be obtained through Members, or from the Hon. Sec., A. B. Hornblower, 91  
Queen's Road, Buckhurst Hill, Essex.

ENTOMOLOGICAL SECTION, BIRMINGHAM NATURAL HISTORY AND  
PHILOSOPHICAL SOCIETY.—Evening Meetings. On the third Monday of each  
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Communications have been received from or have been promised by Capt. K. J. Hayward, (the late) Rev. C. R. N. Burrows, H. Willoughby-Ellis, Hy. J. Turner, D. G. Sevastopulo, A. J. Wightman, T. Greer, T. Bainbrigge-Fletcher, Dr Malcolm Burr, Rev. R. E. E. Frampton, L. T. Ford, H. Donisthorpe, Wm. Fassnidge, P. B. M. Allan, Dr Bytinski-Salz, Dr Verity, O. Querci, E. P. Wiltshire, Dr G. Robertson, Rev. G. Wheeler, and Reports of Societies.

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## IMPORTANT TO ENTOMOLOGICAL SOCIETIES AND MUSEUMS.

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BACK VOLUMES OF

### The Entomologist's Record and Journal of Variation

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# ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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TO OUR READERS.—Short Collecting Notes and Current Notes. Please. Early.—Eds.



## AUTUMNAL LEPIDOPTERA IN KURDISTAN.

Preliminary Notes on Some Excursions in the Rowanduz Chai Valley,  
Iraq.

By E. P. WILTSHIRE.

(Concluded from p. 94.)

*Elaphria (Hymenodrina)* sp.? ♀♀, R., 14.ix, at 5000 ft. No males have yet been taken of this boldly banded species, which Boursin thinks may be a form of *rjabovi*.

*Elaphria (Caradrina) clavipalpis*, Scop. ix-x.

*Elaphria (Eremodrina) salzi*, Brsn. (det. B.). B.G., 9.x.

*Elaphria (Eremodrina) belucha*, Swinh. (bona sp.) (det. B.). B.G., 9.x. Also at Mosul, and Palmyra (Syrian desert).

*Elaphria (Eremodrina) zernyi* ssp. *debilis*, Brsn. (det. B.). R.G. and B.G., ix-x.

*Elaphria (Eremodrina) bodenheimeri*, Drdt. ssp. *chlorotica*, Brsn. (det. B.). The nomino-typical (Palestino-Lebanese) race is redder than this form which occurs in the upland semi-desert plain of Iraq as far south as Khanikin, and extends into the Kurdish hills certainly as far as R.G., perhaps further. The species is represented by yet a third race (ssp. *pleiarchia*, Brsn.) in the mountains of Northern Iraq (Persia). The autumnal brood flies from ix to x, and I have taken it at Khanikin in xi and iii.

*Crymodes bischoffi*, H.S. (= *Antitype apora*, Stgr.). R.G., 7.x. Occurs also in the Lebanon in ix.

*Enargia regina*, Stgr. x. Varies somewhat, though I have no Kurdish examples quite so vividly coloured as the vividest of my Lebanese examples.

*Maraschia grisescens*, Osth. Previously only known from Marash (Taurus). A long series of females and one male came to light in B.G., 9.x. Among them, almost indistinguishable, were a few *Rhyacia semiramis*, Brsn. of both sexes.

*Polyphaenis subsericata*, H.S. R.G., 25.ix. One, to sugar. Much commoner in the Lebanon.

*Mania maura*, L. ix, to sugar, Shaqlawa; doubtless also occurs in this valley.

*Amphipyra pyramidea*, L. The same remarks apply as to the foregoing.

*Porphyrinia ostrina*, f. *aestivalis*, Guen. ix-x.

*Porphyrinia parva*, Hbn. ix-x.

*Tephrochares inquinata*, Led. R.G., ix-x. Commoner in the Lebanon.

*Cortyia vetusta*, Walk. D., x.

*Autophila ligaminosa-subligaminosa*, Stgr. (det. B.). B.G., 9.x. A transitional form to the Lebanese ssp. *rhodochroa*, Brsn. (ined.).

*Toxocampa craccae*, F. R., 14.ix (at 4000 feet).

*Acantholipes regularis*, Hubn. A common summer insect, still out in late August. It occurs also at Bagdad and Marash.

*Aleucanitis cailino*, Lef. R.G., 7.x. Also occurs in high summer.

*Rhynchodontodes ravalis*, H.S. A summer insect, liking damp spots, and still out at the end of August.



*Scopula* and *Sterrha*. Several species of these genera are not yet named.

*Scopula ochroleucaria*, H.S. D., 6.x. Also from Mosul and Bagdad.

*Sterrha flicata*, Hbn. R.G., x.

*Somatina wiltshirei*, Prt. (ined.). R.G., 28.viii, and B.G., 9.x. Also flies in high summer.

*Anaitis plagiata*, L. R.G., 8.x.

*Cidaria salicata*, Hbn. A small series, B.G., 9.x. I have the spring brood from D.

*Eupithecia*. I have several species from this genus, still unnamed.

*Eumera hoferi*, Wehrli. 14.ix at 6000 ft., R. Very common at lower altitudes, in early x.

*Nychiodes divergaria*, Stgr. x. A rather small race, spanning 33 mm.

*Boarmia rhomboidaria*, Schiff. x. I have not yet compared these with my series from the Lebanon of *syritaurica*, but they are probably referable to this race.

*Boarmia umbraria*, Hbn. B.G., 9.x. Three fine examples.

*Gnopharmia* and *Gnophos*. These genera are richly represented.

*Macaria syriacata*, Stgr. Still flying in x, after successive broods all summer.

*Aspitates ochrearia*, Rossi. D., x.

*Pyalids* and *Micro-Heterocera*. Until the considerable material of my 1936 visits has been determined, it is probably wiser not to catalogue the few species whose identification is sure. New species from the 1935 visits were described recently by Meyrick in *Exotic Microlepidoptera*, Vol. V. It is, however, perhaps worth mentioning that a further short series, from B.G. and R.G., was obtained in x.36 of the handsome and distinctive *Leptarchis psologramma*, Meyr., described from a single specimen caught at R.G., 25.ix.

#### CORRECTION.

Instead of *palaestinensis*, etc., read:—" *Rhyacia?* sp. n. ined. near *palaestinensis*, Kalchb. To sugar, x.36, D., R., and B. Its dull, grey coloration distinguishes it from *xanthographa*, Schiff., the Kurdish race of which is reddish. Boursin has recently examined the type of *palaestinensis* and finds that, though superficially very close, it is distinct from the present species, which occurs in Sicily and Syria as well as in Iraqi Kurdistan, and which, if it is not *pulverea*, Hamps., he intends to name after Grosse, who took a series of it at Sheikh Adi together with the true *xanthographa*, Schiff. This latter species, no doubt, also occurs in this valley."

#### KEY TO PLATE VII.

Figure a:—Rowanduz Gorge, viewed from the Alana Su falls, looking north over the lower Alana Su ravine.

Figure b:—New forms from Kurdistan:

#### KEYS TO MOTHS.

1. *Leptarchis psologramma*, Meyr.
2. *Autophila ligaminosa-subligaminosa*, Stgr., trans. ad ssp. *rhodochroa*, Brsn.

3. *Elaphria salzi*, Brsn.
4. *Elaphria wiltshirei*, Brsn.
5. *Elaphria surchica*, Brsn.
6. *Elaphria zernyi*, ssp. *debilis*, Brsn.
7. *Elaphria belucha*, Swinh.

---

## RECORDS ABOUT THE DEVELOPMENT OF A FEW PAPILIO.

By ORAZIO QUERCI.

---

The object of the following notes is to record what we have learnt during the rearing of *Papilio polyxenes*, Fab. at Philadelphia, Pa., and of *P. machaon*, Linn. in Portugal, Spain and Morocco.

*Hatching.*—In the hottest periods of the year the eggs hatched in six days, but if the sky was often cloudy the hatching was delayed one to two days longer. When the heat was moderate but the sun was generally shining some eggs hatched in a week; however, if the solar radiation was scarce and feeble, the hatching was sometimes delayed for twelve days.

*Feeding larvae.*—The larvae hatched all together but never started for their first moult at one and the same time. Those that took to their food the more readily grew more rapidly than the others.

While the larvae of some Lepidoptera died on the advent of a cold spell or a heat-wave, those of the *Papilio* never died in our cages. They fed both at about 50° F. if the sun was shining, and at over 90° if the sky was cloudy. When the heat was moderate and the radiation was not strong the larvae were caught by a temporary stupor. If it was hot and the rays were intense the larvae, even in the shade, ceased feeding, but became active again if a fan was set going near them.

*Moulting larvae.*—When the temperature was fairly low, the larvae, that had started to moult, were unable to throw off their skins, and remained inactive as long as the radiation was not a little stronger than that at which they could feed. The caterpillars that began to moult in the morning often succeeded in casting their skins in a short time, but those that started in the afternoon were caught by stupor when radiation decreased, and delayed moulting until it was again strong enough on the following days. Sometimes the moulting larvae became inactive, even during the day-light, after the sky grew cloudy.

In a hot environment, while the larvae that were feeding continued to do so, those moulting became dormant from an excess of radiation, and delayed casting their skins until it became more feeble in the night. On the other hand, the larvae, which started to moult at sunset, cast their skins rapidly. Often both the feeding and moulting larvae were very active while it was hot and raining, and the sky was covered by thick clouds.

*Varying rate of growth of the larvae.*—Those larvae that matured, when radiation was balanced both by temperature and other climatic factors, hung up at once and in a perfect manner. If it was rather cold and the radiation was feeble, the mature larvae were unable to hang up; if it was hot and the rays were strong, the larvae became excited and afterwards dormant. In both cases they became active again after the radio-thermic environment returned to a suitable rate. Sometimes

the mature larvae that had remained dormant hung up imperfectly, while the weakest ones remained on the ground, but did not die.

*Suspended larvae.*—The larvae, that had hung up in a short time, formed pupae in a few hours if the environment continued to be suitable after suspension. When the influences of the climatic factors were balanced, pupae were formed in our cages at any temperature between 50° and 95°.

If the intensity of the radiation changed suddenly after suspension even those larvae that had hung up rapidly became dormant.

The larvae that had lain in lethargy became feeble and, even under the most favourable conditions, they needed some days to recover and so form pupae.

*Active pupae.*—The pupae that were formed rapidly produced adults in a week to a fortnight, according to their degree of activity, provided that the weather was suitable sufficiently long.

*Arrested pupae.*—Neither heat above 90° with a strong radiation, nor cold down to 45° with a feeble radiation, produced any change in the *recently formed* active pupae. Instead their development was arrested, either above 85°, when the sun was shining, or below 60°, when the sky was cloudy, while the pupae were *nearing their physiological change*.

The active pupae of which the development had been arrested delayed emergence until after the temperature settled between 65° and 85° with a moderate radiation and a big amount of sunshine. The arrested pupae in our cages produced adults in one to four months according to their degree of latent vitality and the fluctuations of the climate.

*Dormant pupae.*—None of the pupae formed by weakened larvae have ever been seen to emerge in our cages during the same year in which they have been formed. Most of them produced adults gradually in the following year, but some pupae of *P. machaon* went over two winters. Many dormant pupae either rotted, or dried inside, and their shells remained empty.

*Adults.*—The adults mated when the combined effects of light, radiation, temperature and humidity were nearing their favourable rate. Light has a preponderant effect, radiation is beneficial in a certain moderate amount.

---

## LIMONISCUS VIOLACEUS, MULL. (ELATERIDAE), A GENUS AND SPECIES OF COLEOPTERA NEW TO BRITAIN.

By A. A. ALLEN.

---

The genus *Limoniscus*, Reitter (*Bestimmungs-Tabellen*, 56, 1905, p. 12, 14) is closely related to *Limonioides*, Esch. According to its author, it is distinguished from the latter by having the posterior margin of the thorax excised near the angles, which extend forward in a point beneath (*Fauna Germanica*, 1911, vol. iii, p. 224). These characters, however, do not appear very obvious, at any rate in my specimen, and at least as far as the British fauna is concerned, the two genera may be more readily separated as follows:—

1. Penultimate joints of antennae fully as broad as long; posterior angles of thorax projecting slightly outwards, with a strong keel not

parallel to the side; extreme base of thorax broader than elytra at shoulders; scutellum extremely finely and thickly punctured, very dull. (Habitat, decaying timber) ..... *Limoniscus*, Reitt.

2. Penultimate joints of antennae narrow, elongate; posterior angles of thorax not projecting outwards, not carinate, nor with a feeble keel parallel to the side; extreme base of thorax narrower than elytra at shoulders; scutellum not thickly punctured, shining. (Habitat, grassy places, etc.) ..... *Limonius*, Esch.

*L. violaceus*, Ph. W. Müller in *Germa. Mag. Ent.*, iv, 1843, p. 184 (*Elater*).

Lead-en-black, somewhat dull, fore parts with a feeble steely-blue reflection, elytra dark metallic blue, or slightly violaceous in some specimens and some lights, tarsal claws ferruginous; body clothed with thin and short silvery-greyish pubescence, which is inconspicuous above but more noticeable beneath, especially at the sides and on the abdominal segments. Antennae stout, joint 3 a little longer than 2, 4-10 broad and obtusely serrate. Head with the front finely bordered and obsoletely emarginate in the middle, together with the thorax densely and strongly punctured. Thorax longer than broad, sides slightly converging in front and subparallel behind, indistinctly channelled. Scutellum obscurely fusco-aeneous, very dull, appearing shagreened but under a high magnification seen to be very thickly and finely punctured, obsoletely carinate longitudinally. Elytra very slightly and gradually narrowed behind, somewhat depressed on disc, apex rather bluntly rounded; interstices closely punctured, but less strongly than the thorax. Length, 11 mm.

The colour, combined with the general shape and puncturation, etc., will at once separate this from any other British Elaterid.

On 17th May, 1937, I found a single specimen of this interesting addition to our indigenous Coleoptera in Windsor Forest, in an old decaying beech trunk, at some depth below the surface of the wood. No other examples of the beetle could be found, either in this tree or in the several beech trunks in a similar condition near by. In June another thorough search was made by Mr Donisthorpe and myself, without success, except that Mr Donisthorpe obtained a larva, which seems likely to belong to this species, and from which, we hope, the perfect insect will be reared.

The few members of this genus are chiefly Asiatic, the present species alone being an undoubted native<sup>s</sup> of Europe. On the Continent *L. violaceus* appears to be very rare; it is found in parts of France, Germany, Italy, and perhaps more especially Austria. The four specimens in the National Collection of Coleoptera at the British Museum are all from the latter country.—63 Blackheath Park, London, S.E.3, 29th June, 1937.

---

#### SCIENTIFIC NOTES.

INFLUENCE OF REFLECTED RADIATION.—This summer we have resided at Bolognola, on the Sibyllini Mountains, with our granddaughter, Lycaena Romei, who for several years has helped us to collect. We often spoke about radiation, trying to increase our knowledge. We

noted that, when the sun was shining, we could remain a long time and without shelter either near a stream, or in a verdant meadow, or close by a wood; on the other hand, we could endure only a short time our stay in a stony and dry environment, although both temperature and radiation were the same. Then my granddaughter put into two equal boxes many larvae of *Pieris brassicae*. One of the boxes was set upon a moist plot of weeds, the other on the bare soil. Both exposed in direct sunshine. The thermometer marked about 110° F., and, after two hours, the larvae on the weeds were not injured, but the others on the bare soil had died.

These simple experiments, carried out for a few days, prove that the solar radiations are beneficial to life until the rays are absorbed by dampness and vegetation of the ground; on the other hand, if they are reflected by a barren environment, they become harmful. The dry soil acts like a condenser.—O. QUERCI.

---

### NOTES ON COLLECTING, &c.

COLEOPTERA, ETC., AT HESTON.—I have never actually collected at Heston, and the few species mentioned below have been either taken, or seen, in the house and garden, or when out for walks.

A few insects which have occurred in the house are:—The House Cricket (*Gryllus domesticus*, L.), when we first came here, which seemed rather curious for a quite new house. *Bembidium articulatum*, Pz., in bath. *Cryptophagus acutangulus*, Gyll., has put in an appearance at intervals for over two years, always in the bath; some specimens having a much reduced tooth to the anterior angles of the thorax. *C. punctipennis*, Bris., in cupboard in kitchen. *Throscus elateroides*, Heer, in the bath; this is probably a new record for Middlesex. I have taken it very sparingly in Windsor Forest and not uncommonly at Mr B. S. Williams' locality in Herts. There are not many other localities known.

*Anobium domesticum*, Fourc., occasionally on windows, etc. *Bembidium lampros*, Hbst., in the churchyard. *Carabus monilis*, F. Dear Miss Kirk used to take this species in gardens in this area; some of the specimens being of a distinct green colour. *Amara plebia*, Gyll.; *A. trivialis*, Gyll.; *Harpalus ruficornis*, F.; *Pterostichus madidus*, F.; *Ocypus ater*, Gr. (more frequently found on the coast); *O. siculus*, Stierl. (the first specimen I have ever taken); *Lucanus cervus*, L.; *Agriotes obscurus*, L. (very small specimens); and *Nacерdes melanura*, L., have occurred on paths and pavements. The last is also much more common on the coast. I have found it in sea-breakers in numbers at West Worthing, etc. Inland I have taken it at Penge, in London, and in Windsor Park and town.

In the *Ent. Mo. Mag.* for 1935 and 1936 a number of extra records are given for this beetle, and in the latter year there is a note by Mr Laing on the destructive habits of the insect.

*Aphodius granarius*, L., on the wing and once in the house, and *Atheta longicornis*, Gr., on grass in the garden. *Cis vestitus*, Mell., one under bark of a post; and *C. boleti*, Scop., *C. villosulus*, Marsh., and *C. micans*, Hbst., were common in fungus on posts.—HORACE DONISTHORPE.

A SMALL CAPTIVE STRONGYLOGNATHUS-TETRAMORIUM COLONY.—I described\* a new *Strongylognathus* species taken by Captain Diver at Studland, Dorset, in 1935 in a nest of *Tetramorium caespitum*. On 23rd May, 1936, I joined Captain Diver with the intention of taking inhabitants from this colony (or others if found) to keep alive under observation. It was also hoped to find a female of the new species. This was not done, though the nest was carefully dug up—some larvae and pupae were taken, and the *Strongylognathus* ♂♂ were found only to be present in the proportion of 1-2% to the *Tetramorium* ♂♂. A certain number of the latter with 6 *Strongylognathus* ♂♂ were established in a plaster observation nest, and were kept under observation for a good many months. The pupae proved to be all *Tetramorium* ♂♂. The *Strongylognathus* ♂♂ moved about freely amongst their hosts, no notice, however, being taken of them. Most of the larvae disappeared, but a few pupated and proved to be *Strongylognathus* ♂♂. These were unfortunately killed and cut up before I could get at them. As there were no more larvae and no ♀ present, the *Strongylognathus* ♂♂ were killed and set for the cabinet, and the *Tetramorium* ♂♂ let loose in the garden.—HORACE DONISTHORPE.

METHYLATED SPIRIT AS A RELAXING AGENT.—Some years ago I published a short note (*Entomologist*, lxii, p. 284) on the use of methylated spirit as a relaxing agent and I mentioned it more briefly in a recent note on the Preservation of Heterocera in India (*Journ. Bomb. N.H. Soc.*, xxxviii, p. 634).

I have since found that it is not necessary to bring the insects into actual contact with the spirit and that the action is very quick if the specimens are exposed to the vapour from a mixture of spirit and water. It is not difficult to devise some sort of stage on which papered specimens can be placed, whilst pinned insects can be simply pinned to the top of the relaxing tin above the liquid.

This method avoids any matting of the hair on the thorax and abdomen, whilst it is almost as rapid, both in the actual relaxing and drying off, as my old method of damping the specimens with the spirit. Forty-eight hours is more than sufficient to relax even large insects and they will dry in about the same time.—D. G. SEVASTOPULO (F.R.E.S.), London, 3.viii.37.

A PRESERVATIVE FLUID FOR METALLIC PUPAE.—About a year ago, I made the accidental discovery that a saturated solution of bichloride of mercury (corrosive sublimate) in water, to which is added an equal volume of 95% alcohol, would preserve the brilliant golden pupae of the Danaid *Euploea core*, Cr., in their full beauty. I have pupae that have been preserved in this fluid for over a year and they are almost as bright as the day they were killed. I have never before been able to preserve the gold colour for even a few days.

The only other species that I have tried in this fluid is *Danaus limniace*, Cr., f. *mutina*, Fruhs., a very beautiful green pupa with large golden spots. This has not been a success, as the green pigment is soluble in alcohol, but the gold colour of the spots has been preserved.

It seems probable, therefore, that this solution will prove successful

\**Ent. Mo. Mag.*, lxxvii, 111-16. T. figs. 1-7 (1936).

with all metallic pupae except those that have green or any other alcohol soluble pigment. The English species that seems most suited for a trial is the brilliant golden pupa of *Aglais urticae*, L.—ID.

**EMIGRANT BUTTERFLIES.**—It would be interesting to know if observers in England notice any difference in the numbers of *Vanessa (Pyrameis) cardui* in 1936 and 1937. Last winter was exceptionally mild, but this winter has been unusually severe in Iraq, and, I hear, in Egypt also. Perhaps this will diminish the stock that usually survives the winter in these regions, and thus diminish the number of larvae this coming spring; this would lessen the northward urge commonly attributed to successive broods finding, on hatching, their breeding-grounds crowded with the offspring of the first butterflies which oviposit in February and March. Was this species noted commonly in 1936 in England? In the plain of Iraq, I may add, the chief foodplant is *Malva parviflora*, L., on which the larva may be found in large numbers in March; it withers in April.—C. P. WILTSHIRE, Iraq. P.S.—From the English viewpoint, "Emigrant" ought to be "immigrant," I suppose. But I write from mine.

**EUCHELIA JACOBÆAE AND RAGWORT.**—Three years ago ragwort appeared in a large park in this district. Last year the plant had increased greatly, and this year ragwort has spread a yellow carpet over some hundreds of acres. *E. jacobæae*, the chief natural "control" of this weed, has been seen sporadically in the district for some years, but usually only single specimens, and, so far as I know, it has not been seen previously in the park in question.

This year the moth has appeared in profusion. Its larvae are smothering the ragwort at the east end of the park and are to be seen, in lessening numbers, for about a mile to the west. The plants are stripped bare of both leaves and flowers, and larvae are wandering to various low-growing plants some yards from the natural foodplant.

Whence have these moths come? None of the local entomologists has liberated ova or larvae, and indeed the profusion of the insect is too great to be accounted for by any artificial introduction. Like *Callimorpha dominula* the males of this species often fly in the daytime; the females begin to fly only at late dusk, and ovipositing is performed at night. Are there any records of mass movements of *E. jacobæae* by night? It would seem that a considerable swarm of female moths has come to the park from somewhere. Presumably when this insect has cleared off all the ragwort in a district the emerging moths migrate—if not to "fresh woods" at least to "pastures new." But I should like to know if there are any records of these mass movements. I use the term purposely because I have found twelve full-fed larvae on a single-stemmed plant; and since with most moths in the wild state only about one per cent. of ova laid results in an imago, and a female *E. jacobæae* does not lay 1200 eggs on a single plant, it would seem that this one plant had been visited by several females. Trade follows the flag; does *E. jacobæae* follow the ragwort?—P. B. M. ALLAN, Bishop's Stortford.

[*Euchelia*, Bdv. (1829), is the generic name of years. *Hypocrita*, Hb. (1806), is a *Tentamen* name and has been much used. And *Tyria*, Hb. (1822), is the more recent old name now advocated.—HY. J. T.]

**PARTHENOGENESIS IN CALLIMORPHA DOMINULA.**—On 11th July a deformed female of this species emerged in one of my cages. On 13th July, there being no male to mate with her, she began, at late dusk, to scatter ova about the floor of the cage, as is the habit of this moth. She continued ovipositing on the 14th, and on the morning of the 15th I removed about 140 ova from the cage and put them in a glass-topped cardboard box.

On the afternoon of 15th July a male *C. dominula* emerged in the same cage, and on the following morning he paired with the deformed female. They were *in cōp.* for 25 hours. When they separated I put the deformed female in a chip box, and that night (17th July) she laid three eggs, and on 18th July four. Thereafter she laid no more ova and died in the night of 22nd/23rd July.

The unfertilised ova in the glass-topped box changed colour in the afternoon of 22nd July, and at 10.30 p.m. on 23rd July larvae began to emerge. They continued to emerge from the 24th to the 28th. Fifteen ova were added.

The seven ova laid after impregnation were added.—**Id.**

**PERIPLANETA ORIENTALIS, L., IN THE OPEN.**—On 7th August I was busily engaged putting out a fire that had broken out in a prone dead elm in my garden. Numbers of interesting creatures were driven out by the heat and smoke, such as a handsome grass snake, lots of *Isopoda* and a *Lithobius*. But what astonished me was an adult female cockroach. I caught her, but a smaller one escaped.

The occurrence of this cockroach in the open in England is surprising, and has never before occurred to my knowledge except in municipal rubbish heaps, where the fermentation maintains a high temperature, so that they are often swarming with cockroaches and crickets.

The elm was about 50 yards from my house, but there are certainly none with me. The only other house in the neighbourhood is separated by a spacious garden and a large meadow.—**MALCOLM BURR**, "The Hermitage," Dorney, Windsor.

**OBSERVATIONS ON THE FEEDING OF MECONEMA THALASSINUM, De Geer.**—**W. J. Lucas** in his *British Orthoptera*, London, 1920, on p. 192, mentions that *Meconema thalassinum* is sometimes carnivorous, and with reference to this the following observations may be of interest:—

I obtained six nymphs of this Tettigoniid by sweeping young elm trees at Brentwood, Essex, on 16th July 1937, and took them all home in a box together. They were all probably in the last nymphal instar, and one, a male, had a damaged leg. Two had disappeared by the evening, presumably eaten by the rest, and the antennae of most of them were much shorter than when they were first caught. There were no pieces lying about so I came to the conclusion that they had nibbled each other's antennae.

Having no fresh elm leaves, I gave them some lettuce leaves, which they ate readily. They would not eat rose or apple leaves. They also liked drinking the blood of a crushed *Pieris rapae*, and would nibble the muscles. Tarsal joints disappeared from time to time, probably through nibbling, and after a few days one became quite incapable of climbing twigs I had put in and died of exhaustion.



There were now only one female and two male nymphs left, one of the males being the one with the damaged hind leg, which it had cast. For several days they rested under the elm leaves and showed no inclination to move or eat.

On the 29th July the males ecdysed. The next morning the female nymph was found half eaten on the floor of the cage. She had appeared to be quite healthy on the previous evening, so presumably the males had killed and eaten her though, unfortunately, I never actually witnessed the cannibalism. As I was going away for a holiday I was unable to watch the imagines any further.—PAUL FREEMAN, Imperial College of Science and Technology, South Kensington, August 1937.

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### CURRENT NOTES.

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We have received the following notice concerning the Seventh International Congress for Entomology which will convene in Berlin, from August 15th to 20th, 1938. Discussions will be held in the following sections and on the subjects indicated below:—

#### A. *General Entomology*:

(1) Systematism and Zoogeography. (2) Nomenclature and Bibliography. (3) Morphology, Physiology, Embryology and Genetics. (4) Oecology.

#### B. *Applied Entomology*:

(1) Medical and Veterinary-medical Entomology. (2) Agriculture and Sericulture. (3) Forest Entomology. (4) Agricultural Entomology ((a) Viticulture and Pomiculture. (b) Agriculture and Olericulture. (c) Vermin. (d) Means and Methods for Fighting Vermin).

All entries for participation, and all inquiries, should be addressed to the Secretary General, Professor Dr Hering, Invalidenstrasse 43, Berlin, N.4.

Dr Hering is well known as the apostle of the study of leaf-miners.

Part 5 of Dr Martin Hering's *Die Blatt-minen* has recently been issued and contains the remainder of the ordinary text dealing with the mines to be found on *Rubus* to *Zinnia*. It consists of 112 pp. and includes the mines of over 500 species, of which 143 are illustrated. These last are well chosen, for instance, the contrast between the cases of *Coleophora badiipenella* and those of *C. limosipenella* is given. There is one plate, vii, illustrating various mines found in oak leaves. There are 53 mines found in *Salix*, 21 in *Stachys*, 20 in *Ulmus*, and so forth. The wealth of information condensed in the analytical tables is most remarkable. There now remain only the various indexes, references and addenda for the next part, the concluding one. We urge those who wish to obtain this valuable work to do so at once, as after publication the price will be nearly double.

The third and last part of Dr Walther Horn's work on the History of Entomology, *Die entomologische Sammlungen, Entomologen & Entomo-Museologie*, containing a list of all past and present entomologists, dates of birth and decease, scope and present destination of

their collections, has just come to hand. This compilation must have taken many years of constant work to produce such a wonderful result. The whole work is illustrated by a series of 38 plates on which are reproduced copies of a sample of the labels attached to the insects in a very large number of cases. Truly Dr Horn's work is encyclopaedic.

Herr G. Warnecke, of Kiel, has sent us separates of his recent articles. One in particular on the Macrolepidoptera of South-west Arabia, with a plate of new species and forms, is a most useful pamphlet. It records the results of the expedition of Dr v. Vissmanns to the area in 1931. Another article discusses the Lusitanic-Atlantic element in the Lepidopterous Fauna of the German coast of the North Sea.

The first 3 parts of the 1937 volume of *Iris* have been published. The first 100 pages contain an annotated List of the Macrolepidoptera of Aachens, by the late Herr Püngeler. There are several diagrams explaining the physical conditions of the area comprised; a map of the district, elevations, areas of late and early frosts, the Geological formation. Herr Osthelder contributes notes on the Microlepidoptera of Hungary. There are also a contribution on the *Arctiidae* of Shanghai and a note on the Microlepidoptera of the Mediterranean seaboard.

Another section of the comprehensive Catalogues of Insects, which Herr Dr Wm. Junk, of the Hague, is publishing, is now in hand. We have received Pt. 3 of the *Hymenopterorum Catalogus*, which appears quite as full of references as are the now famous *Lepidopterorum Catalogus* and *Coleopterorum Catalogus*. These Catalogues are so divided into groups, families, etc., that a specialist can obtain only the portion he wants. Dr Hedicke, of the Berlin Museum, is the editor. Pt. 3 dealt with *Pamphiliidae*.

We regret to announce the decease of Lord Rothschild of Tring. A memoir will appear later.

URGENT.—We must ask our contributors to send in all manuscript not later than the 20th of the month, at least.

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## SOCIETIES.

The 3rd Annual Congress of the Society for British Entomology was held at Reading from July 9th-12th, under the presidency of Dr B. M. Hobby, M.A., D.Phil., F.R.E.S., and was quite a successful meeting. Owing to the clash of other gatherings the numbers present were less than last year. An admirable programme was arranged, and the various meetings were held in the spacious and well-equipped new University Buildings. The Saturday events were, in the morning, An Address of Welcome from Prof. W. B. Brierly; the Presidential Address by Dr Hobby, "Predacious Insects and their Prey," an admirable summary of the results of the President's recent investigations; from Mr J. A. Downes, F.R.E.S., "A Study of the Insect Fauna of the Dock," an account of a very intensive investigation of the relation between a plant and its insect dependents. The usual photographic record of those present was taken and the members adjourned to Wantage Hall for lunch.

The afternoon events were an Address by Mr R. B. Benson, of the British Museum, "The Present State of our Knowledge of the British Sawflies," succeeded by a paper, "The Lepidoptera of the Reading District," by Mr C. Runge, the Vice-President of the Reading Natural History Society. Tea was then taken in the Buttery of the University and a visit was made to the University Zoological Museum, and the inspection of the exhibits brought by members of the Congress. In the evening the *Conversazione* and Dinner took place in Wantage Hall. The following day was spent in a Field Meeting at Silchester and a walk in Pamber Forest, and was quite enjoyable until the rain fell in the afternoon. On 12th July Mr W. E. H. Hodgson gave a paper, "The Narcissus Pests"; Dr Malcolm Burr, F.R.E.S., read "Notes on the Distribution of the British Orthoptera"; Prof. F. Balfour-Browne, F.R.E.S., described "The Sculpture of the Wing Cases of some Water-beetles"; Mrs K. J. Grant, F.R.E.S., a paper, "Recent Migrations of *Plusia gamma* in Great Britain." This was, so far as we experienced and report tells us, another very successful meeting, no doubt due in large measure to the enthusiastic organization work of the Hon. Secretary, Mr E. Rivenhall Goffe. May we make a suggestion for future Congresses, and that is to arrange a Public Lecture by some well-known Naturalist as a piece of missionary work on behalf both of the Society itself and of the Society under whose auspices the gathering takes place.

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### REVIEWS.

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**INSECTS OF THE BRITISH WOODLANDS**, by R. Neil Chrystal, M.A., D.Sc.—In his preface the author refers to this book as "an elementary treatise on the insect life of the British Woodlands, for use in training schools of the Forestry Commission," but it deserves a much wider circulation, and should find a place in the libraries of all Natural History Societies, as well as being a most suitable gift book for a young entomologist. More advanced students, who would like to refresh their knowledge of Orders other than their own speciality, will find in this work a *précis*, as it were, of the larger and more expensive works on General Entomology. It reads easily, as the author has the gift of being able to compress a great deal of information into clear and concise paragraphs. Technical and detailed descriptions are avoided in the body of the book, but in two appendices brief scientific descriptions of some of the more important Forest Species are given, and a Table gives page-references, host-trees, and names, of some 150 species arranged by Orders under the biological headings of "Bark-feeders," "Leaf-rollers," etc. There is an introductory chapter dealing with classification and morphology, then six chapters on the different Orders treating the various Forest species from the biological and economic, as well as from the taxonomic, aspect, a method which makes this work fuller and more interesting than the average text-book. Finally, an admirable chapter on origins of insect attacks on woodlands, natural and artificial controls, and collecting methods. There are 33 plates containing 205 illustrations, both photographs and drawings, a bibliography and index, and, not least amongst its good points, the book is published by Messrs F. Warne & Co. at the very moderate price of 7/6.—H.W.A.

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*busta*, *Gilvago*, *Fulvago* v. *flavescens*, *Liturata* v. *nigrofulvata*. Harold B.  
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ton, Scarborough.

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many rare species from Syria and Morocco.

*Desiderata*.—Rare British and European Macro-lepidoptera, especially *Zygae-*  
*nidae*, *Arctiidae*, *Agrotidae*.—R. E. Ellison, Moccas Rectory, Hereford.

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*Sanio*, *Rubi*, *Trifolii*, *Potatoria*, etc., during the year.

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3 vols., Lond., 1892-94, w. map, views and 43 colour pl.—Dr Max Cretschmar,  
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*Duplicates*.—Larvae of *N. lapponaria*.—Dr Edward Smith, "Highroyds," Men-  
ston, near Leeds.

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## MEETINGS OF SOCIETIES.

THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON.—41 Queen's Gate,  
South Kensington, S.W.7, 8 p.m.—October 6th, 20th.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY  
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in the month, at 7 p.m. September 23rd, October 14th, 28th.—Hon. Secretary,  
S. N. A. Jacobs, "Ditchling," Hayes Lane, Bromley, Kent.

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**SOME NOTES ON ASSEMBLING MOTHS.**

By P. B. M. ALLAN, M.A., F.S.A.

## Part III.

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*(Continued from page 98.)*

Very little is known about the chemistry of the scents secreted by moths, and in this connection much work is still to be done on the chemistry of the plants which nourish their larvae. The well-being of a lepidopterous larva depends upon the chemical properties of its food-plant, and the chemical substances found in a plant may be the products either of metabolism or katabolism. And since certain external characteristics of a plant are transmitted by the genes of its parents, it is possible that future research may show that the chemical characteristics of that plant are evolved by a katabolic process coincident with the breaking up of the chromosomes.

The female moth on its errand of ovipositing is attracted to a food-plant by the odour of that foodplant. It has been asserted that the scent of the plant acts as a stimulus to the moth's central nervous system, evoking the reflex actions concerned with ovipositing. A proof of this would seem to lie in the well-known fact that a female moth disturbed during the act of ovipositing will sometimes continue to lay her eggs on the first object upon which she settles, be it the post of a verandah, a tennis net, or even a garden roller. The reflex action of emitting ova, it is suggested, continues until the stimulus has passed or the action is complete.

For my part I doubt this stimulus of scent. I regard ovipositing as a tropism, not as a reflex action. It is an abstract response to a stimulus that may come from within no less than from without—an "instinctive" action by the whole animal, not merely by a part of it. And in my opinion the stimulus is a chemical one and comes from within. It arises from maturation of the ova. Just as in nest-building by birds (a tropism), the stimulus is provided by the genital organs themselves. The "urge" to oviposit in larva-cage or pill-box is not usually initiated by the scent of a foodplant. But that it is the odour of a foodplant which attracts an egg-laying moth to it there can be no doubt at all. This has been shown by several observers.

The larvae resulting from ova laid on a foodplant are provided by the plant, by means of one of its chemical constituents, with a protective colouring which ensures them a considerable degree of immunity from their enemies. Thus the plant doubly ensures the destruction of its own leaves: it attracts the imago and it protects the larvae. Presumably the price paid in damage to its foliage is worth while when set against the advantages of cross-fertilisation to the race. At all events, the balance is maintained. There appears to be little or no correlation between the two; that is to say, the imaginal form of the insect whose larva feeds on a particular plant is seldom the one which fertilises the flowers of that plant. The foods in the two cycles of the insect are different: the imago needs and is attracted to the flowers by honey, and it is this cycle only of the lepidopteron in which the plant is interested, so to speak. The other aspect is harmful to the plant but unavoidable and part of Nature's plan.



With regard to polyphagy, there would seem to be three ways in which we can account for it:—

(a) In the case of *Argynnis paphia*, Linn. (which will eat *Viola canina*, *V. odorata*, *V. tricolor*, and garden pansy), and other lepidoptera which are polyphagous within a definite Family of plants, one would suppose that insect and plant were evolved side by side. Lepidoptera for the most part are dependent on flowering plants and did not evolve until these were to be found. It is possible that "in the beginning" the only species of *Viola* in existence was *V. canina*. The *Violaceae* are a primitive Natural Order, and *V. canina* is an old type, as witness its dependence on cleistogamous flowers for seed production: it has only recently begun to develop the habit of cross-fertilisation. The Natural Order is pollinated by the aid of bees. It may be, therefore, that *Argynnis paphia* and *Viola canina* evolved side by side, and that now, though other species of *Viola* will serve equally well as foodplants for the larvae, the imago, being controlled by blind instinct, is unaware of this fact, though the larvae are not, and so still will only (normally) oviposit on *V. canina*.

(b) In the case of those insects, such as *Triphaena fimbria*, Linn., whose larvae eat, for example, sallow in early spring and low-growing herbaceous plants at a later stage of their growth, these may be stages in the evolution of a polyphagous type as a survival factor. The essential food body needed for the full development of the insect (pigmentation of the imago, for instance) is only to be found in plants which appear later in the spring; so the larva, awakened from hibernation by the temperature factor, has to start on some other plant and wait till the "normal" food appears. When the converse is the case (*i.e.* feeding on low-growing plants first and finishing on shrubs), the reason probably is that under natural conditions the original "normal" food tends to become smothered by over-growing vegetation. Thus are produced changed conditions of light, moisture, heat, etc., inimical to the larval development, before the larva is full grown.

One must never lose sight of the enormous age of insects. The formation of continents and oceans are novelties compared with the age of our Lepidoptera. The earth's changes have forced them to "adapt and adopt."

(c) In the case of those Lepidoptera which are widely polyphagous, these may or may not be high in evolutionary development. Species such as *Callimorpha dominula*, Linn. (which Meyrick regards as the most ancestral form of the *Arctiidae*) are polyphagous probably because, since the female imago scatters her ova on the herbage, the larvae must, within limits, eat the plant upon which, or at least close to which, the ova fall. On the other hand the female imagos of certain species have "learnt" by evolutionary processes that many plants will suffice for their larvae's nourishment. They have adopted a good survival factor as compared with those in Class (a). For the insects in Class (a) run the risk of extinction should anything happen to their one and only foodplant (e.g. *Calymnia diffinis*, Linn., and elm disease). I do not put it more strongly than "run the risk" because of the adaptability which Instinct so often displays.

In an article on the pigments of butterflies' wings, published in *The Biochemical Journal* in 1926, D. L. Thompson showed that flavone

is present in the wings of *Satyrus galathea*, Linn., and that flavone occurs in its larva's foodplant. Flavone is a carotenoid—a group of pigments which are intimately associated with chlorophyll—and it is the “parent” of a group of pigments (anthoxanthins) which occur largely in plants and in lepidopterous larvae. For example, *chrysin* (dihydroxyflavone) is found in the buds of poplar; *luteolin* (tetrahydroxyflavone) in mignonette; *quercetin* (pentahydroxyflavone) in the flowers of horse-chestnut. It is likely that these anthoxanthins could be shown to be present in larvae which feed on poplar, mignonette and horse-chestnut. There is no reason to suppose that this is not the case.

Therefore there are two qualities in every plant nourishing a lepidopteron which are essential to that lepidopteron: a pigment-forming body and an aromatic body. And it is possible that both these bodies are the products of katabolism of a common body. For acetic acid and acetaldehyde—hydrocarbon groups found in all botanical perfumes—are oxydation products of carotene.

Incidentally I would remark here that  $\beta$ -carotene exhibits the same physiological activity as Vitamin A, and it has been proved that carotene yields Vitamin A in the animal body. If you watch *Hyloicus pinastri*, Hb. emerging you will notice that the “horn” on the 8th abdominal segment remains semi-transparent until the larva has eaten a part of its eggshell, when the “horn” begins to turn black. If the larva is deprived of its eggshell the “horn” remains greenish-brown for some time and the young larva does not “do so well” nor grow so quickly. It would seem, therefore, that this colour change in the “horn” is due to an active body contained in the eggshell, and it is possible that this active body is  $\beta$ -carotenè. The black pigmentation of the “horn” is interesting (cf. the black rings on the larva of the Cinnabar Moth); but that is outside the scope of this paper.

It would appear, then, that the chemical constituents of the scent secreted by the female moth are derived from the plant upon which its larva fed. This, of course, is what we should expect. But the task of the chemist who sets out to isolate these scents is a big one: there are many thousands of species of moths on this Earth, and each species has its own particular scent. A female can attract males of her own species only.

Moreover, a great many perfumes are isomeric, that is to say they are composed of the same elements in the same proportions and having the same molecular weight, but with the molecules differently grouped. Thus *zingiberine*,  $C_{15}H_{24}$ , which is the main component of ginger oil, smells quite different from *bisabolene* (in oil of bergamot) and *selinene* (in celery), both of which also contain fifteen molecules of carbon and twenty-four of hydrogen. In another chemical group (the cycloparaffins) those substances containing 12 carbon atoms to the molecule smell of camphor; those with 13, of cedar; those with 14, of musk; with 16, of civet; and so on. So a different grouping of the molecules, as well as the addition of one carbon atom, can alter a scent so radically that even our imperfect olfactory organs can readily discern it.

The scents secreted by moths are infinitely more diffusible than any which can be smelt by man. Our noses can appreciate three one-hundred-millionth parts of one grain of musk; but I have not yet obtained the

faintest whiff when my nose has been within an inch of a vigorously calling female lappet. Perhaps other entomologists endowed with a keener sense of smell have been more fortunate. The scents emitted by certain butterflies are readily perceptible by the human nose (Dr G. B. Longstaff has much to say about this in his book, *Butterfly-Hunting in Many Lands*); but I am inclined to believe that these particular scents are repugnatorial. It would seem to be impossible to obtain a sufficient quantity of one of these moth scents for analysis, since their instability is such that death may bring about a change in the arrangement of their molecules.

Certain insects are attracted by scents which the females of their species do not, so far as we can tell, secrete. In some cases the odour is associated with the insect's food; in others, with its customary site for ovipositing. In others, again, we can assign no reason for the attraction. J. Dewitz showed that "it is the scent of the nectaries of the vine flowers that attracts the vine moths and induces them to oviposit on the unopened buds." (Imms.). But no one has yet suggested why the odour of boiling cocoa should attract *Hepialus fusconebulosa* (*velleda*, Hb.). The attraction which a decomposing animal has for *Apatura iris*, Linn., is known to all entomologists; but the significance of the butterfly's response to this smell is not yet understood. Experiments, in this instance, with decomposition products, e.g. *putrescine* (tetramethylene diamine) or *cadaverine* (pentamethylene diamine), would be interesting; but unfortunately on account of their instability it is a matter of the greatest difficulty to separate these complex substances in a condition even approaching purity. Being non-volatile and non-crystalline, the ordinary methods of purification cannot be applied to them.

The experiments of F. M. Howlett (a brilliant Cambridge biologist who died young) with fruit flies were spectacular. On one occasion he arrived at a big lecture hall with a gauze cage full of blue, green and red Trypaneids. As soon as everyone was seated he opened the cage and let the flies loose. They flew all over the hall. Presently he said: "I will show you how I get my flies back," and proceeded to place three saucers on the table, into one of which he poured a few drops of isoeugenol, into another methyl-eugenol, and into the third a mixture of each. As he went on with his lecture the audience noticed that the flies (they were *Dacus diversus*, *D. zonatus* and *D. ferrugineus*) were coming to the lecturer's table from all parts of the hall, and that each species was settling on a particular saucer, the blue at one, the green at another, the red at the third. By the end of the lecture the flies had all collected on the saucers, and the lecturer was able not only to cage them again but to report that all had been recaptured.

All these flies were males: the females are not attracted by these substances. Neither food nor oviposition is therefore concerned. Unfortunately Howlett does not appear to have carried his experiments further by treating a female *Dacus* with these allyl-derivatives of benzene and observing the reactions of a male insect placed with her in an observation cage. Perhaps some of my readers will undertake this.

I am indebted to my friend, Mr R. D. Anstead, M.A., C.I.E., for some suggestions, for the account of Howlett's lecture, and for much stimulating talk on the subject of this part of my paper.

**AN ENTOMOLOGICAL DICTATORSHIP.**

By (REV.) GEORGE WHEELER, M.A., F.R.E.S.

The well-timed complaint of Brigadier-General Cooke in the July number of the *Entomologist* with regard to the recent flood of changes in entomological nomenclature has aroused me to look carefully into the matter and to write further in the same strain.

Common sense would surely consider that the chief reason for anything having a name at all is that other people may know what one is talking about, and the principal result of all these changes is that nobody any longer does know in the case of many insects. The absurdity of any rule which enables a name well-known as that of one insect to be transferred to another, *for whatever reason*, is so obvious as to need no comment; such cases for example as *camilla-sibylla* and *pheretes-orbitulus* can do nothing but create chaos. Changes between names all of which have always referred to the same insect, as for instance *medon*, *agestis* and *astrarche*, are tiresome but not confusing, whereas these cross-references which can serve no useful purpose should always be absolutely forbidden.

But I want to go much deeper than this. *Why* are we to accept these changes? In any case, where a change is made the full reasons for the change should be clearly set out, so that the matter can be fairly argued out. This was always done, for example, in Tutt's great work, which the Committee seems to ignore, but now it appears that we are expected to accept all this on the *ipse dixit* of a committee which has evidently adopted the dictatorial methods now so fashionable elsewhere. Unless, or until, such complete reasons are published in every instance, it is futile to expect these changes to be accepted—outside the pages of the *Entomologist*, which seems to have swallowed them wholesale (*v.* page 164), with accompanying indigestion on the part of its readers.

It is true that a book was published some few years ago by the British Museum authorities giving reasons for the changes in generic names, but this takes in no names later than 1865, and takes no account of the far more important specific names at all, and these are apparently arbitrarily changed in the list published by the Royal Ent. Soc., no reason (so far as I can make out) having ever been published. Moreover, the British Museum never seems to advertise its publications, so how is anyone expected to know of their existence?

Furthermore, I am quite sure that some of the deductions from the facts given in the published book are definitely wrong, and many more are strongly suspect.

I should like here to draw attention to Mr Turner's weighty comments in Vol. xlvii of this magazine, especially those on pp. 36, 46, 92, and 108, but the whole series deserves the closest attention. At the moment I wish particularly to mention the use of *Lycaena* for the "coppers." The whole question was argued out in Tutt's great work on the British butterflies, Vol. i, p. 303, etc., and again in Vol. xiv, p. 302. The "argument" by which the List comes to the conclusion that Oken did not restrict the name to the "blues" in 1815 is perfectly unintelligible, and the correct use of *Lycaena* would involve other alterations in the list.

Then, again, why are we to accept on the *ipse dixit* of the Committee the suppression of generic names which are generally accepted? For instance, the "lumping" together of *Dryas*, *Argynnis* and *Brenthis*. There is no doubt much to be said for the amalgamation of the first two, but the reasons should have been stated. Again, only complete ignorance of the early stages of some of the "hairstreaks" could excuse the extended use of a single generic name. Again, *Why?* I do hope that all entomologists who feel as I do in this matter will combine in asking for the precise reason for all changes made, and will refuse to be put off by mere references to a code of regulations. I may add that in the first British Committee on Nomenclature (1912), of which I was a member, there was a strong inclination to ignore the rules of the Zoologists altogether, as being unsuitable in the case of Entomology. Indeed, so strong was the consensus of opinion in the International Congress in 1912 that I was quite under the impression that the rules of the Zoological Congress had been definitely discarded for Entomology. It would certainly be the best solution of the present muddle, especially in view of present interpretations of some of the rules, *e.g.*, those relating to what are and what are not to be considered synonyms, which appear to have been constructed with a view to producing as much confusion as possible.

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### EARLY STAGES OF INDIAN LEPIDOPTERA.

By D. G. SEVASTOPULO, F.R.E.S.

(Continued from p. 81.)

*Polytela gloriosae*, F. (*Noctuidae*).

Head brown. Legs brown with black tarsi. Prolegs orange. Ground colour purplish black. 1st somite with an orange dorsal blotch edged anteriorly with six black and posteriorly with two white spots. 2nd and 3rd somites each with an ovate orange subdorsal blotch containing a black dot and with a white spot on the outer edge. 1st to 12th somites with a white dorsal spot on the posterior edge of each somite, the 6th to 12th somites with a smaller white spot on the anterior edge as well. 4th to 9th somites each with two subdorsal white spots. 10th to 12th somites each with an orange subdorsal blotch. A lateral white spot between each somite from the 1st to the 11th. 3rd to 11th somites with a sublateral white spot on the anterior portion of each somite. The dorsal and lateral spots largest.

Pupa reddish brown, subterranean.

Foodplant.—Various species of Lily, particularly *Gloriosa superba* and *Amaryllis*.

Described from a full fed larva found in Calcutta 31.vii.32, buried itself 2.viii.32, and a male emerged 14.viii.32.

Seitz gives the ground colour as "purplish brown irrorated with silvery blue" and describes the white spots as yellow. Hampson describes the larva as "smooth; purple black with dorsal, lateral and sublateral series of white spots; purplish lateral blotches on thoracic and two terminal somites; head, legs and a dorsal spot on 1st somite red."

Moore, *Lep. Ceylon*, III, pl. 145, figs. 1, 1a.

*Ophiusa coronata*, F. (*Noctuidae*).

Head brown, a yellow stripe along the median suture, a submedian yellow line and a pink stripe edged anteriorly with yellow and posteriorly with black. Body sienna brown, a double dorsal, a double subdorsal and a lateral line of somewhat paler brown. The dorsal lines touch twice on the 8th somite enclosing a dark spot. A pair of subdorsal yellow tubercles on the 11th somite. Ventral surface light brown with darker specks. Claspers externally very dark brown with a transverse yellow stripe, internally orange. A velvety black spot between the first and another anterior to the second pair of prolegs. I found one example in which the ground colour was flesh pink.

Pupa dark purple and enclosed in a slight cocoon of gummy silk spun, in captivity, between leaves.

Foodplant.—Japanese Honeysuckle.

Described from a full fed larva found in Calcutta 19.x.31, pupated 26.x.31, and a male emerged 9.xi.31.

Hampson's description appears to have been made from an immature preserved specimen. The yellow edged lateral spot on the 5th somite is only present in immature examples. The brown stripes of the head darken to black in preserved specimens. The mention of paired black tubercles on the 10th and 11th somites must be a mistake, the pair on the 11th somite is the only one present and that is yellow.

Moore, *Lep. Ceylon*, III, pl. 166, fig. 5.

(To be continued.)

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### NOTES ON COLLECTING, &c.

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OVIPOSITION OF *PERIZOMA FLAVOFASCIATA* (DECOLORATA).—At Storrington, Sussex, on 7th June 1936, at 9.40 p.m., I saw a female of *P. flavofasciata* deposit an ovum on the flower stem of red campion just below the calyx. The vegetation was difficult to work in and I only saw her actually do this once, although she appeared to do the same again.—GEO. ROBERTSON, M.D., Storrington.

EARLY DATES FROM STORRINGTON.—The first dates I have this year are *Ectropis bistortata* (*crepuscularia*), dark form, 14th February; *Erannis marginaria*, 15th February; *Taeniocampa pulverulenta* (*cruda*), 15th March.—ID.

The Rev. M. H. Huthwaite reports the occurrence of *Plusia bractea* and of *P. festucae* on valerian bloom in his garden at Whickham, Newcastle-on-Tyne. These species were reported more than thirty years ago from this area by the late J. E. Robson as being "decidedly rare" and "a scarce insect" respectively (*Cat. of Lep. of North. Durh. and Newc.*, Vol. I, p. 185). It is interesting to find that these species still occur near the famous and beautiful locality of Gibside.—HY. J. T.

CAPTURES IN SCANDINAVIA IN AUGUST 1936.—My nephew collected some butterflies for me in Norway (Tellemarken area) last August and the Rev. G. Wheeler, of Worthing, has kindly named them for me. Unfortunately, many are in poor condition. There were three examples of *Brenthis euphrosyne*, two of which so much resembled *B. selene* that

they were at first placed with the single specimen of that species. Four examples of *Erebia ligea* were of the typical form which is Scandinavian; another example is the form *dovrensis*, and is exactly like that figured in Warren's work on the genus *Erebia*. There is a pale *Heodes phlaeas*, which is the form *schmidtii*, and not *alba*, which is quite white. The "blues" are *Polyommatus icarus* and *Plebejus aegon*, but their condition is not sufficiently good to show minute peculiarities. *Brenthis arsilache* varies very little except in size. *Hipparchia semele* is probably the *pallida* form, and quite unlike the examples found in Finland. The *Urbicola comma* are quite typical; the *catena* form is generally said to be commoner in Scandinavia. *Aglais urticae*, though rather dark, are not the *polaris* form. There is one each of *Argynnis adippe* and *A. niobe*. The *Vanessa antiopa* were mostly in splendid condition and of quite the typical form.—G. ROBERTSON, M.D., Storrington.

THE END OF A CAPTIVE COLONY OF MYRMECINA GRAMINICOLA, LATR.—On 1st May 1910 I took a small colony of *Myrmecina graminicola*, Latr., consisting of a dealated female, a certain number of workers, eggs, and young larvae, situated in a hollow flint at Box Hill. These were taken home and established in a plaster observation-nest. A full account of the doings of these ants up to the end of June 1926 can be found in my book [*British Ants*, 2nd Edtn., pp. 85-88 (1927)]. From that date until 1935 the colony carried on as usual. In April 1935 the ants were brought down to Heston and in August and September many of them died. On 1st October there were only 20 (del. ♀♀, and ♂♂) present with a number of small and medium larvae. The colony never did well again. On 1st January 1936 only 13 ants were left, and a certain number of larvae; 25th March only 11; 1st April only 10, and the larvae had not grown, though the nest was well fed. 10th May—Eggs were laid and the larvae a little larger. 28th June—Only 8 ants. During the summer a number of ♂♂ emerged and died off; eggs and larvae disappeared. 16th August—Only 1 del. ♀, 5 ♂♂, and 8-10 larvae. On 3rd January 1937 only 1 del. ♀, 4 ♂♂, and a few small larvae. In March the ants attacked each other (as they did when much more numerous in 1919). The ♂♂ died or were killed off; only two were present in April, and on 7th May these were dead. The solitary remaining ♀ settled down with the 5 larvae then present. I gave her honey and dead flies and she fed the larvae. One of the larvae became of a blackish colour and the ♀ removed it. Two of the larvae were ♂♂ and 2 ♂♂. In June the ♀ laid eggs. One ♂ larva pupated on 12th June. On 18th June one of the ♂ larvae died. On 24th June, after wandering about the nest, the ♀ died, and thus ended this notable colony. It had been in my possession for just over twenty-seven years. The most remarkable feature was the production of winged females after the colony had been in my possession for over five years. These, therefore, were produced from eggs laid in captivity. Copulation took place in the nest; the young females later removing their own wings. The males sometimes endeavoured to copulate with workers, and even dead ants. As I have pointed out (*l.c.*) it is much to be regretted that I did not think of marking the original queen in some way as, after winged females had been reared for several years, and having removed their wings had joined the other ants, it was impossible to recognise her again with certainty.—HORACE DONISTHORPE.

THE VANESSIDÆ IN THE PRESENT SEASON.—I do not know if the *Vanessidæ* have been rather less abundant than usual this year? With me there have been very few of any of them. I have a *Buddleia* that has been full of bloom and have only seen 2 *Aglais urticae* and 2 *Vanessa io* on it at any time. Last year I have seen 4 species—*A. urticae*, *V. io*, *V. atalanta*, and *Polygonia c-album*—all at one time and always 2 or 3 of these species in number. As to *P. c-album* I have never seen it in Kent before 1935; in that year I caught 2 here at Ryarsh and last year I saw 4 or 5. There were two broods of *A. urticae* on the nettles growing close to the house, of which one brood disappeared after a few days; the other brood were also entirely destroyed when nearly full fed.

The other point of interest to me was the occurrence of *Catocala nupta*, of which I saw a pair on a ledge, the moths being only a few inches apart. A few days later I saw another pair also close together. Although I see *C. nupta* every year, I have never seen a pair before side by side and I was much interested to note the marked difference in their colouring.—H. S. FREMLIN, "Heavers," Ryarsh, Kent, 3.ix.37.

SOME CUCULLIA NOTES.—In the Arundel District of Sussex three species of Mullein occur—*Verbascum nigrum*, in great quantity; *V. lychnitis*, very local, but plentiful in a few spots; and *V. thapsus*, the hardest of the three to find, yet not really scarce. In the early part of the summer (late May-early July) the larvae of *Cucullia verbasci* are plentiful on all three species of mullein and occasionally occur on *Scrophularia*. Later (mid July-mid September) the larvae of *Cucullia lychnitis* occur on the same plants. No matter how much the larvae of *C. verbasci* have damaged the flowering stems, the plants send up fresh shoots in time for the *C. lychnitis* larvae. But whereas *C. verbasci* appears to have no preference for any particular species of *Verbascum*, *C. lychnitis* prefers *V. nigrum*, and is rarely found on the other *Verbascum* species or on *Scrophularia*. This is rather curious, since its name suggests *V. lychnitis* as the food, and on the Continent this is said to be the case, but in this district a single *V. nigrum* or *V. thapsus* in a group of *V. lychnitis* is the most likely plant on which to find the larvae of *C. lychnitis*. In some districts these larvae are little "stung," while in others they are very heavily "stung" indeed, principally by Diptera.—A. J. WIGHTMAN, F.R.E.S., Pulborough.

SUGAR AND LIGHT IN THE SUMMER OF 1937.—The recent summer has provided comparatively few opportunities for successful night work. For the greater part of early June, whilst I was staying in South Cornwall, the nights were cold and clear, and the prevailing wind was in the North. Sugar proved to be useless and very few insects came to light. On one such evening after putting a lamp on the lawn for an hour and a half, I was on the point of retiring when a small Geometer settled on the sheet. This appeared at first to be a small specimen of *Lampropteryx suffumata*, but on closer observation I detected something unusual in its markings. Further investigation proved it to be the newly-discovered species *L. otregiata*—and from a fresh locality. Mr Prout, of the British Museum, subsequently confirmed the identification. The only other capture of interest in this locality was a fine series of *Thecla betulae* larvae on the Sloe, which ultimately emerged in good condition.



A night spent on Wicken Fen in early August yielded a few *Arsilonche albovenosa* (second emergence) and also a second brood of *Phragmatobia fuliginosa*, together with a few of the rarer "wainscots," including *Phragmataecia castaneae*.

During a week spent in Dorset during the first week in September, I tried sugar every night, but the only insect of interest that I took in this way was *Leucania albipuncta*. I also took a specimen of *Heliothis peltigera* flying in the bright sunshine, and a female *Selidosema ericetaria* whilst dusking, on the valerian.—(CANON) T. G. EDWARD, M.A. F.Z.S.

STIGMELLA (NEPTICULA) SUBERIVORA, STAINF.—On 2nd September I bred a specimen of this moth from mined leaves of *Quercus ilex*, taken on 10th August at Freshwater, Isle of Wight. I see that May is given in Meyrick's *Revised Handbook of British Lepidoptera* as the month for the imago. It would be interesting to know if specimens of a second brood had been noted previously. Similar mined leaves were also taken at Osborne, East Cowes.—S. WAKELY, 4 Auckland Road, Upper Norwood, S.E.19, 16th September 1937.

LARVA OF MYELOIS CERATONIAE, ZELLER, FEEDING IN ORANGE.—On 20th March a Spanish orange was brought to me containing a lepidopterous larva, which was feeding in the centre of the fruit. Another orange was procured and the larva placed therein, a small hole being made for this purpose. After a few weeks it was found that the orange was covered with mildew. I was surprised to find the larva still alive and healthy inside a tubular web, and it was transferred to another orange, this proceeding being repeated three or four times. Eventually, at the beginning of June, pupation took place, and on 29th June a perfect specimen of *Myelois ceratoniae* emerged. This species is usually found in warehouses in England, the larvae feeding on freshly-imported dried dates, etc. I have seen no previous record of the larvae feeding in oranges. I understand that attempts to rear this insect from ova in Britain have always been futile; perhaps a diet of oranges instead of dried dates would enable more successful results to be obtained.—S. WAKELY, 4 Auckland Road, Upper Norwood, S.E.19, 16th September 1937.

LITHOSIA GRISEOLA.—Of thirty-six specimens of *Lithosia griseola* taken during the past July in the Weymouth, Dorset, district, nine were of the yellow var. *flava* = *stramineola*. How does this ratio vary in other parts of the British Isles? R. South (*Moths*, I, p. 182) states that this variety is found chiefly in the Norfolk fens and the New Forest; also, though less frequently, in Surrey (Weybridge), Berkshire (Reading), and still more rarely elsewhere. Perhaps other readers can give their own figures relating to the two forms of this species.—B. A. COOPER, 61 Okehampton Road, London, N.W.10.

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#### CURRENT NOTES.

---

Vol. x of the *Bull. Instit. Roy. d'Hist. Nat.* at Sophia, Bulgaria, contains a continuation of "A Study of the Horizontal Distribution

of Lepidoptera in Bulgaria," by the editor, Dr Buresch, and by Dr Tuleschow. It consists of more than 60 pp. of records of the *Geometridae*.

Dr C. R. L. Perkins, F.R.S., etc., has sent us a copy of his paper read before the Torquay Nat. Hist. Socy., entitled "Twenty-five Years Insect-Collecting in Devon," where he has resided since his return to England in 1909. It was in 1886 that he first visited Devon and although in Hawaii for a long period he spent his vacations there for the most part. Although a Hymenopterist he, nevertheless, gives a deal of information on the Lepidoptera and his remarks upon the species which arrive on our shores from across the sea will interest those interested in the so-called migration question.

We have received a copy of a new Journal, *The Microscope*, of which the secondary title is "The British Journal of Microscopy and Photomicrography." The first number consists of 28 pages with over 20 illustrations, diagramatic and half-tone. It will be issued monthly and the price is 1/- per month. Members of the Quekett Club and of the Photomicrographic Society are at the back of the issue, and it is edited by L. E. Brown, and the publishers are Messrs Arthur Barron, Ltd., of Took's Court, London. It is well got up and the matter is interesting and varied, scientific and instructive, and should prove a successful and useful periodical. But the matter should be quite correct. We are told that the article on The Common House-fly is an admirable one, but that although it depicts its subject well, is absolutely incorrect in its sub-title, *Musca domestica*, which it is not. The fly depicted, although a common house-fly, is not *Musca domestica*.

The Society for British Entomology has most enthusiastic and efficient officers, who continue to pilot their publications with persistent regularity. No sooner have we looked into one brochure and mentioned it in our pages, than another arrives. At the moment there lie before us part 2 of Vol. IV of the *Transactions*, and part 7 of Vol. I of the *Journal*. The former contains a "Study of the British Species of the Hymenopterous genus *Epeolus*," by O. W. Richards, M.A., D.Sc., illustrated by a series of about 20 figures. The latter contains in its 28 pages more than 30 separate short notes on various interesting matters.

Parts III and IV of the *Deutsche Entom. Zeitschrift* contain a long discussion on the destructive, subterranean larvae of the *Agrotidae*, illustrated by a plate and 45 text figures. A short article shows conclusively that the inclusion of four species of "blues" with *phlaeas* and *dispar* in the genus *Chrysophanus* by Meyrick in his *Revised Handbook* of 1928 is completely insupportable.

Our correspondent Captain K. J. Hayward, of the Ministry of Agriculture in the Argentine Republic, informs us that he attended the II Reunion of the Natural Sciences at Mendoza in March last, and presented several papers. Recently he has written two supplementary papers to his notes on the Argentine *Hesperiidae*, and has compiled a Bibliography of over 800 papers on the Fruit-fly question and very urgent and important matter to the fruit-growing industry in S. America. He has received the entire Hesperiid collections from the

Chilian National Museum to classify and the National Museum of Brazil has sent him the *Pyrrhopyginae* group with the rest of the *Hesperiidae* to follow.

We wish to remind our readers that the South London Entomological Society will hold its Annual Exhibition and Conversazione on October 28th at their rooms in Hibernia Chambers, adjoining the south side of London Bridge. Visitors are welcome. A form for exhibitors can be obtained from the Hon. Secretary of the Society, S. N. A. Jacobs, Esq., 54 Hayes Lane, Bromley, Kent.

A CURIOUS ASSOCIATION.—One of our Editors has sent a cutting from the "letters" columns of a Sunday paper in which the announcement of the capture of *Catocala fraxini* is associated with "Test Matches," "Hollow Larva Blades," "Records of the mention of the hirsute appendage of man, in the Bible and Shakespeare," etc.

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### SOCIETIES.

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A meeting of The Entomological Club was held at "Friary Hill," Weybridge, on 28th July 1937, Mr H. Willoughby-Ellis in the Chair. Members present in addition to the Chairman:—Mr Jas. E. Collin, Dr Harry Eltringham. Visitors present:—Dr K. G. Blair, Mr L. F. Barton, Mr C. L. Collenette, Mr H. M. Edelsten, Dr Karl Jordan, Captain N. D. Riley, Mr W. Rait-Smith, Dr Hugh Scott, Mr W. H. T. Tams.

The meeting was called for 2.30, and the guests were received by the Chairman and Mrs Willoughby Ellis. The weather was fine and very warm and the shade of the gardens was preferred in the early afternoon. Large numbers of the Tingid bug *Leptobursa rhododendri*, Horv. recently discovered in this country were observed on the rhododendrons and also one specimen of the Homopteron *Graptoccephala coccinea*, Först. was found later also on rhododendron, indicating that this insect, recently introduced to the British list, has during a short time spread from Chobham, where it originally occurred in numbers, to Weybridge, a distance of about 7 miles. Mr Edelsten exhibited a remarkable aberration of *Spilosoma lubricipeda* = *lutea*, almost spotless and with a black border around the upper wings, thickened at the apex and outer margin and extending along three quarters of the inner margin, the hind wings also had a black border. The specimen came to light at Wood Walton Fen on 12th June 1937.

During dinner Dr Blair showed an old and interesting Entomological Club invitation sent by Matthew Marshall, who became a member of the Club in 1850. It was addressed to G. R. Waterhouse and dated 19th May 1856 for the Club Meeting to be held at the Bank of England. The Chairman's Museum was open for inspection, the special exhibits being the extensive series of British *Longicorina*, *Buprestidae*, *Elateridae* and *Heteromera*, all of which have recently been re-arranged. Dinner was served at 6.45 and a long evening was spent. The members of the Club stayed the night and the visitors dispersed between the hours of ten and eleven.—H. WILLOUGHBY ELLIS (Hon. Secretary).

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*Duplicates*.—Numerous. Please send list.—B. W. Adktn, *Highfield*, *Pembury*,  
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*Desiderata*.—Exotic Lepidoptera in papers.

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*hispidaria* (southern), *E. autumnaria*, and *O. rubiginea*.

*Duplicates*.—Larvae of *N. lapponaria*.—Dr Edward Smith, "Highroyds," *Men-*  
*ston*, near *Leeds*.

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## MEETINGS OF SOCIETIES.

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THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON.—41 Queen's Gate,  
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THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY  
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**GENERIC NAMES, &c., OF THE BRITISH FORMICIDAE.**

By HORACE DONISTHORPE, F.Z.S., F.R.E.S., etc.

(Department of Entomology, British Museum (Nat. Hist.)).

We have before us "The Generic Names of British Insects. Part 5. The generic names of the British *Hymenoptera Aculeata*, with a check list of British species," published by the Royal Entomological Society of London, 14th August 1937.

The part dealing with the *Formicidae* is, of course, that which most concerns us personally, and about which we propose to offer the following remarks.

We differ from the author on various points, which are more or less a matter of opinion, and these will be dealt with in due order. There are, however, some actual errors in dates, quotations, etc., and it seems necessary to point these out, as the paper in question carries the authority of the Committee on Generic Nomenclature of the Royal Entomological Society of London.

When we were writing the first edition of *British Ants* (1915), we actually personally verified all the bibliographic references cited in that work, but there was not the evidence on the dates of publication of some works dealing with Hymenoptera, etc., which has since been brought forward—mostly due to the painstaking researches of F. J. Griffin.

For example, under *Ponera* (pp. 99 and 123 in the paper under discussion) the date of the type species, *Formica coarctata*, Latr., is given as 1801, whereas Dalla Torre (1893), Emery (1911) and Donisthorpe (1915) all give 1802. The first date, however, is correct.

Latreille described his *Formica coarctata* in "*Bull. Soc. philom. Paris*, 3, No. 57, p. 63. Frimaire an 10 de la République." The year ten of the first French Republic ran from 22nd September 1801 to 21st September 1802. Frimaire was the third month of the Calendar, from 21st November to 20th December; therefore the date is 1801.\*

Again the type of *Solenopsis*, West., *Atta geminata* is given (p. 124) as 1805; Dalla Torre, Emery, and Sherborn give 1804. Griffin, however, has shown that the date of Fabricius, *Systema Piezatorum*, is 1805 (see in *Trans. R. Ent. Soc. Lond.*, 1935, p. 144). The date of Latreille's *Hist. Nat. Crust. Ins.*, 13, Paris, An xiii, is not so certain. Our author gives it as September 1804, whereas Dalla Torre, Emery and Donisthorpe give it as 1805. The copy of this work, both at the B.M. and the R. Ent. Soc. Lond., is marked "1805" in pencil. All we know is that it came out during Ann. xiii, which ran from 22nd September 1804-21st September 1805.

We do not agree with the reasons given to show that the type of *Ponera* was fixed by Westwood, nor do we understand the statement that Wheeler (1912) avoided the difficulty by treating Latreille's work, September 1804 [1805?] as fixing types. Donisthorpe, however (1915), stated the matter very clearly—"In 1810 Latreille [*Cons. Gén. Crust. Ins.*, 311, No. 443, 437 (1810)] cited *Formica crassinoda*, (Latr.) F., as the type of *Ponera*, but he had already in 1805 [1804?] [*H.N. Crust.*

\*For the benefit of future students we append a list with dates of the years and months of the first French Republic.



*Ins.*, **13**, 257-8, No. 365 (1805)] cited *contracta* as type." We still consider that in the 1805 (1804?) publication Latreille does fix the type; though he does not actually use the word type.

With regard to Wheeler, we cannot trace any 1912 paper on the subject. In 1911 [*Ann. N. York Acad. Sci.*, **21**, 157-75 (1911)] he published an excellent and much needed paper on the type species of the genera and sub-genera of *Formicidae*. He stated that he had verified all the references except for a few from obscure and antiquated sources, for which he had to rely on Dalla Torre's *Catalogus Hymenoptorum*. Unfortunately *Ponera* was one of these; for which Dalla Torre gives "*Latreille Hist. Nat. Crust. and Insect.*, iv, 1802, p. 128." Both the title and the date are incorrect; it should be *Gen. Crust. Ins.*, **4**, 1809, p. 128. Emery [*Genera Insectorum*, **118**, 88 (1911)] gives this quotation correctly, but he gave the 1805 (1804?) publication for *Ponera*, when, of course, it should be *Nouv. Dict. d'Hist. Nat.*, **24**, 178-9 (1804), as given by Donisthorpe (1915), Sherborn (1927), and our author (1937).

For 1913 [*Ann. N. York Acad. Sci.*, **23**, 77-83 (1913)] Wheeler published some corrections and additions to his former list; we do not, however, find that he mentions anywhere that the Latreille's 1805 (1804?) publication fixed types. He simply gives *coarctata*, Latr., as the type of *Ponera* without any date.

The quotation for Mayr's *Formicoxenus* (p. 123) is incorrect, both as to date (this no doubt was a slip of the pen, or a printer's error; although Mayr actually continued to write on ants up to 1906!), and title of publication. It should be Mayr, 1855 (not 1885), *Verh. Zool. bot. Ver. (not Ges.) Wien*. It was not until 1858 that the title "*Kaiserlich-Koenigliche Zoologisch-Botanische Verein*" (1851), was changed to *Gesellschaft*.

This misquotation occurs again (p. 124) with *Monomorium*, Mayr, *Leptothorax*, Mayr, *Strongylognathus*, Mayr, and *Tetramorium*, Mayr.

The date given for *Solenopsis*, Westwood (pp. 100, 124) is incorrect; it should be 1841 (not 1840), *Ann. Mag. Nat. Hist.*, **6**, 86. We do not agree that "the occasion is hardly one in which it is worth making an exception" (p. 124) when retaining the subgenus *Mychothorax*, Ruzsky, 1905. In this subgenus the antennae are 11-jointed, whereas in *Leptothorax* proper they are all 12-jointed. Wheeler, who had given *Formica acervorum*, F., as type of *Leptothorax* in his 1911 paper, accepted Emery's suggestion of *L. clypeatus*, Mayr (the latter was the first species described by Mayr for the group with 12-jointed antennae) in his 1913 paper. Donisthorpe also followed Emery.

(To be continued.)

## NOTES ON LOCAL GRASSHOPPERS FROM SOUTH BENFLEET, ESSEX.

By R. W. ATTWOOD.

During a short visit to South Benfleet, Essex, in August a careful search was made for the local Grasshoppers, *Metrioptera roeselii*, *Conocephalus dorsalis*, and, on the suggestion of Dr Burr, the newly-discovered British species *Conocephalus fuscus*.

The latter was not found, but *Conocephalus dorsalis* was scattered here and there along the sea wall, although it could not be called common. *Metrioptera roeselii* is much more plentiful this season, and appears to be spreading. There are at least five distinct colonies near South Benfleet, ranging from the sea wall to about a mile-and-a-half inland, and from sea level to a height of about 300 feet. It also occurs near Hockley, Essex, about two miles from the sea wall. One colony here is very large. I took some seven or eight and saw very many more, but none of them of the macropterous form, *diluta*. Thinking that as *roeselii* is a coastal insect it might be possible to find an even larger colony, I walked across to the sea wall at South Fambridge and made a prolonged search, but was disappointed, only one *roeselii* and one *dorsalis* being found. I think it probable, however, that there is some area near South Fambridge from which *roeselii* has spread inland.

It is, of course, very difficult to prove that a local insect is spreading, but the appearance of *roeselii* this season in a certain field, where I have collected for several years, is possibly of interest. It may, of course, have been there all the time, but as I have searched this area in previous years to find such an elusive Grasshopper as *Tettigonia viridissima* it seems probable that I should have noted *roeselii*.

The field has not been mown for some four years, and is in a rough condition. It is about a mile-and-a-half from the sea wall at an elevation of about 300 feet. Assuming that *roeselii* is a coastal insect, as one would infer from the records of its occurrence, it seems difficult to account for its appearance in this field. *Roeselii* is not a very active Grasshopper. It occurs in colonies over a restricted area. One colony which I have known since 1934 is still in the same area, and does not appear to be any more widely dispersed. Apart from the distance, the insect would have to cross several dykes, a railway, a steep hill, a roadway, and a wood to reach this particular field, which would seem a difficult task for such a creature. In 1933 and 1934 the macropterous form of this insect (*diluta*) was common along the sea wall and I am wondering whether it was during this phase that some of the Grasshoppers were able to reach this field. The presumption is that insects are more likely to disperse in the winged state, but so far, I believe, no macropterous female has been found to contain fertile ova. Dr Blair's description, however (*Proceedings of the South London Entomological Society*, 1934/5), of the pairing of the macropterous type with the ordinary form seems to indicate that possibly in certain stages of development fertile ova may be produced.

In the neighbouring wood the Grasshopper *Pholidoptera cinerea* is well established. The female does not leap readily, but prefers to drop off a bramble leaf into the undergrowth. She will often hang over the edge of a leaf head downwards, the body being quite visible, but she is very wary and falls off at the least disturbance. In the open she will often take two jumps, one about eighteen inches and the other a foot, and then scuttle into the roots of the grass. The male, however, is capable of prodigious leaps. One that I was endeavouring to capture leaped so far that I was curious enough to measure the distance. It was five feet eight inches. When we consider that the insect is wingless, comparatively heavy, and the take-off was a bramble leaf, one appreciates the immense strength and rapidity of action of the legs

of this Grasshopper. To obtain a purchase from such a delicately poised object as a leaf, it must have struck with extreme suddenness to take advantage of the inertia of the air beneath.

*Tettigonia viridissima* does not appear to be so plentiful. I have only seen six this season and two of these were immature at the end of July. Several were heard stridulating one warm evening in August at dusk on some isolated Hawthorn bushes, but it was too dark to track them down.

This particular evening appeared to have some effect on the Grasshopper *Meconema thalassina*. I had been sugaring for moths the three previous evenings with little success, nor was this evening any more successful as regards Lepidoptera, but I counted eleven Grasshoppers of this species on the sugared trees and posts. *Meconema thalassina* frequently comes to the sugared trees but rarely in such numbers. None were actually on the sugar but settled near. I had run out of Rum that evening and had added a little Amyl Acetate to the treacle as a substitute. Possibly the Pear-like scent was the source of attraction.

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### NOMENCLATURE RUN WILD.

By BRIGADIER-GENERAL B. H. COOKE, C.M.G., C.B.E., D.S.O.

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The remarks of the Rev. G. Wheeler in the October number of this Journal are very much to the point, and will have many sympathisers. It is, of course, unavoidable that as knowledge of the structure and habits of insects progresses, re-grouping of species and splitting up of genera become necessary from time to time. This, however, has no connection with the present wholesale alteration of names which have been known to generations of entomologists. The scientific gain from these changes is, in a large number of cases, nil; it is merely red tape run wild. After discussing the question with other entomologists I feel sure that this feeling is widespread.

I can, however, discern a gleam of hope. As we all know, articles of everyday use, such as clothes and furniture, go out of fashion. If they are stored away for a few years it is surprising how the taste for them revives. I have always known (and shall continue to know) the "Adonis Blue" as *bellargus*, and I note with interest that that name is again coming into fashion. Nor is this by any means the only instance. Meanwhile it is exasperating to be compelled to waste time in identifying insects under new, and probably temporary, names.

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### NOMENCLATURE.

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A CORRECTION.—In the October number, on p. 130, line 15 from the bottom, for "*lubricipeda* = *lutea*" read *lubricipeda* [*menthastri*]. The "= *lutea*" was the Editor's error in an attempt to clarify the meaning of a name used ambiguously for many years.

This is one of those cases of which the Rev. Geo. Wheeler wrote so trenchantly in the October number. See *ante*, p. 124, lines 5, 6, 7, 8.

The Notes below give an example of the loose way names have been used for several generations and of the huge and intricate task, which

the present generation has taken in hand, to correct and to stabilise them. It is impossible to expect every individual entomologist to follow out the changes (corrections), which have to be made, and we must emphasise that when changes are made, it is absolutely essential to the clarity and understanding of communications, that the name, which has to fall, should be placed with the correct name; e.g., *croceus* (*edusa*), *jurtina* (*janira*) are recent cases in point, both of which corrections have now become adopted. 'Tis a matter of education. But to use names like *Ochloides venata*, *Lithina chlorosata*, etc., etc., without their long-used predecessors, such as occur in some recent publications, is a waste of valuable time to a student and a deterrent to our science.

Linné in the *Sys. Nat.*, X ed. (1758), described a species, which he named *lubricipeda*, stating that there were 2 forms. This he added to in *Fn. Suec.* (1761) and in *Sys. Nat.*, XII ed., in 1767. A white-winged form and a yellow-winged form.

In 1766 Hufnagel in the *Berlin Mag.* revised Linné's work and said that the colour and marking definitely indicated 2 species, and named the white one (Linné's first form) *lubricipeda-alba*, and the second form of Linné *lubricipeda-lutea*.

Rottemberg, in the *Naturforsch.*, 1776, definitely proved that the view of Hufnagel was correct, by gathering larvae, separating them into 2 sets and breeding the two species respectively.

Esper, in his *Abbild.* in 1783, named the white form of Linné *menthastri* and kept the name *lubricipeda* for the yellow form of Linné, although he refers in his extended synonymy to Linné, Hufnagel and Rottemberg, misquoting and adding misleading remarks to their information, e.g., where Linné said "albidis" for *lubricipeda* he added "luteis."

This incorrect action of Esper has been accepted for more than 170 years in spite of the clear revision and correction of Hufnagel and Rottemberg, and even our bookmakers of the present century have retained the same application of these names as did Esper. Staudinger, South, Meyrick and Meyrick's Revised copy Esper's application of these names.

Now since at least 99 out of every hundred British entomologists and general naturalists refer to Newman's, South's and Meyrick's books, the bare name *lubricipeda* gives them a definite impression of a common yellow or buff moth, and the name *menthastri* that of a common white moth. In such a case the real way is not to thrust the bare name with a changed significance on to the readers but to endeavour to educate him to the fact that in this case *menthastri* is a name, which should never have been introduced and must drop out of use, being replaced by *lubricipeda* of which Linné said "alis albidis," and Hufnagel, *lubricipeda alba*. While Linné's *lubricipeda* of which he had said "alis flavescentibus" must be replaced by *lutea*, Hufnagel, and should be written

*lubricipeda* [*menthastri*] for the white moth and  
*lutea* [*lubricipeda*] for the yellow moth,

or more fully

*lubricipeda*, L. [*menthastri*, Esp.] and  
*lutea*, Hufn. [*lubricipeda*, L. in pt.]\*

Strange to say Hampson in 1901, *Lep. Phal.*, III, was correct in his application of the names, while Seitz, *Pal. Noct.*, in 1910, kept to the erroneous use of Esper. Hampson remained unnoticed. Kirby, *Cat. Lep. Het.*, I, 1892, was also correct, and remained unnoticed.

Doubtless this complication was one of the disastrous results of the use up to the seventies of the XII ed. (1767) of the *Sys. Nat.*, and the then change to the recognition of the X ed. (1758).

Kirby in his *Synonymic Catalogue*, 1871, based his work on the XII ed., but in the *Supplement to the Catalogue* he based his work on the X ed. of the *Sys. Nat.* (1767).—HY. J. T.

\*[In my opinion it would be far better and simpler to scrap this nonsense altogether and to continue to use the names *menthastris* and *lubricipeda* in the sense they have always had. If there had been time at the International Congress of 1912 to discuss my suggestions, I have no doubt that this would have been settled once and for all, as they were most favourably received in the informal discussions in which most of the real work of the Congress was done.—G. WHEELER.]

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### NOTES ON COLLECTING, &c.

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PERIPLANETA ORIENTALIS, L., IN THE OPEN.—With reference to my friend and colleague Dr Burr's note (*ante*, p. 113) on capturing an adult female *Periplaneta orientalis* in the open, it may be as well to recall the fact that I recorded a similar occurrence in 1918. I was staying in the New Forest for a fortnight [*Ent. Record*, 30, 171-72 (1918)] and I found an adult male of this Cockroach under the bark of an oak stump in an enclosure. In this case the locality was very far from any houses, outbuildings, or buildings of any sort. I suggested at the time that the insect might have been introduced in stores, etc., for the Canadians, who had been felling trees in the New Forest about that time.—HORACE DONISTHORPE. [*Blatta* should replace *Periplaneta*.—T.B.-F.]

ALEUONOTA AURANTIACA, FAUV., AND OTHER BEETLES IN THE BOX HILL DISTRICT.—The above species (the *Homalota rufotestacea* of Fowler) has occurred only twice in Britain, as far as I know; in each case to the late Mr G. C. Champion, who took a specimen by sweeping in Headley Lane, Mickleham, in May 1868, which remained unique as British until he met with it again at Guildford in May 1894. It is of interest, therefore, to note that it still occurs in the original locality, where on 16th April of this year I found two examples under a stone on one of the slopes of Box Hill, only a few hundred yards from Headley Lane. This piece of ground was scattered with smallish stones for a considerable area, but a fairly exhaustive search of it for more specimens was unavailing.

Of the beetles I have found in the course of occasional collecting in this district during the past four years, in addition to a few previously recorded, the following are perhaps worth mention:—

*Homoeusa acuminata*, Märk., *Strophosomus faber*, Hbst., and *Tropiphorus carinatus*, Müll., 1 of each on a path near Headley, iv.35.

*Scydmaenus rufus*, Müll., *Neuraphes elongatulus*, Müll. (1), *Enicmus consimilis*, Mann. (1)\* *E. testaceus*, Steph., *Cicones variegatus*, Hellw., *Endomychus coccineus*, L., *Aleochara moerens*, Gyll. (1), *Gabrius splendidulus*, Gr., *Cis alni*, Gyll., *C. bilamellatus*, Wood, *Sphindus dubius*, Gyll., *Hallomenus binotatus*, Quens. (2), and *Acalles turbatus*, Boh., at various times under bark and in decayed wood of beech on Mickleham Downs, 1933-5. In the same locality, by sweeping, vii.35, *Phyllotreta nodicornis*, Marsh., *Cassida nobilis*, L. (1), *Mordella fasciata*, F., *Miarus graminis*, Gyll., *Sibinia signata*, Gyll. (1), *Apion filirostre*, Kirby, *Psylliodes dulcamarae*, Koch (1); on flowers of *Pyrus aria*, *Cistela luperus*, Hbst. and one example of its variety *ferruginea*, F. Box Hill, by sweeping, *Platystethus capito*, Heer (1), *Cryptocephalus bilineatus*, L., *Tychius meliloti*, Steph. (vii.37); *Leptinus testaceus*, Müll. and *Ceuthorrhynchus atomus*, Boh. (1 of each, v.37); under stones, iv.37, *Stenus erichsoni*, Rye (2) and *Bythinus glabratus*, Rye (1, with the ant *A. (D.) niger*); in moss, vii.37, *Cymindis axillaris*, F. (2), *Falagria thoracica*, Curt. (common in July), and *Liodes badia*, Sturm. Burford Bridge, in flood-refuse, iii.37, *Meotica exiliformis*, Joy, *Atheta forcipata*, Rey (soror, Kr.), *A. nigritula*, Gr. (*holetobia*, Th.), *A. obfuscata*, Gr., *Proteinus macropterus*, Gyll. (1 of each), *Trogophloeus impressus*, Lac. (2; see *Ent. Mo. Mag.*, lxxiii, p. 191), *T. rivularis*, Mots., *Brachygluta haematica*, Reich., *Paramecosoma melanocephalum*, Hbst., *Baris lepidii*, Germ. (1). Dorking, in sand-pit (v.37), *Atheta indubia*, Shp., *A. obfuscata*, Gr. (2 of each), *A. intermedia*, Th., *Amarochara umbrosa*, Er., *Meligethes solidus*, Sturm, *Cryptophagus setulosus* Sturm, *Sibinia potentillae*, Germ. (1 of each), *Philopeton plagiatus*, Schol., *Rhinoncus castor*, F., and *Phloeophthorus rhododactylus*, Marsh.—A. A. ALLEN, 63 Blackheath Park, London, S.E.3, 18th September 1937.

MACROLEPIDOPTERA IN A LONDON GARDEN.—Canon Edwards's list of lepidoptera observed in his Vicarage garden near Brockwell Park is, with one or two exceptions, characteristic of London suburban gardens, and interesting for comparison with similar lists published in recent years. Canon Edwards does not specify whether *Boarmia gemmaria* is the type form or *perfumaria*. In our Clapton garden in N.E. London we never saw anything but the latter; here in Cornwall I have seen nothing but the type.

At Clapton we were separated from open fields and marshes by the River Lea only, and within a mile of our house I took, about 55 years ago, a short series of *Arenostola phragmitidis*, var. *rufescens*, Tutt, flying along a rushy ditch. In those days we were just on the edge of London, but the latter has since spread more east and Walthamstow more west, so that the river and marshes are now a mere dividing ribbon between the houses.

Am I right in thinking that "the country" is nearer central London on the south than on the north, and therefore one can find better insects without going so far out in the former?—C. NICHOLSON, Tresillian, Truro, Cornwall.

\*This capture (iv.35) is apparently a new record for Surrey. The species was reinstated in the British list on specimens taken by Mr E. C. Bedwell in Sherwood Forest,

"CORNISH NOTES."—I am obliged to Captain Parsons for his reply (p. 103) to my query about *P. moneta*, and I am sending him the last "separate" of my paper on that insect in Britain, read to the City of London Entomological and Natural History Society in December 1912. It is, of course, somewhat ancient history now and the species has since reached Wales, Scotland and the Isle of Man, but it will give him some hint about the early stages and I hope he will succeed in finding it in the Torquay district. There is as yet no sign of its occurrence in Cornwall, which is to me quite inexplicable.

Thanks also to Mr Bainbrigge Fletcher for mentioning *Artemisia* as an additional food-plant quite new to me. Presumably the common wormwood is meant (*A. absinthium*) but no doubt mugwort (*A. vulgaris*) and sea wormwood (*A. maritima*) and even "old man" or southernwood (*A. abrotanum*) would be accepted by *moneta* larvae.—**Id.**

I have not yet seen *Eurois prasina* hereabouts, and with the exception of the list in the Victoria County History (about 20 years old) I know of no list of Cornish lepidoptera. But the Rev. Alfred Thornley, "St Anael's," Carbis Bay, is listing Cornish insects and could perhaps help Captain Parsons.—**REV. ALFRED THORNLEY.**

**TYRIA [EUCHELIA] JACOBÆÆ AND RAGWORT.**—Whence have these moths in the Bishop's Stortford district come? The answer, I think, is given by the fact that the insect has been seen sporadically in the district for some years, kept in check, no doubt, not merely by scarcity of foodplant, but also by parasites. Take the following case from my own district. The species here feeds on groundsel, a weed found in most parks and gardens but kept under fairly good control by the gardeners. During the past few years I have always been able to take a few larvae in season, although an imago is but rarely seen. This year, I am sorry to admit, I allowed a portion of my own garden to run wild after early June, in consequence of which groundsel sprang up everywhere. On 2nd July I disturbed four or five newly emerged imagines nearby. During August the plants were being devoured by far more larvae than I have seen hereabouts for a long while. They pupated in late August, and three out of forty were parasitised. Of a dozen taken at Preston, near Weymouth, where the foodplant (groundsel) was scarce none were parasitised—they pupated at the end of July. Near Tuddenham, Suffolk, I collected on 9th July about a hundred fully-grown larvae from the vicinity of ragwort, which they had completely stripped—fully half of these were parasitised, the rest pupating immediately. The species was present there last year, but less common. In the same way, large masses of ragwort on the other side of this road in Suffolk, which for some reason or other had been scarcely touched earlier in the season, were this autumn swarming with *Eupithecia* larvae of various species, a large proportion being parasitised. Widely spaced plants from elsewhere produced very few larvae, these being scarcely parasitised at all.

I think therefore that Mr Allen's observations are equivalent to my own, namely, that this year's large numbers are due not so much to a large migration as to descendants of last year's few unnoticed individuals augmented by stray specimens from the surrounding country—

side, being, as one would expect with a species whose foodplant is apt to change its headquarters rapidly, one which wanders long distances in search of new feeding grounds, not however in a flock or in a single direction as most migrants are supposed to do. Yes, *T. jacobaeae* undoubtedly follows its foodplants—but only by a very chancy manner of dispersal.—B. A. COOPER, 61 Okehampton Road, London, N.W.10.

THE SEASON OF 1937 AT RODBOROUGH.—The season here has been distinctly below the average, many species, usually observed, having occurred in reduced numbers or not being seen at all. The whole summer has failed to produce a single really good night for sugar or light, the autumnal species especially having been attracted in very small numbers. Dates of appearance have been erratic: thus, on 30th September I saw a male *Lycaena* [*Polyommatus*] *coridon* on the wing and light attracted *Colotois pennaria*, which normally occurs here towards the end of October or in early November, the occurrence of these two species on the same date being quite a novelty in my experience.

*Lycaena* [*Polyommatus*] *coridon* has remained on the wing very late this year, a female being seen on 4th October; as 5th October was sunny, it was probably still flying then, but I did not visit the locality on that date and could find none on my next visit on 9th October. I do not understand Mr Davis' records of *coridon* in the Stroud district in Tutt's *British Butterflies*, Vol. iv, pp. 85, 86, where he gives 17.vii.1901 as "the earliest date for this locality" and 17.viii.1892 as "the latest date ever noticed in the district." Since I have been here my earliest and latest dates are 20.vii and 28.viii.1933, 20.vii (a fresh female, so males probably out earlier) and 5.x.1934, 11.vii and 26.viii.1935, 22.vii and 23.ix.1936, and 19.vii and 4.x.1937. This butterfly was in smaller numbers than normal.

Both broods of *Lycaena* [*Polyommatus*] *icarus* and *L.* [*P.*] *bellargus* were only about ten per cent. of normal; on the other hand, *L.* [*Cupido*] *minima* was unusually abundant and well out on 28th May, the earliest date I have seen it here (4th June is about normal) and two specimens of a second emergence occurred in August. There were third broods of *Pieris brassicae*, *P. rapae* (but not of *P. napi*) and of *Chrysophanus* [*Heodes*] *phlaeas*, this last on 2nd October. *Coenonympha pamphilus*, which usually goes into early October, was over by middle of September.

On 23rd September, about a month later than usual, a larva of *Tyria* [*Euchelia*] *jacobaeae* was still feeding on groundsel and was then not full-grown, although I did not see it later.

Several *Asilus crabroniformis*, (Dip.) were still on the wing on 9th October and grasshoppers (*Stenobothrus lineatus*, *Chortippus bicolor*, *Gomphocerus rufus*) were still about to-day, and *Plusia gamma* was flying this evening when the temperature was only 40° F.—T. BAINBRIGGE FLETCHER, Rodborough, Glos., 13th October 1937.

FOODPLANTS OF PIERID LARVAE.—On 1st July I found a batch of half-grown larvae of *Pieris brassicae* feeding in my garden on Honesty (*Lunaria annua*); unfortunately, the wasps found them at about the same time and cleared them all out. This may be a known foodplant but I am not aware of any record. *Pieris napi* often oviposits on *Arabis* here.—ID.



## CURRENT NOTES.

Parts 67 and 68 of the *Supplement* to Vol. III of *Seitz Palaearctic Noctuidae* have come to hand and contain a sheet of eight pages of additions to the letterpress, which have accumulated while the section was being issued, and plates 19, 20, 21, 22, 23, which contain over 300 figures, mainly of aberrations. The additions are to species occurring in Britain, *Catocala fraxini*, 1; *C. nupta*, 2; *Syngrapha interrogationis*, 1; *Phytometra festucae*, 1; *Euxoa suffusa*, 1; *Rhyacia baja*, 1; *R. depuncta*, 1; and *Athetis morpheus*, 1. This volume is rapidly coming to its conclusion and with the Main Volume will form a splendid introduction to the Palaearctic Noctuidae for all time.

Five parts of the Main Volumes of the Exotic Sections have also appeared. Three parts of the American Bombyces contain five sheets (20 pages) and four plates with over 200 figures. This volume, VI, is also nearly complete and with the Index when issued will be a valuable source of information on the huge fauna of the Americas. The one part of Vol. VIII contains three plates of American Geometers. Further there is one part of the Noctuidae of the Indo-Malay Region, comprising three sheets, 24 pages.

The List of Free Lectures given at Horniman's Museum, Forest Hill, London, S.E., on Saturday afternoons this Autumn Session contains the announcement of one on "Flight—from Insects to Aeroplanes," by Dr W. E. Swinton, B.Sc., F.R.E.S., on 4th December.

CACTOBLASTIS CULTIVATION.—We shall soon be in the thick of the *Cactoblastis* breeding again, and have collected over 400,000 cocoons from the veld with which to start the ball rolling. Being able to collect these in the veld makes it unnecessary to breed during the winter, a great saving of labour, and also ensuring a healthier stock. Baboons are giving trouble, opening infested "leaves" and removing the larvae. I suppose this will mean the extermination of the baboons, and I wonder with what plague we will be smitten then.--J. SNEYD-TAYLOR (M.A., F.R.E.S.), Cape Province, S. Af., 13.ix.37.

Two more parts of the *Generic Names of British Insects*, prepared under the auspices of the Royal Entomological Society, have recently appeared. The one of the "British Neuroptera" for which Mr F. J. Killington is mainly responsible and the other of the "British Hymenoptera Aculeata," by Dr O. W. Richards. This latter is reviewed in part on another page by our colleague Mr H. Donisthorpe. Each part also includes a List of the recognised Species in the group dealt with. These Lists will be of the utmost use for workers in the different Orders, but we must protest on the loose way of treating the priority rule. Priority should be priority and not *qualified* priority. It should be the *actual spelling* of the name without modification by classical monkey tricks. In the first of these lists at least 6 names are not the precise names given by the authors whose names are attached to them. In the genus *Halictus* alone of the latter list there are at least 7 errors. We are not cavilling at the excellent work done by the authors who have used the utmost care, but are complaining of the misapplication of the rule of Priority to which they are compelled to acquiesce. We note

another stupid habit which has crept in of late, with no meaning but a negative one, and that is the enclosing the name of the author of a specific name in brackets. Tutt's plan was to place the name of the author of the generic name as well, as seen in his *British Noctuae*, a far more informative method. [I entirely disagree with this. Why perpetuate misspellings any more than other misprints.—G.W.]

We have received the following from the Secretary of the Madrid Museum, with the current copy of the Magazine referred to. "The editorial staff of the *Revista Española de Entomología Eos* takes the pleasure of sending you Number 3-4 of Volume XII (1936) which even, though, much delayed, has been printed in Madrid despite the difficulties caused by the grave situation in which the capital of the Spanish Republic has been for so many months, and despite which the Laboratory of Entomology of the Madrid Museum has been able to continue its work and the publication of its Revue." The *Revista* consists of pp. 193-322, 4 plts. of drawings and numerous text figures. The first memoir is a continuation of the Revision of the Palaearctic *Sphingonotus* (Orth.) in English and the second memoir discusses the species of the Zygaenid genus *Procris*, the 4 plates giving figures of the genital structures of the ten species under consideration.

Dr Skat Hoffmeyer of Aarhus, Denmark, continues his earnest interest in the Lepidoptera of his native country. Recently we have received separates of his last writings. (1) Discusses the *psi* group of the genus *Acrionicta*: *A. psi*, *A. tridens* and *A. cuspis*. (2) He gives the history of *Heodes* (*Chrysophanus*) *dispar*, ssp. *rutilus*. He designates the English form as *Heodes dispar dispar dispar*. Surely the poor insect should not be treated to this childish repetition comparable to an infant's "Dad, dad, dad." (3) Is an account of a delightful three days with the Lepidoptera of the Southern Isles of Denmark with a companion, Sigfred Knudsen. Their captures included *Apatura iris* and *Limenitis populi*.

An interesting booklet has been issued by the British Museum entitled "Butterfly Migration in the Tropics," illustrated by 5 plates in colour comprising 25 species, with several pages of explanatory letterpress. A concise and well-produced little pamphlet. The price is ninepence.

We cull from our reading the following apt quotation:—

"Vive l'entomologie!  
Doux charme de nos loisirs,  
N'est-elle pas dans la vie  
Une source de plaisir."

We have received an early announcement of "A Monograph of the British Aberrations of the Chalk-hill Blue Butterfly," by P. M. Bright, F.R.E.S., and H. A. Leeds. There will be 4 coloured plates and 14 black and white plates, figuring about 400 aberrations, with about 120 pages of text, quarto. Each aberration described will be designated,

irrespective of any "name" which may have been applied previously; by a "descriptive term," which, it is intended, may be applied to similar aberrations occurring throughout the *Lycaenidae*, and will, it is hoped, tend to discourage the multiplicity of names, mostly non-informative and in no way indicating the particular forms to which they are placed. Unfortunately the cost of the work has been very heavy, and this will possibly react on individuals and societies that would desire to subscribe. (See the advertisement on cover.)

Our Argentine friend and subscriber, Capt. Hayward, continues, in spite of his heavy official duties, to add his quota of matter in the advancement of entomological knowledge. There lie before us (1) Descriptions of two new species of Chilian *Hesperiidae*, with plate; (2) Additions and Corrections to his previous work on the Argentine *Nymphalidae*, with a plate; (3) Notes with a plate on the structures of the *Hesperiidae* of the Argentine with a bibliography, 2 separates. He has also contributed a memoir on the menacing pest of the Argentine, the locust, *Schistocerca paranensis*, with diagrams and a plate, to the publications of the Ministry of Agriculture of the Nation.

Three further volumes of Dr W. Junk's *Lepidopterorum Catalogus* have recently been published. Vol. 78 is the first portion of the *Danaidae* comprising the Sub-family *Danainae* by F. Bryk. It consists of 432 quarto pages with Index. It appears to be very thoroughly compiled. The true *plexippus* (Indo-Malay) has 15 pages of references; the *archippus* (American wrongly called *plexippus*) has 6 pp. of references. The *Canadian Entomologist*, 1869 et seq., consistently used the name *archippus*. Vol. 79 contains the micro Family *Gelechiidae* (not *adae* as Meyrick endeavoured to establish it). It consists of 630 pages with Index by M. Gaede. So far as we have tested it seems very thoroughly done. Two pages of references are given to our common *Anacamptis populella*, and its references are to all the accredited books and magazines. *Sitotroga cerealella*, the well-known pest, has two and a half pages of references. Access to such works as these is of the utmost use to workers in the various families and even readers of papers on particular species would be well advised to consult the references therein.

The *Monograph of the Pierine Genus Delias*, by G. Talbot, F.R.E.S., is at last completed by the issue of part VI from the British Museum (Natural History). It was begun some years ago in the Hill Museum, Witley, under the auspices of the late Mr J. J. Joicey. The present part contains 395 pages and 64 plates, of which 10 are coloured. A large proportion of the species dealt with and figured are not contained in the volumes of Seitz. Not only are all the species, 157 in number, figured, but there are numerous plates of details of the genitalia, the scent scales, and two of larvae and pupae. There are more than 400 species and forms described. The introductory matter treats of the Geographical Distribution, Habits, Migration, Mimicry, Morphology, Phylogeny and finally the Bibliography. The work appears to be very well done and is a credit to the intensive energy of the author. This final part was apparently published in January, but was not advertised, we suppose, as our copy was obtained from a second-hand book list.

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## GENERIC NAMES, &amp;c., OF THE BRITISH FORMICIDAE.

By HORACE DONISTHORPE, F.Z.S., F.R.E.S., etc.

(Department of Entomology, British Museum (Nat. Hist.)).

---

(Concluded from p. 132.)

We now come to the question of *Acanthomyops* and *Lasius* (pp. 124-125). We personally still accept the validity of the Erlangen List, and regret to learn that a proposal that the name *Lasius*, Fabricius, 1805, is to be accepted and *Lasius*, Panzer, 1804, is to be rejected, has already been laid before the International Commission on Zoological Nomenclature. The whole question is dealt with by Donisthorpe [*Brit. Ants*, 2nd edition, pp. 208-10 (1927)]; the full synonymy of the subgenera, types, etc., being given. Both Forel and Emery did accept the Erlangen list at first; and Chester Bradley, in a paper on certain genera of Hymenoptera, *Trans. Ent. Soc.-Lond.*, 1919, 50-75, under *Lasius*, Jur., stated that Morice and Durrant seemed to be correct in considering *Lasius*, Fabr., 1804 (=1805) a homonym of *Lasius*, Jurine, 1801. Should *Lasius*, F., be finally accepted *Donisthorpea*, Morice and Durrant, 1914 (type *Formica nigra*, Linnaeus, 1758) will (as stated on p. 125) become a synonym; but it is quite inaccurate to give *Acanthomyops*, Mayr, 1862 (type *Formica clavigera*, Roger, 1862, *claviger*, Mayr) as a synonym of *Lasius*, F.

Mayr founded the genus *Acanthomyops* [*Ver. Zool. Bot. Ges. Wien*, **12**, 699 (1862)] for the reception of the American species *Formica clavigera*, Roger, and he compared it with *Lasius*, F., describing the differences (in the latter the maxillary palpi are 6-jointed, in the former 3-jointed! the antennae are slightly clubbed, and the species possess an aromatic scent, etc.). *Acanthomyops*, in the limited sense which embraces a number of American species, is now considered to be a subgenus, whether of *Lasius*, F., or *Acanthomyops*, Mayr, does not alter the case—it is certainly not a synonym of *Lasius*. I agree with Wheeler, who pointed out in his 1911 paper that he was firmly convinced that the subgenus is, at least, heuristically a useful and valid category (in the *Formicidae*), and that he could not agree with those entomologists who entirely ignored the subgeneric category, or threw them all, or most subgenera, into the synonymy.

Much as I admire and respect the work of the late Professor Emery, I can not help feeling that in his fine production the *Formicidae* in the *Genera Insectorum* he is entirely wrong in his treatment of *Lasius*. He removes *Formica flava*, F. (1781) from the subgenus *Chthonolasius*, Ruzsky [*Kasani Zap. Veterin. Inst.*, **29**, 630, 633 (1912)], for which it was cited as type by Ruzsky (1912), Donisthorpe [*Ent. Rec.*, **23**, 275-77 (1916)], and Wheeler [*Psyche*, **23**, 171 (1916)], and places it in the subgenus *Lasius*, F., with type *Formica nigra*, L. He cites as type for *Chthonolasius*, Ruzsky *Formica umbrata*, Nylander (1846), which is of course, quite incorrect.

Furthermore *flavus* differs from *niger* in the shape of the maxillary palpi in the ♀ and ♂, the much smaller eyes in the ♂, and its hypogaecic life, as well as in colour.

With *Formica*, Linnaeus (1758) Donisthorpe states (1915) that Lamarck [*Syst. An. sans. Vert.*, 268, No. 124 (1801)] adopts *F. rufa*,



L. as the type of *Formica*, L. This, however, is considered to be invalid under the code.

We quite fail to understand the statement (p. 125) that "Myrmecologists do not appear to have decided what is the next available name for Nylander's *Formica picea* (1846)." Donisthorpe [*Ent. Rec.*, 30, 9 (1918)] in a paper on Dr Leach's *Ants and Gnats* in 1825 makes the matter quite clear. We will quote the passage in full:—"The most unfortunate point in nomenclature which arises is that concerning the name of *Formica picea*. For over 50 years the species we now know as *F. picea*, Nylander was confused with *F. gagates*, Latr., until 1909, when Emery separated it from that species on the Continent (*Deutsch. Ent. Zeitschr.*, 1909, 195) and in 1912 I put the matter right for the British species [*Ent. Rec.*, 24, 306 (1912)]; see also [*Ent. Rec.*, 25, 67-8 (1913)]; and *Brit. Ants*, 325-34 (1915).

There cannot, however, be two species called "*Formica picea*" and as Leach's name has 21 years' priority, Nylander's name must fall. This being the species described by Farren-White in 1883 as *Formica glabra*, the latter name would have to be used; but, unfortunately, there is another *Formica glabra*, Gmelin, *Linné Syst. Nat.*, ed. 13, I, v, 2804 (1790), which is fatal to the adoption of Farren-White's name. It is also probably not ascertainable what Gmelin's species really is, but at any rate it cannot be what we know as *F. picea*, Nyl., since the scale is described as bidentate. The next name in order of date for this insect is *Formica transkaukasica*, Nessonow, *Imp. Obshch. Lyrrb. Est-Ant-Etn. Mosc.*, 58 (1), 62 [= *Tr. Lab. Zool.-Mus.*, 2 (1), 62 (1889)], and this is what the insect we know as *Formica picea*, Nyl., will have to be called." The italics are now added.

Finally on page 100, under *Myrmica, sabuleti*, Meinert, 1861, is given as a synonym of *scabrinodis*, Nylander, 1846, and on page 101, under *Formica, glebaria*, Nylander, 1846, is given as a synonym of *fusca*, Linnaeus, 1758. This is incorrect, as both are recognised as good and distinct varieties. In the former the worker and female possess a much more developed lateral tooth to the scape of the antennae than in *scabrinodis*, and the longitudinal keel on its upper side is very distinct. The male is known by the longer scape, which is as long as the first five joints of the funiculus taken together, as against the first three in *scabrinodis*. In the latter the body is in part red or brown instead of being black, and it is not so cowardly an ant as is *fusca*. Emery indeed (*Deutsch. Ent. Zeitschr.*, 1912, 672) considered *glebaria* to be a sub-species of *fusca* as the latter will not readily bring up the pupae of the former. The beetles *Dinarda pygmaea*, Wasm., and *Atemeles paradoxus*, Gr., occur with this form, whereas no *Dinarda* occurs with *fusca*, and the *Atemeles* found is *A. emarginatus*, Payk.

#### APPENDIX.

(a) Dates of the years of the first République Française.

Ann.	22nd Sept.	21st Sept.	Ann.	22nd Sept.	21st Sept.
I.	1792	1793	VIII.	1799	1800
II.	1793	1794	IX.	1800	1801
III.	1794	1795	X.	1801	1802
IV.	1795	1796	XI.	1802	1803
V.	1796	1797	XII.	1803	1804
VI.	1797	1798	XIII.	1804	1805
VII.	1798	1799	XIV.	1805	1806

(I am indebted to Mr A. C. Townsend for the above).

(b) The Months of the Calendar of the first French Republic.

Vendémiaire, the first month .....	22nd or 23rd Sept. to 21st or 22nd Oct.
Brumaire, the second month .....	23rd Oct. to 21st Nov.
Frimaire, the third month .....	21st Nov. to 20th Dec.
Nivôse, the fourth month .....	21st or 22nd Dec. to 19th or 20th Jan.
Pluviôse, the fifth month .....	20th Jan. to 18th or 19th Feb.
Ventôse, the sixth month .....	19th or 20th Feb. to 20th March.
Germinal, the seventh month .....	21st March to 19th April.
Floreéal, the eighth month .....	20th April to 19th May.
Prairial, the ninth month .....	20th May to 18th June.
Messidor, the tenth month .....	19th June to 18th July.
Thermidor, the eleventh month .....	19th July to 17th August.
Fructidor, the twelfth month .....	18th Aug. to 16th Sept.

NOTES ON COLLECTING, &c.

LARVAE OF *HADENA CONTIGUA* ON GORSE.—Last year I took a few imagines of *H. contigua* on a heath, so in the autumn I visited the spot in the hope of finding the larvae, but after searching some stunted oak gave it up without success. This year, on 8th September, I thought I would try my luck with a few birch bushes, but my wife soon forestalled me by finding the larvae by the light of my lamp on gorse flowers. The bushes were low and compact but none the less prickly and contained enough larvae to satisfy the most avaricious.—(CAPT.) C. Q. PARSONS, Torquay.

POLYGONIA C-ALBUM IN CORNWALL.—I have seen more of this species than of any other Vanessid this autumn, mostly on Michaelmas Daisies, but one was on ivy with three *Vanessa atalanta*. If any reader has seen it further west in Cornwall than Penzance, I shall be glad to hear, as I am anxious to complete a map of its spread through the county from 1933, in continuation of one by Mr C. W. Bracken illustrating its spread across Devon from 1925.—C. NICHOLSON, Tresillian, Truro, Cornwall, October 29th.

DANAUS PLEXIPPUS.\*—Will readers, who know of any specimens of the "Milkweed Butterfly" having been captured, or merely seen, in our islands this year, kindly report same in these pages in order that they may be added to the list of records already published.—C. NICHOLSON, Tresillian, Truro, Cornwall, October 29th. \* [*Archippus* in Seitz American volume.—H.J.T.]

SOME CUCULLIA NOTES.—The following will be interesting to compare with Mr Wightman's notes on p. 127, bearing in mind that the Pulborough area is partly on chalk, which is absent from Cornwall and naturally represented, on the N.W. seaboard only, by lime from the Atlantic shell-bed, sometimes to the extent of 60 per cent. of the sand content.

*Verbascum thapsus* is the most generally distributed mullein, but is not particularly common; *V. nigrum* is very local; *V. virgatum* and *V. blattaria* are both more or less rare; *V. lychnitis* is very rare and has apparently been recorded twice only—once near Truro and once at Falmouth, in neither of which localities is there any chalk—but, curiously enough, its hybrid with *nigrum* has been found at Par, a great locality for alien and casual plants, and the hybrid of *nigrum* with *V. pulverulentum* at Charlestown, near St Austell, on ballast heaps, where *nigrum* is plentiful and *pulverulentum* occurs as a casual.

*Cucullia verbasci* is common as a larva on *Scrophularia aquatica*, probably wherever that plant grows (and it is very common), and also, but less generally, on *V. thapsus*. On *nigrum* I have seen it only in my garden, where this plant is of perennial duration, although classed as biennial in the floras. I have also *thapsus*, *blattaria*, *virgatum*, and a magnificent hybrid which Kew authorities consider contains *speciosum* and *nigrum* "blood," and possibly other strains. It grows up to seven or eight feet high and sets millions of seeds from its two-inch (diameter) golden-yellow flowers. If anyone would like a pinch of seed to try, I will send some on receipt of an addressed envelope, stamped 1½d, and if Mr Wightman can send me seedlings of *V. lychnitis*, and anybody else can supply me with seeds of *pulverulentum*, I shall be very grateful. Both these species prefer chalk, which I can give them. So much for *C. verbasci* and its food plants; see also Owen Wilson's *Larvae of the British Lepidoptera and their Foodplants*.

About twenty years ago I found several larvae of *C. lychnitis* on the flowers of fine plants of *S. aquatica* along a stream flowing through an open meadow in Gloucestershire and reared three moths from them. It is very curious that the larva of this species should be so different in some forms from those of its near relatives; those I found were yellow with a greenish tinge and the usual black dots and not like any of Buckler's figures on Pl. xcvi of Vol. vi in his *Larvae of Brit. Butts. and Moths*, being less green than fig. 3 and with dots very distinct, and not a bit like Owen Wilson's figure on Pl. xxxix.—C. NICHOLSON, Tresillian, Truro, Cornwall.

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#### CURRENT NOTES.

*Lambillionea*, the magazine of the Union of Belgian Entomologists, for October, contains the conclusion of the article on the Biology of the species of *Bucculatrix* (Micro.) with 18 figures of the mines made by the larvae, by J. Klimesch, who a while ago communicated a very fine article on the *Nepticulae*, which, by kind permission of the author, was translated by Mr Jacobs, Hon. Secretary of the S. London Ent. Socy., and published recently in their *Transactions*. The monthly photographic plate figures 20 forms of the beautiful *Zygaena carniolica* from Asia Minor and Iran.

An article in the *Entomological News* (Philadelphia) for October, based upon the following observation, is well worth reading. A colony of the Notodontid moth, *Datana integerrima*, "consisting of about 200 individuals, was situated in a young walnut tree and the larvae were just completing their final moult. They had congregated in a cluster under the branch of the tree. A small amount of silk had been spun to anchor them to the branch, and from this they depended as an irregular globular mass. A few of the caterpillars nearest the branch were holding on to the bark, as if to reinforce the inadequate silk anchor. The chief number of larvae, however, reposed in the hanging globe; this resembled an inert body measuring 8 ins. × 4 ins. × 3 ins. which, when touched, transformed itself into a writhing aggregate of furry worms. The larvae were just casting off their skins. A fly, one of the *Tachinidae*, buzzed about, surveying the moult with pregnant anticipation. As each skin was shed, the fly would promptly deposit 5

or 6 eggs on the caterpillar's soft head. In an hour or two the head, red at first, became black and hard. A female Ichneumon fly (*Ichneumonoidea*) also stood guard, but I did not see it use its spear-like ovipositor."

In a record of the occurrence of a *Pyrameis virginiensis* among a number of *P. cardui* on the slopes adjoining the Bordeaux river, the writer says that it was improbable that it came over direct from America, but it might have migrated from the Canary Islands, where it is occasionally met with, or it may be the result of an evolution of *cardui* towards *virginiensis*, or as the two species are said to have had a common origin it may be an example of a throw-back to the ancestral form. There he leaves it; but it did not occur to him that the great probability is that a few chrysalids came over with produce to the nearby busy port of Bordeaux, escaped, and joined up with the nearest colony of its relative *P. cardui*.

Three further parts, with index, of Staudinger's *Catalogus Lepidopterorum Regionis Palaearcticae* have been published, and comprise the Palaearctic Bombyces covered by Seitz works. There are 48 pages of three columns and the Index is of the genera alone. Authorities for all names are added and each species name is followed by the names of its sub-species, its races, and its aberrational forms. Each section has been prepared by some specialist, and some sections follow the names and order of the species as given in the famous *Catalogus* of the firm of Messrs W. Junk. This publication will be of much help to systematists as a "first-aid" to references they wish to make. The publishers, Dr O. Staudinger and A. Bang-Haas, the well-known firm of Dresden and Blasewitz, have added their prices to the various species, etc., which they have for disposal. These prices will give a rough indication of the rarity of the items and can be utilized in all exchanges as the firm's lists always have been. The price of each part of 16 pp. is 1 mark (German).

CORRECTION. II.—p. 130, line 13, for "Larva" read "Sword."

"On the Evolution of Subspecies, as demonstrated by the Alternation of Variability existing in the Subspecies of the Genus *Erebia*," by B. C. S. Warren, is a paper well worth consideration. In his study of the extensive genus *Erebia* the author was struck by the great extent of both structural and superficial variation. In this genus his researches resulted in his recognising a group of 60 species and no less than 224 subspecies with 90 "associated forms" which latter he calls incipient races. He applies the term "subspecies" to races which (so far as is ascertainable) exclude other races of the same species from the region of their distribution. It is at last demonstrated that all colonies of a species may give origin to local races, all of which may become subspecies in due course. This definitely distinguishes between the terms "race" and "subspecies," which have been up to the present to a great extent confusingly used. We have long pointed out that where a colony of a species develops a few individuals of a peculiar form differing from the typical, that colony forms a race. If in due course the peculiar form predominates then the colony may be considered a subspecies.

**NOMENCLATURE.**—The criticism of the Rev. George Wheeler on the Nomenclature proposals published by the Royal Entomological Society is timely and much to the point. We must bear in mind, however, that they—the new proposals—are not authoritative, their acceptance is quite optional. Before their adoption can be entertained they will have to be considered and accepted by the International Zoological Commission on Nomenclature. The wholesale change of names like this is inadvisable, whilst on some of the proposals some doubts certainly exist.—G. T. BETHUNE-BAKER.

The Rothschild collection of objects of natural history includes probably the finest and most extensive private collection of Lepidoptera in the world. It comprises long or very long series of every species it was possible to obtain with races, subspecies and aberrations (e.g., eight "black" *machaon*). Whereas the Oberthür collection was extremely rich in Oriental, Chinese, N. African, and Palaearctic species and the Joicey collection was rich in species from selected and special areas only, the Tring Museum is rich in species from every corner of the world, and particularly in types of newly described species. The collection of British species is also remarkable for its long series of racial and aberrational forms with many life-histories. The Library too is a rich one, containing copies of all the rarer works on Lepidoptera and complete sets of most of the world entomological periodicals. In the present building there is plenty of available space for consulting the collection, and we hope that Treasury Funds may be forthcoming to carry on the work at Tring, since in the National Collection the space is so congested that one finds the utmost difficulty to work comfortably in the very restricted space; even passages are used to store a large number of cabinets. At present it is absolutely impossible to find room at S. Kensington for even a tithe of the Tring Collection.

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#### SOCIETIES.

A meeting of The Entomological Club was held at "Woodhouse," Stroud, on 12th August 1937, Dr Harry Eltringham in the chair. Members present in addition to the Chairman—Mr H. Willoughby-Ellis, Mr Jas. E. Collin, and Mr R. W. Lloyd. Visitors present—Dr Malcolm Burr, Mr T. Bainbrigge Fletcher, Mr H. W. Holloway, Dr Karl Jordan, and Mr Austin Richardson. The guests were received by Dr and Miss Eltringham early in the day and were fortunate in enjoying one of the few really fine days of an unsettled season. Before lunch the garden provided great interest, and the phlox, dahlias, and gladioli, probably just at their best, were much admired. Luncheon was served at 1.15 and afterwards arrangements were made for a drive through some of the picturesque Cotswold country. Later the Laboratory and Photographic rooms were inspected. Here the chief items of interest were the appliances for histological research, mostly of Dr Eltringham's own design and construction. They included a high-power photomicrographic apparatus fitted with distant control for focussing and centring, a vacuum-recording hydraulic air-pump, a vertical micro-projector for making drawings at various magnifications, an automatic clockwork-electric exposure machine for prints and lantern slides, and a new low-power photomicrographic apparatus for producing photographs of insects and insect preparations, up to about eight diameters, and adapt-

able to either transmitted or reflected light, the latter, by a special system of reflectors, providing a shadowless light. A few typical sections and micro-preparations were demonstrated. Tea was served about five o'clock, and the party broke up, after a delightful day, barely in time to miss a severe thunderstorm.—H. WILLOUGHBY ELLIS, Hon. Secretary.

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### REVIEWS.

“MAN AND THE TERMITE,” by Herbert Noyes. 8vo., pp. 296, 8 illus., 8/6; Messrs Peter Davies, London.—This book deals with a group of insects (Order ISOPTERA) living in large communities, and building huge pyramids in tropical or subtropical lands. We are told that, although they resemble ants in structure, appearance and habits they are in no way related to them. They are polymorphic, and the mass of the workers are utterly blind, and shun the light, even building over-ground tunnels rather than be exposed to sunlight. This is in no way a systematic book, although it is replete with much biologic detail of the lives of these social insects. It is, in fact, an idealistic account by one who has spent a lifetime among them. Much of the information is conveyed in animated conversation presumed to be engaged in by various grades of the occupants of the termite dwellings.

After discussing the “beginning” of the termites, possibly 300,000,000 years ago, the suggestion is broached that these blind creatures have a sixth sense, since they can unfailingly find one another when far apart. Their underground gardens, where crops of fungus provender are grown, are described, and we are told how a winged female leaves her birthplace to found a new colony, carrying a few workers attached to the tarsal hairs of her feet. No less than eight Castes are recognised. The King and Queen, two grades large and small of Male and Female, two grades large and small of male and female workers, large, medium and small male and female soldiers.

As in human society many parasites are tolerated, but many are ruthlessly destroyed, even at some distance from the termite pyramids. Many pages are devoted to the struggle between man and the termite, detailing the insidious, silent, attack upon human handiworks. And the writer foretells the end of the struggle “that when the parasites who rule us have sucked us dry, and faded into insignificance, and when the fate of Sodom and Gomorrah has overtaken the Vale of the Universe, the termites, unperturbed, will survive.”

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### OBITUARY.

THE RIGHT HONOURABLE LORD ROTHSCHILD, M.A., Ph.D., F.R.S., F.R.E.S., F.L.S., F.Z.S., ETC.—By the passing of Lord Rothschild the study of the Lepidoptera has lost a notable figure. Born in 1868 heir of Sir N. Meyer Rothschild, Bt., and for many years known all over the world as the Hon. Walter Rothschild, he succeeded to the title in 1915. At an early age he became attached to the study of animal life. After being educated at home, he went to the University of Bonn and then to Cambridge; his studies were always dominated by natural history. Naturally his father expected his son to share in the family financial business, but this was an uncongenial prospect to him, and he took up in earnest the acquirement and study of objects

of general natural history; although the Lepidoptera gradually became the chief aim of his work, he amassed a striking collection of Vertebrates, especially Birds, building later a museum to contain them. Various species were kept alive in Tring Park for years, especially the emu. About 1890 he built a small museum to contain the specimens he had already obtained and well we remember the array of cabinets of set insects and the huge packing cases full of papered insects, which, at a later date, filled the building to repletion. To a second museum he built for the vertebrates he gradually added spacious rooms, especially for the Lepidoptera, the Bird-skins, and the rapidly-growing Library, so that at the present time the floor area is about 60,000 square feet, very considerably more than that of the Insect Department of the great National Museum at South Kensington. He trained young men of the town to assist in the work of the museum, which he personally arranged and managed. With growth of the collections the task became too big and in 1892 he engaged Dr Hartert as Curator of his birds and general collection and soon after Dr Karl Jordan especially for the section devoted to the Coleoptera and Lepidoptera, which was growing by leaps and bounds. The latter choice was a very fortunate one, for Dr Jordan has become one of the most famous scientific entomologists we have to-day. For lack of space the Coleoptera were given up. In the current publications of that time it was found impossible to adequately describe the host of new species and forms so rapidly coming in, that in 1894 the *Novitates Zoologicae* was commenced and has continued until this year to record, describe and also to figure, often in colour, these novelties, assisted by specialists in particular sections. Lord Rothschild had a marvellously retentive memory, practically knowing each specimen in his enormous collection, and it was a delightful treat to go around an exhibit with him. He was a Fellow of the Royal and many other Societies, in all of which at times he took an active interest. For two periods he was on the Council of the Entomological Society of London and its President for two years. He took part in the International Congresses, both in Zoology in general and in Entomology in particular, and but few works devoted to the objects which he loved to study do not include references to his writings or to his collections, and officials in charge of the important museums of the whole world constantly consult the Tring collections. Lord Rothschild was greatly interested in the preservation of the flora and fauna threatened by the advance of destructive civilisation. As a man his manner was friendly to all; he was, as one who knew him well said, "a nice man," and those who were with him as delegates to the Congress at Zurich will agree. A few years ago Lord Rothschild became one of the eight members of the famous Entomological Club, and to those of us who were invited to the lunch at Tring each year it is an occasion to be a lasting memory of a genial reception, of a pleasant reunion of friends, of an exhibition of a splendidly displayed section of the collection and an excellent luncheon in the precincts of "entomological sanctity." He died on August 27th last after an illness, possibly the indirect result of a serious fall in his home twelve months previously. We understand that the whole of the collections and the Library, as well as the buildings containing them, are left to the Nation.—HY. J. T.

(With thanks to Dr Karl Jordan, F.R.S., Director of the Tring Museum.)

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**SPECIAL NOTICE.**—May we ask all readers who wish to have their communications published in a forthcoming number at any time to send early. We now have to assemble the whole of the matter for the next number immediately after the publication of a number, in order to assure the early issue of proofs. All proofs were in our hands this month on 27th of November and some had been delivered a week before that.

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By HY. J. TURNER, F.R.E.S. F.R.H.S.

VOL. XLIX. (new series) (1937).

## The Entomologist's Record & Journal of Variation.

*Coleoptera arranged in order of Genera. The other Orders arranged by Species. Genera, Species, etc., new to Britain are marked with an asterisk, those new to Science with two asterisks.*

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## CORRECTIONS.

- p. 18, line 14, for "most" read "never."  
 p. 22, line 12, for "*Oreasobia*" read "*Oreasobbia*."  
 p. 78, line 22, for "*L.*" read "*P.*"  
 p. 94, line 27, for "*ledereri*" read "*lederi*"

**Trypeta vectensis sp.n. and other new or little known  
British species of Trypetidae (Diptera).**

By J. E. COLLIN, F.R.E.S., etc.

The generic name TRYPETA, Mg.

It has been suggested that Rondani's fixation in 1870 of *Musca arctii*, DeG. (= *tussilaginis*, F.) as the type of the genus *Trypeta* is inadmissible, and that *artemisiae*, F. should take its place, with the consequence that the name *Trypeta* would be transferred to a different subfamily and applied to an entirely different group of species to that with which it has been associated for more than 70 years. Such a transfer in the use of a well-known generic name is one of the most pernicious changes that can be made—a far greater cause of confusion than the sinking of a well-known name as a synonym—so I feel certain that the majority of working Dipterists will join with me in a request that Rondani's type fixation be accepted. The name *Trypeta* first appeared in a paper in Illiger's *Magazin für Insektenkunde*, 1803, which was obviously an attempt by Illiger to advertise the great work on European Diptera upon which Meigen was known to be engaged, and was entitled:—"Versuch einer neuen Gattungs Eintheilung der europäischen zweiflügligen Insekten von Joh. Wilh. Meigen in Stolberg bei Aachen." In this paper an introductory preface by Illiger is followed by short diagnoses of 114 genera, with, in most cases, the names of a few species quoted as examples. It is, however, obvious that these names were not intended as a complete list of all the species originally included in each genus by Meigen, because the expression "etc." is often added. Such is the case with *Trypeta* where "*Musca arnicae*, *cerasi*, *urticae*, *artemisiae*, etc. Fabr." are the examples given, and as *Musca tussilaginis* was described by Fabricius in the same work as the four species quoted as examples, and was included in the genus by Meigen when he subsequently published his great work, it might be well accepted as "originally included in the genus" under the expression "etc." and therefore available as type.

*Trypeta vectensis* sp.n.

This species belongs to the group having wing markings (often faint) *not* in the form of transverse or obliquely transverse bands; a group represented in Britain by *colon*, Mg., *florescentiae*, L., and *winthemi*, Mg. The wingmarkings in *colon* when present (they are sometimes almost indistinguishable), and in *florescentiae*, are quite distinctive; in *colon* they take the form of only a darkening of the stigmal area and about the ends of the radial and cubital veins (sometimes spreading backwards along these veins or even forming a subcostal blotch); the distinctive feature of the wing-pattern in *florescentiae* is the presence of three distinct rounded dark costal patches (one at stigma, one at tip of wing and one in between), and a smaller patch at lower outer angle of discal cell.

In *winthemi*, which the new species more closely resembles in having fainter, rather indeterminate, and variable, wing-markings, there are usually three small patches along the radial vein (one beneath stigma, the second halfway along towards end of the vein, the third at apex of subcostal cell) and a large patch at tip of wing; an extension downwards of the first three patches may be traced, that of the first patch as a faint clouding embracing the middle crossvein, of the second patch embracing the outer crossvein, while the *very* faint extension of the third patch widens out rapidly towards hindmargin of wing, and is often only evident when the wing is viewed by reflected light; *when so viewed the lighter areas between patches have a whitish appearance* and the stigma also, though when the latter is seen by transmitted light it is pale yellowish.

*Trypeta vectensis* sp.n. ♂ ♀. Resembling *T. winthemi* but smaller and otherwise differing as below:—

♂. Head smaller and seen in profile with eyes occupying rather greater area, consequently jowls below eyes narrower; the usual stronger bristle halfway along jowls near mouthedge, pale in colour, at most only brownish. Thorax with two narrow wedge-shaped extensions forward of the prescutellar yellow area, the anterior pair of dorso-central bristles placed on (or very near) the tip of each extension, the posterior pair on prescutellar yellow area; in *winthemi* there is only a wider median wedge-shaped extension forward, the anterior dorso-centrals being well away from any yellow area, and the posterior pair on the hindmargin of dark area, one on each side of base of median yellow extension. In *winthemi* there are two yellow pleural patches below thoracal squamae, the posterior one extending upwards to basal corner of scutellum; in *vectensis* the latter is black dusted with grey like rest of area below scutellum, leaving only the patch in front of halteres yellow. General pubescence more whitish-yellow compared with the golden-yellow of *winthemi*.

Abdomen more extensively darkened than in *winthemi*, the 2nd to 4th tergites often almost entirely black, or with only hind-margins paler, the long 5th tergite black across base with projections at sides and middle; in *winthemi* the darkening is confined to isolated patches on base of these tergites, two on 2nd and four on 3rd to 4th, the side patches on 5th tergite being often connected to another patch on each hind corner.

Wing-markings more restricted, that at tip of wing much smaller and usually consisting of a small patch about end of cubital, with sometimes a still smaller one at end of discal, vein; both crossveins, and the end half of stigma often darkened; there is practically no extension downwards from the first and third small patches along radial vein, and that from the second patch is often indistinct or even absent, and when viewed by reflected light *there is no whitish tinge* to any part of wing surface. In pale specimens there is practically no darkening at end of stigma or about crossveins; in dark specimens in addition to the end half (or less) of stigma, and the crossveins, there may be a dark streak in subapical cell from the outer crossvein to apical wing patch.

♀. Resembling male but abdomen less extensively darkened, hind-margins of tergites 2-5 often broadly yellowish, but the dark markings on these and the longer 6th tergite, even when restricted, are in the form of *three* shallow segmental basal patches and not *four* isolated spots



as in *winthemi*. Pubescence rather shorter and especially no longer hindmarginal bristles to 5th tergite, which in *winthemi* are about two-thirds length of those on hindmargin of 6th tergite. Ovipositor narrower at base and rather longer than in *winthemi*.

Length about 4mm., often rather less in male and slightly more in female.

The discovery of this new species was made by Mr. H. G. Jeffery of Newport, Isle of Wight, in the following circumstances.

In December 1933 he collected a number of seedheads of various plants with a view to breeding Trypetids, hoping to add to the small number of species (5) recorded in Morey's "Guide" as occurring in the Isle of Wight. Among these seedheads were some of *Serratula tinctoria*, Tr. (Saw-wort) and from these in 1934 from 9th July onwards about half-a-dozen specimens of a Trypetid emerged which were set and put away with a miscellaneous lot of Diptera awaiting identification.

In August 1935, Mr. H. W. Andrews was visiting Mr. Jeffery and noticed these Trypetids as unlike anything known to him. Mr. Jeffery told him their history and on August 16th Mr. Andrews swept a fair series from heads of saw-wort on Cranmore Heath where this plant was extremely abundant. Upon returning home an attempt to identify the species failed and Mr. Andrews sent specimens to me. The species was quite unknown to me and I suspected it might prove to be new to science; this was confirmed by Dr. Hering of Berlin to whom I, in my turn, sent specimens.

Further specimens have since been bred from seed-heads of *Serratula tinctoria* collected in the I. of Wight, and Mr. Andrews has found the species in the New Forest (Hants).

*Trypeta (Ceriocera) cornuta*, F., and *T. microceras*, Hering.

In 1794 Fabricius described as *Musca cornuta* such a remarkable Trypetid that its identity has never been questioned, and it has been known and described as *Trypeta cornuta*, F. since 1844. There was however a previous *Musca cornuta* described by Scopoli in 1772 which remained unrecognised until 1870 when Rondani suggested (apparently with good reason) that it was the same as the species then known as *Spilographa abrotani*, Mg. The homonymy of *Musca cornuta*, F. was ignored until 1913, and indeed it was certain that there was never likely to be any confusion in retaining the same name of different authors in two widely separated genera. Hendel, however, in 1913 (*Suppl. Ent.* II. p. 82, footnote) proposed a new name, *ceratocera*, Hend., for *cornuta*, F., a proposition which I consider was entirely unnecessary and should not be adopted.

The larva of *T. cornuta*, F. has long been known to live in the flower-heads of *Centaurea scabiosa* but it has recently been discovered independently by Dr. Martin Hering of Berlin and Mr. G. C. Varley of Cambridge that there is a closely allied species the larva of which lives in the stem of the same plant. This was described in March 1936 by Dr. Hering (*Deuts. Ent. Zeits.*, 1935, p. 207) as a subspecies *microceras* of *T. cornuta*, F., but it appears to be sufficiently distinct to merit specific rank.

*T. microceras* is a smaller species than *cornuta* with the projection



to second antennal joint more slender and shorter so that it does not project so far beyond end of third antennal joint; eyes larger in proportion to size of head so that facial orbits and jowls are narrower; the small hairs on frontal orbits pale in colour and therefore less distinct. Wings with narrower bands which are less distinct on hinder half of wing. Last abdominal segment of male with dark side-margins; ovipositor of female rather narrower and with two longitudinal dark streaks on basal half.

I obtained four males and six females of this species by sweeping where *Centaurea scabiosa* was plentiful on the Devil's Ditch (Cambs) in July 1935. The same locality provided Mr. Varley with his material, in fact it was Mr. Varley's discovery which induced me to search for the species.

I would note here that I have never seen a British specimen of *T. lappae*, Ceder. and consider that Loew erred in attributing Walker's *tussilaginis* to this species. It needs confirmation as a British species.

*Spilographa wiedemanni*, Hend.

Hendel described this species in 1913 (*Deuts. Ent. Zeits.* p. 397) from one male in Wiedemann's Collection, taken at Kiel. It is allied to *S. zoë*, Mg. which, as is well known, is peculiar in having different wingmarkings in the two sexes, the male particularly having the outer crossvein not clouded. The male of *S. wiedemanni* agrees with the female of *zoë* in having this crossvein clouded. I possess two males from Chippenham Fen (Cambs) taken on 15.x.99 and 9.vii.28. The question whether they represent a distinct species, or are only aberrant males of *zoë*, is one to be elucidated by the capture or breeding of further material.

*Urophora*, Desv. = *Euribia*, Latr.

A genus *Euribia* was validated by Latreille in 1802 (*Hist. Nat. Crust. et Ins.* III. p. 458) when he associated it with his group VI of *Musca* and quoted *M. umbellatarum*, F. and *M. cardui*, L. as examples; the latter has been designated as the type, and it becomes necessary to use *Euribia*, Latr. in place of *Urophora*, Dsv.

*Euribia spoliata*, Hal.

This little known species was described from specimens taken in the I. of Wight by F. Walker, and until last year the only specimens known to me were those in the Dale Collection at Oxford. It is therefore particularly interesting to be able to record that Mr. H. W. Andrews bred several specimens in June-July, 1936, from flower-heads of *Serratula tinctoria* collected at Cranmore (I. of Wight) and kept for the purpose of breeding out the new *Trypeta rectensis* described above. *E. spoliata* is easily recognised on account of its clear wings with only the stigma darkened, and its extensively darkened legs. It is a small species about the size of *quadrifasciata* with similar yellow thoracic markings. Its wings are rather narrow with strong dark veins.

*Euribia solstitialis*, L., *E. cuspidata*, Mg., and *E. jaceana*, Hering.

These three species have usually been mixed up under the name *solstitialis*; none of the three is easily identified owing to the liability

to variations, especially in wing-markings; as a rule, however, each exhibits a tendency to a special facies in these markings, which, though difficult to define, when once grasped, does help in the identification. Moreover it would appear that they are each associated with different food-plants.

*E. solstitialis* was originally described as to be found "in *Carduis aliisque*," and subsequently (1761) as "in floribus & foliis *Cardui crispifolii* frequens, rarius in *Cerasi foliis* mense junio," and (1788) as "in *cardui floribus*," therefore the restriction of this name to a species associated with thistles appears to be justified; such a species is found commonly on the Continent though apparently not so common in Britain.

The name *solstitialis* has in this country been applied both to the true *solstitialis* and (more usually) to *E. jaceana* which, with us, attacks the flower heads of the black knapweed (*Centaurea nigra*) and is very common and widely distributed, though, apparently far from common on the Continent where it attacks *Centaurea jacea*. Finally we have a third species *E. cuspidata*, Mg. associated with *Centaurea scabiosa* and bred from the flower heads of that plant by Dr. Martin Hering of Berlin.

This *E. cuspidata* is probably the most easily distinguished species. It is slightly the largest and has the longest female ovipositor—much longer than rest of abdomen. Wing markings rather like those of *E. stylata*, F. (except of course for the presence of the basal "band" or darkening about the basal cells), the "bands" being narrow, with the second (extending from stigma downwards) often interrupted; the darkening at end of stigma is nearly always continued backwards beneath costa leaving the extreme base and lower side of stigma pale. Front femora with a dark posterodorsal streak, and hind femora often darkened beneath about base; prosternum and hind coxae extensively dark. Anterior dorsocentral bristle only slightly in front of a line connecting the supra-alar bristles, much less so than in *jaceana*. Last abdominal tergite in male decidedly longer than the two preceding ones together and the very long coiled penis when extracted noticeably longer than that of *jaceana*. Hending's "Table of species" in Lindner's *Die Fliegen* is rather misleading inasmuch that in *cuspidata* the third and fourth wing bands are more often separated than united on the costa.

I have taken this species by sweeping *Centaurea scabiosa* flowers in July on the Devil's Ditch (Cambs) near Newmarket, and it will probably be found in many other districts where this plant grows.

Of *E. jaceana*, Hering,\* which its describer has reared from the flower heads of *Centaurea jacea* (a plant not indigenous to Britain) I have been able to compare co-types with our common *Euribia* from flower heads of *Centaurea nigra* and believe them to be conspecific. It is a rather smaller species than *cuspidata* with a much shorter female ovipositor—not, or scarcely, longer than rest of abdomen while the more slender apical part of the ovipositor merges very gradually into, and is not longer than, the stouter basal part. Wings with rather broader dark "bands," only the end of stigma darkened and the basal band evident up to the costa. Front femora in male seldom, in female

\* Described in 1935 *Markische Tierwelt*, Berlin, p. 169. Bred (Hering in lit.) from both *C. jacea* and *C. nigra*.—J.E.C.

often, with a dark posterodorsal streak; prosternum and hind coxae mainly yellowish. Anterior dorsocentral bristle well in front of a line connecting the supra-alar bristles. Last abdominal segment of male not, or scarcely, longer than two preceding tergites together. Wing markings variable; the third or fourth bands may be united or separated on costa.

Apparently an abundant species, at least in some districts, making hard galls in the flower heads of the common black knapweed *Centaurea nigra*.

The restricted *E. solstitialis* in many respects combines the characters of the two previous species, having the long last tergite in male and long ovipositor in female, of *cuspidata*. Front femora usually with a dark streak, but prosternum and hind coxae extensively pale. Anterior dorsocentrals more in front of a line connecting the supra-alars than in *cuspidata*. Wing markings rather like those of *jaceana* but the dark bands somewhat narrower, two middle bands straighter, basal band very faint towards costa and stigma brownish at tip only, so that the first and second bands are rather more widely and distinctly separated, and the costal area from wing base to stigma paler than usual.

I have very few British records of this species, but it has probably been overlooked. My friend Mr. A. H. Hamm finds it not at all uncommon near Oxford, where *E. jaceana* appears to be rare. Otherwise I have only one specimen from the Devil's Ditch (Cambs), and another from Farley Down (Hants.)

I have seen no British specimens of *E. aprica*, Fln. or *E. macrura*, Lw. and believe that records of the former have been based on specimens of *quadrifasciata*, Mg., and of the latter on specimens of *cuspidata*, Mg.

#### *Campiglossa grandinata*, Rdi.

This Tephritinid genus has, like *Oxyyna*, a geniculate proboscis (which however is rather stout), and two pairs of upper orbital bristles; it differs from the restricted genus *Oxyyna* in having two pairs of lower orbitals and from other genera with all these characters in having the antennae wider apart at base and a very wide frons, while there is no large hyaline spot in subapical cell just beyond middle crossvein such as in *Paroxyyna* completes the triangle of hyaline spots having its base on costa. However I must say that the generic differences between *C. grandinata* and some species of *Paroxyyna* such as *argyrocephala*, Lw. appear to be very insignificant.

*C. grandinata*, Rdi. is a handsome species differing from *C. irrorata*, Fln. (a species which might well be found in this country) in having the lower orbital bristles black, and the rounded hyaline spots about tip of wing and in the whole of the subapical (or first posterior) cell, smaller. Thorax grey, maculated with brown, the two pairs of dorsocentrals placed upon darker spots, anterior pair immediately behind suture; abdomen grey with four rows of dark patches, those at the sides smaller and on the actual side margins of tergites; ovipositor short, about length of two previous segments, shining black or dark chestnut brown. Legs yellow with femora somewhat brownish. Length 4-5mm.

Three females in the Verrall Collection under a label "*Oxyphora biflexa*, Lw. vel *Tephritis*, sp.n. aff. *zelleri*, Lw." Two were taken

at "Tilgate" (Sussex) on 29th March, 1872, the third is labelled "Coph. 8. 72.," which probably means that it was taken at Copthorne also in Sussex. The larvae are said to form galls in the stem of *Solidago virgaurea*, L.

*Paroxyna loewiana*, Hend.

The genus *Paroxyna* with type *tessellata*, Lw. was established by Hendel in 1927 (Lindner's *Die Fliegen, Trypetidae*) for those species of *Oxya* having two pairs of lower orbital bristles, which means that all the British species except *parietina*, L., *proboscidea*, Lw. and *flavipennis*, Lw. are placed in *Paroxyna*.

*P. loewiana*, Hend. is the species added by me to the British List in 1910 under the name of *Oxya parvula*, Lw. Mr. A. H. Hamm has bred it from flower heads of *Solidago virgaurea*, L. Loew in his Monograph of 1862 figured its wing under the name of *O. argyrocephala*, though the accompanying description applied to the true *argyrocephala*, Lw. (1844), and I was misled in 1910 by this description.

*Paroxyna argyrocephala*, Lw. (1844).

This species occurs in Scotland (Aviemore district). It differs from *P. loewiana* in having a distinctly striped thorax, and apical part of wing with more numerous and much smaller hyaline spots.

*Paroxyna parvula*, Lw. and *P. absinthii*, F.

There has been considerable confusion over the use of the name *absinthii*, F. Hendel considers that *elongatula*, Lw. must in future be known as *absinthii*, F. though he does not state whether he has seen Fabricius' type (which ought to be in the Dom Lund Collection at Copenhagen), and that *absinthii*, Lw. *nec* F. must be known as *punctella*, Fln. Our British *absinthii* is however evidently *parvula*, Lw. of which Hendel for the first time figures the wing of the type specimen, and *P. punctella*, Fln. (*absinthii*, Lw. *nec* F.) does not appear to occur in this country.

*Tephritis praecoæ*, Lw.

This species may be known by its small size (2.5mm.), and by the middle crossvein of wing being practically opposite end of subcostal vein, so that the two large central spots in the marginal cell and the two (only) beneath them in the submarginal cell, are all beyond this crossvein.

I captured a female of this distinct little species at Aldeburgh (Suffolk) on 19th September, 1907.





## New Lepidoptera from Iran.

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and WILHELM BRANDT (Degerö Finlandia).

Mr. Fred H. Brandt collected lepidoptera during summer and autumn 1936 at the south western slope of the Elburs mountains in northern Iran, firstly in the hilly steppe at Keredj, about 40 km. west of Teheran at an altitude from 1400-1700 m., and later in the centre of the Elburs mountains at Nissa. This mountain village lies at about 70 km. from Keredj on the Keredj-Majanderan Road in a valley at 2100m. The surrounding mountains reach a height of about 3500m.

The extensive collections of Mr. Brandt proved to be very interesting and two new species from this material have been already described by Mr. O. Bang-Haas (*Pheosia brandti*, *Rhetera brandti*, in *Ent. Zeitschr.* Vol. 50, p. 451, 562). We are bringing here short descriptions of a number of new species and forms collected by Mr. Fred Brandt. An extensive list of the whole material will be published later, where also most of the new forms described in these pages will be figured. As more material is continually coming in, the descriptions will not be arranged exactly in the taxonomic order of the species, but will be published as they come in.

We are very much indebted to Messrs. O. Bang-Haas, Ch. Boursin, A. Draudt, A. Pictet, L. B. Prout, and R. Verity for comparing doubtful specimens and for lending type material for comparison.

*Pieris ergane*, Hbn. ssp. **elbursina**, ssp. nov.

A large and heavily marked subspecies. ♂♂ 43-45mm., ♀♀ 39-44mm.

*Male*:—Ground colour pure white, near the margin with a yellowish hue; grey apical spot dark and large. Distal spot very variable, in some specimens not larger than in typical *ergane*, Hbn., in some specimens enlarged and sometimes with traces of a connection with the apical spot. Costa heavily powdered with grey. On the hind-wing the spot at the anterior angle is mostly present, sometimes however only in traces.

*Underside*: Costa and apex of the forewing and the entire hind-wing bright yellow, the latter suffused with grey with the exception of the anal part.

*Female*: Ground colour varying from white to yellowish; markings very large. In one specimen the apical spot and the two distal spots are enlarged and connected by grey scales forming almost a transverse band (ab. *magnimaculata*, Rostagno). Costa yellow. The grey suffusion extends from the base along the costa and reaches even the discal cross vein. Hindwing with a large spot at the anterior angle which may extend along vein III<sub>1</sub>. Base suffused with grey.

*Underside*: Costa and apex of the forewing and the entire hind-wing bright yellow suffused with grey. The yellow runs along the margin of the forewing reaching vein IV<sub>2</sub>. The distal spots of the upper side are shining through.

This new ssp., which spans 4-5mm. more than my European

specimens of *ergane*, is not identical with f. *detersa*, Vrty. from the Taurus, which, on the contrary, is an almost unmarked form. May be ab. *niediecki*, Strd. from the Taurus is an extreme female aberration of ssp. *elbursina*. One heavily marked ♀, which I am inclined to consider as ab. *magnimaculata*, Rost., forms a good transition to ab. *niediecki*, Strd. though it seems to be less yellowish than this form.

*Cotypes*: Keredj 1500m. 4.iv.-20.v.1936. 4 ♂ 2 ♀ in coll. Bytinski-Salz; other specimens in coll. Brandt.

*Chilades trochylus*, Frr. ssp. **persa**, ssp. nov.

Span 14-17mm. Ground colour a lighter brownish grey than in the brown *trochylus*, Frr. The dark veins very conspicuous. Discal spot only faintly encircled with a lighter border. Light marginal band double. Hindwing with the 4 black spots very large, bordered on the outside with white. The orange discal lunules reduced in size, 2-3 present. They are followed by a conspicuous white band. Discal spot as in the forewing.

Underside as in *trochylus*, Frr. with the orange band sometimes pretty pale.

*Cotypes*: Keredj 1600m. 25.v.-9.viii.1936. 15 ♂ ♂ 3 ♀ ♀ in coll. Bytinski-Salz, other specimens in coll. Brandt.

One female lacks all silver on the under side. The marginal spots are large and entirely black: ab. **pauper**, ab. nov.

*Holotype*: 1 ♀ Keredj 1600m. 25.v.1936, in coll. Bytinski-Salz.

*Lycaena (Glaucopsyche) panagaea*, H.-Sch. ssp. **ahasveros** ssp. nov.

Very variable in size; the ♂ ♂ span 18-23mm., the ♀ ♀ 18-21mm.

*Male*: Blue of the fore-wing lighter than in *panagaea*, H.-Sch. from Anatolia and the Taurus. Black margin much narrower. Discocellular streak straight, not semilunar as in *taygetica*, Rbl.

Under side in both sexes lighter grey without any brown colour. Only one orange marginal spot between vein  $IV_1$  and  $IV_2$  present, much reduced in size and of a pale yellowish-orange colour. The large black spot in front of the orange one, small and pale, in some specimens not more distinct than the other semilunar spots of the marginal row.

This subsp., which comes near the var. *taygetica*, Rbl. agrees with this form by its narrow black border and the greyish underside. It differs by the presence of only one pale orange spot on the underside and the reduction of the black spot between vein  $IV_1$  and  $IV_2$ .

*Cotypes*: Keredj 1700m. 6-10.v.1936. 10 ♂ ♂ 6 ♀ ♀ in coll. Bytinski-Salz; other specimens in coll. Brandt.

*Adopaea pfeifferi*, sp. nov.

Span 31mm., length of forewing 15mm. Thorax greenish brown, Colour of the wings a bright "marshyellow" (after Ridgway) not reddish brown as in *A. flava*. Androconial streak in the same position as in *flava*, but narrower and interrupted in the lower third. A dark border along the margin of both wings. Costal area of the hindwing also dark brown. Fringes white.

Underside of the hindwing a pure "pinard yellow." Costa and apex of the forewing of the same colour. The outer part of a bright "yellow ochre" colour. A dark grey suffusion from the base along the lower border of the cell. A faint brown marginal line in both wings present. Fringes white.

This species differs from the description of *A. nova*, Reverdin, which measures only 25mm., by its larger size, by the lack of a grey suffusion on the base of both wings and by the darker cinnamon area of the forewing. Hindwing not paler than the forewing as in *A. nova*, Rev.

Named after Mr. Ernst Pfeiffer, Munich.

*Cotypes*: Keredj 1700m. 1.vii.1936. 2♂♂ in coll. Brandt, 1♂ in coll. Bytinski-Salz.

*Thanaos elbursina* sp. nov.

Span 26mm., length of forewing 12mm. Palpi whitish, the tips black. Head, thorax and abdomen dark grey, the latter with light borders at each segment. Underside whitish. Forewing with costal fold.

Ground colour of the wings a dark "cinnamon buff." Position of the basal and median spots as in *Th. tages*, L., dark brown and very distinct. Row of postmedian spots complete, sinuate, reaching the inner margin more to the base than in *tages*, L. Spots 1-6 elongate, 7-10 circular, all spots white, encircled by dark brown. Spot 1 only at the inner end, spots 2-6 at their inner and outer margin, spots 7-10 encircled completely (eye spots). Marginal area slightly darker with a complete row of white marginal spots and a black termen. Fringes chequered lighter and darker brown, blackish at their base.

Hindwing: basal and median spots confluent, forming a dark brown field, in which a light discal spot stands out. Marginal area dark "cinnamon buff," darker at its outer border. A row of whitish marginal spots followed by a black termen. Fringes blackish at their base.

Underside "pale pinkish buff" suffused with grey at its base. Forewing with the postmedian row of white spots very distinct, spots 1-8 very lightly encircled with brown, spots 9-10 dark, eyeless. A complete row of white marginal spots. Termen and fringes as on the upperside, in strong contrast against the light colour of the wing. Hindwing almost of uniform colour, only the discal spot and the marginal row a little lighter.

♂ *Genitalia* (B. C. S. Warren's Nomenclature); Harpe much longer than in *tages*, L., the tip reaching the serrate edge of the cuiller (Corona). Teeth of the cuiller more numerous, shorter and evenly distributed along the edge. Style of the left clasper short and stout, without teeth as *tages*, L. has. The field with cornuti at the 10th sternite smaller than in *tages*, uncus less curved. Cornuti of the aedoeagus more numerous, larger and longer than in *tages*, L.

This species differs from all other *Thanaos* species, besides the genitalia, by its very light buff colour, which is much lighter than in *ab. clarus*, Car. It distinguishes itself from this form (which belongs to *tages*, L.!) also by the different shape of the postmedian row of spots and especially by the underside of the forewing with its conspicuous markings. It has also nothing to do with my Asiatic specimens of ssp. *popoviana*, Nordm. and *sinina*, Gr.-Grsch. which come very near to *tages*, L. on the upperside, but differ by their dark brown underside and very distinct rows of postmedian and marginal spots on both wings.

*Cotypes*: 2♂♂ Keredj 1500m. 4.vii.1936, in coll. Brandt.

*Cymatophora osthelderi* sp. nov.

Span 41mm. Head and thorax grey, collar dark, tegulae and base



of abdomen lighter. Ground colour of the forewing pure grey mottled with white. Transverse lines black, less bent than in *or.*, *F.* or *ocularis*, L. Sometimes a darker median shade present. Before and behind the transverse lines a number of rather inconspicuous parallel lines. A black apical streak followed by a row of light dots on the veins, forming an almost straight band across the wing. Veins in the terminal field marked with black, followed by a black terminal line. Fringes chequered light and dark grey. Orbicular very small, circular; reniform oblong, always near the postmedian line mostly touching it with its upper edge. Both maculae are of a bright yellow colour and surrounded by a black line.

Hindwing light grey, with a broad dark grey marginal band; a dark discal blotch present. Fringes white.

Underside light silvery grey, crossed by 3 dark transverse bands which do not reach the inner margin.

♂ *genitalia* of the *ocularis*-type with short curved lateral appendages of the uncus. Papillae of the clavus very small with less bristles than in *ocularis*. Uncus longer, more evenly curved. Tip not tongue-shaped. Lateral appendages longer, more slender and more curved at the base. Aedoeagus: field of cornuti smaller than in *ocularis*, terminal hook more slender.

This species resembles *C. or* by the smallness of the maculae which are never centred with black as in *ocularis*. According to the genital armature this species comes nearest to *C. ocularis* and its ssp. *sareptensis*, Spul. It differs by the pure grey colour of the wings, the shape and position of the maculae which are never yellow in *ocularis*, and by the genitalia. Dedicated to Regierungspräsident L. Osthelder from Munich.

*Cotypes*: Keredj, 1400m. 5-10.ix.1936. 4 ♂♂ in coll. Brandt, 1 ♂ in coll. Bytinski-Salz.

*Cymatophora osthelderi*, By.S. and Brandt, ab. **farinosa** ab. nov.

Two males are completely suffused with white. Both transverse lines are lacking. Behind the place of the postmedian line a darker shade. Apical streak well emphasized, also the black streaks along the veins. The yellow maculae very conspicuous on the light background.

Base of the hindwing white, marginal band lighter than in *osthelderi*. Fringes white.

*Cotypes*: Keredj, 1400m. 10.ix.1936. 1 ♂ in coll. Brandt, 1 ♂ in coll. Bytinsky-Salz.

*Bryophila argentacea* sp. nov.

Span 27mm., length of forewing 13mm. Palpi, head and thorax grey, tegulae a little lighter. Form of the forewing short and broad, even more than in *B. contristans*, Led. Ground colour of the forewing a pure dark silvery grey, a little lighter at the margin. All designs very indistinct. Black narrow basal, antemedial and postmedial lines formed as in *B. galathea*, Mill. Orbicular and reniform encircled by a faint dark line. At the costa a row of small, lighter dots and a larger light blotch at the apex. Marginal area with a light brownish tinge between the veins. Terminal line black interrupted by the veins. Fringes chequered brownish and grey.

Hindwing dark brownish grey, lighter at its base, darker at the margin. Fringes light.

(15.vi.37.)

Underside of the forewing dark lead grey without the silvery shine of the upper side. Costa lighter. Termen a dark line interrupted by the veins.

Hindwing lighter, pale grey at the base. A distinct discal spot and a postmedian line present. Marginal area a little darker followed by a dark terminal line. Fringes lighter.

*B. argentacea* differs from all other *Bryophila* by its broad and rounded shape of the forewing. In the shape of the markings it comes near to *B. galathea* but differs by its silvery grey colour and its very inconspicuous designs.

*Holotype*: 1 ♀ Keredj 1400m. 10.vi.1936, in coll. Brandt.

*Euxoa temera*, Hbn. ssp. **leucotera** ssp. nov.

Span 34-45mm. Ground colour of forewing a pure light grey without any brown tinge. Only the surroundings of the reniform light sable yellow.

Hindwing in the ♂ pure white, in the ♀♀ light grey, darker at the margin, with dark veins. Underside light silky grey, discal spots rather inconspicuous.

Mr. Boursin, who saw the specimens thinks they are a valid subspecies of *temera*. They differ from all other *temera*, Hbn. by the pure grey colour which is best compared with pale *E. decora*, Hbn.

*Cotypes*: Keredj 1400m. 14-21.ix.1936. 1♂, 2♀♀ in coll. Bytinski-Salz, other cotypes in coll. Brandt.

*Porphyrinia draudti* sp. nov.

Span 24mm., length of the forewing 11mm. Palpi light grey, head, thorax and abdomen pure white. Forewing narrow with rather acute apex, costa curved as in *P. leucanides*, Stgr.

Colour of the forewing chalk white. Postmedial line indicated only by a faint yellowish spot at the costa. A black twin spot at the discal cross-vein, another small one in the cell, nearer to the first one than to the base of the wing. Apex with two large submarginal spots, followed by a row of small spots between the veins. Terminal line narrow, yellowish brown. Fringes white.

Hindwing pure chalk white.

Underside chalk white, both wings with a hue of light yellow at the costa.

This species resembles superficially a very light *P. ostrina*, Hbn. v. *carthami*, H.-Sch., but can be distinguished immediately by its larger size, the narrow shape of the forewing, the pure white colour and the spot in the cell, which in *ostrina* stays nearer to the base than to the spot on the cross vein. I think *P. draudti* comes nearest to *P. munda*, Christ. I have seen two specimens, also from Keredj, which I consider to be very light and unmarked specimens of *munda*, Christ. The median shade, so pronounced in the figure of *munda* in Romanoff, Vol. I. pl. VIII. fig. 6, is only in traces present, but the position of the spot in the cell and the presence of marginal spots near the anal angle of the wing agree well. *P. draudti* differs from these specimens and the figure of *munda*, Christ. mentioned above, by its narrow shape of the forewing, the lack of the median shade and the position of the spot in the cell, which stands nearer to the spot on the cross vein in *draudti*, but nearer to the base in *munda*. The hindwings are also much darker than in *munda* and my "*munda*" specimens.

Named after Prof. A. Draudt, Darmstadt, who saw the specimens and agreed it to be a species unknown to him.

*Holotype*: 1 ♂ Keredj 1400m. June, 1936, in coll. Bytinski-Salz.

*Paratype*: 1 ♂ same date and place in coll. Brandt. This specimen is less marked than the type. It lacks the spot in the cell; the spot on the cross vein single and very small. The two apical spots and the marginal row of dark dots less pronounced.

*Porphyrina boursini* sp. nov.

Span 22mm., length of forewing 10.5mm. Palpi brown, frons white, head and tegulae yellowish. Thorax and abdomen white. Shape of the forewing narrow, apex very acute as in *P. conistrotata*, Hmps. ♀ ♀. Ground colour of the forewing whitish almost completely suffused with dull yellow and only in the centre of the wing still observable. A black spot in the middle of the cell nearer to the cross vein than to the base. An oval black mark on the cross vein, connected with the postmedial band. The latter broad, yellowish, leading from the costa outward, forming a sharp angle at vein 7 and then leading obliquely straight inward to the inner margin. From the angle the band has a dull brown colour. From the base of the wing another longitudinal dull brown shade along the median fold, not reaching the postmedial band. Marginal area brownish with a row of very small black dots followed by a terminal dark brown line. Fringes whitish at their base, light brownish at their outer part.

Hindwing light greyish white with a dark median shade which forms the the continuation of the dark band on the forewing. A darker marginal area followed by a narrow brown terminal line. Fringes as in the forewing.

Underside of the forewing grey, with a darker median shade: costa and fringes lighter, Hindwing uniform light grey.

This species seems to come nearest to the *P. conistrotata*, Hmps. *griseola*, Er. group by its narrow and acute forewing. It differs from all *Porphyrinia* known to me by its very oblique postmedian line, which is even more oblique than in the American *Eublemma* (*Porphyrinia*) *obliquialis*, Fabr. Prof. Draudt saw these specimens and wrote they were also unknown to him.

Named after Mons. Charles Boursin, Paris, to whom I am very much indebted for the revision of a number of doubtful specimens.

*Holotype*: 1 ♂ Keredj 1400m. 24.vi.1936. in coll. Bytinski-Salz.

*Paratype*: 1 ♂ Keredj 1600m. 24.vi.1936, in coll. Brandt.

This specimen spans 23mm., is generally of a lighter and whiter colour and shows all markings, especially the oblique brown band, more distinct.

*Polia w-latinum*, Hufnagel 1767 (syn. *genistae*, Borkh. 1792) var. (ssp.?) **umbrosa**, var. nov.

Persian specimens give the impression of a good species somewhat intermediate between *w-latinum*, Hufn. and *thalassina*, Rott. but the genitalia agree with those of *w-latinum*.

Ground colour of forewing dark greyish black. Antemedian and postmedian field only slightly lighter than the middle space, and not violet grey as in typical *w-latinum*. All designs less emphasized. The marginal band before the w-line clear brown.

Hindwing dark fuscous grey a little lighter towards the base.

This form is even darker than *thalassina* ab. *humeralis*, Haw. Specimens from Boli Bythinia 800m. (teste Pfeiffer) are intermediate between typical *w-latinum* and var. *umbrosa*, while a ♂ from Akshehir (teste Wagner) is typical *w-latinum*.

*Cotypes*: Keredj, 1400m. 10.v.-3.vi.1936. 2 ♂♂ 1 ♀ in coll. Brandt, 4 ♂♂ in coll. Bytinski-Salz.

*Polia oleracea*, L. forma **pallida**, f. nov.

*Polia oleracea* flies at Keredj in two generations, in May and September. The form may be called a light *variegata*, Aust. One specimen agrees well with my light specimens of *variegata* from Tunis. The others form a continuous transition to the following light and pale reddish form. Orbicular and reniform light yellowish submarginal line broad white. Hindwing light grey only a little darker at the margin.

Underside uniform light grey without markings, only traces of the discal spots present.

*Holotype*: 1 ♂ Keredj, 1400m. 3.v.1936. in coll. Bytinski-Salz. A transitional specimen also from Malatia Tecde, Kurdistan, 10.vi.

*Aegle iranica* sp. nov.

Span 23mm., length of the forewing 10.5mm. Head and collar white, tegulae white, brownish at their base; tufts of the thorax brown with white tips.

Forewing white with a silky shine and with a yellowish suffusion at the base. From the costa to vein 2 a light brown postmedian band parallel to the margin and doubled from the costa to vein 7. A dark brown terminal line. Fringes chequered brown and white, divided by a faint brown line. Two very light brown streaks from the base, one crossing the discoidal cell and reaching the margin, where it ends between veins 5 and 6 in an enlarged brown spot; the second below the cell along vein 2 reaching the postmedian band.

Hindwing silky white, the veins brown. Fringes silky.

Underside of the forewing silky white. The brownish postmedian band interrupted between veins 5 and 6. Terminal line narrow brown. A broad longitudinal suffusion of brown from the base to the postmedian line, leaving the costal area white; also not extending into the interspace between veins 6 and 7. A dark streak along vein 2; discal spot in the obscure discal area.

Hindwing silky white with a small discal spot.

This species comes nearest to *Aegle gratiosa*, Stdgr., a figure of which is found in *Iris*, vol. VI. plate 1. It differs from this species by the absence of the discal spot on the upper side of the forewing, the more whitish ground colour, by having all brown markings more pronounced and the presence of the brown marginal spot, which *A. gratiosa*, Stdgr. lacks.

*Holotype*: 1 ♂ Keredj, 1600m. 7.vi.1936 in coll. Brandt.

*Catocala* (Subgenus *Blepharum*, Hübner, *Tentamen*, 1806) **fredi** sp. nov.

Fore tibiae unspined, middle tibiae spined, hind tibiae spined also above the middle spurs. Barnes and McDunnough have already pointed out that the type species of the genus *Mormonia*, Hübner, 1823: *M. epione*, Drury, has also spined fore tibiae and so *Mormonia*

must be applied to those species which till now have been placed in the genus *Catobapta*, Hulst. If it seems advisable to subdivide the genus *Catocala* (sensu lato) Schrank, 1802 as Hampson 1912 and Warren 1913 did, the species with "hind tibiae spined also above the middle spurs" till now placed into the genus *Mormonia* must be placed into the genus *Blepharum*, Hübner 1806 (type species: *sponsa*, L.), or, if Hübner's *Tentamen determinationis* is considered unpublished, into the genus *Astiotes*, Hübner, 1816-26, (type species: *dilecta*, Hbn).

Span 42mm., length of the forewing 19mm. Head and thorax olive-ochre, tegulae somewhat lighter.

Forewing: basal line indicated only by a black dentate spot at the costa. Antemedian line black forming a sinuous row of three concave arches bordered inside by a faint white line. Upper part of the reniform olive brown. Postmedian line beginning at the costa with an olive brown spot just above the reniform, then bent outward leading horizontally on vein 7 in a faint black line, then forming a black row of interneural lunules, angled outward above vein 5 and leading straight inward to the inner margin. Postmedian line bordered outside on the costa by a large white spot, followed by a faint white line from vein 7 on. Basal area whitish irrorated with brown scales especially against the antemedian border. Medial area whitish behind the antemedial line and irrorated with brown against the postmedian line, forming there a diffuse brown shade. Median shade indicated by the brownish blotch which extends into the upper half of the reniform. In the ♀ this median shade extends to the hindmargin as a large brown band. Outside of the fine white line, which borders the postmedian line, follows a broad subterminal brown band, leading almost straight across the wing and angled only a little at vein 5. This is followed by a whitish area, which is almost pure white, directly behind the brown band and irrorated with brown towards the terminal line. A sinuous terminal line bent inwards on each vein and followed by lighter yellowish spots on the veins, which are fused together towards a larger post-terminal spot at the apex. Termen darker; fringes chequered with brown and yellow.

Hindwing bright yellow. Medial band narrow leading straight to the submedian fold and then bending inwards to vein 1, not reaching the anal margin. Terminal band broad, ending below vein 2 and followed by a black patch at vein 1. Termen narrowly yellow towards the apex, then with slight yellow marks in the interspaces. Cilia white at the apex and between veins 2 and 1, chequered with brown between vein 6 and 2. Anal fringes white.

Underside: yellow, paler than the upperside of the hindwing. An oblique black median band from vein 9 forming a black blotch directly behind the discal vein, followed by a bent band leading outward to the hind-margin. Terminal area fuscous brown, its inner edge curved towards the costa followed by yellow dots on the veins. Cilia chequered. Hindwing with a very faint brown median band. Terminal area broad suffused with fuscous brown, its inner edge curved at the costa and slightly interrupted between veins 2 and 1. Termen with yellow dots on the veins. Cilia white on the apex and between veins 2 and 1, chequered brown and yellow between veins 6 and 2.

This striking new species is very different from every other species of *Catocala* hitherto known, especially by its non-dentate postmedian

lines. Structurally it seems nearest to the American *C. frederici*, Grote, but differs very much by its whitish ground colour which is even whiter than in *C. messalina*, Guen., by the narrow median band of the hindwing and by many other characters. The lines of the forewing are somewhat similar to those in the *C. abbreviatella*, Grote-group but even straighter and less dentate.

*Cotypes*: Keredj, 1400m. 30.vi.1936. 3 ♂♂ 1 ♀ in coll. Brandt, 2 ♂ in coll. Bytinski-Salz.

*Armada tarachoides* sp. nov.

Span 24mm. length of forewing 11mm. Head process with a cone-shaped protuberance. Frons whitish, collar, tegulae and thorax covered with brownish scales. Abdomen brown with whitish tip. Apex of the forewing pointed.

Ground colour of forewing chalk white. A brown basal band constricted in the middle. The dark brown median band interrupted by the white ground colour, forming an oval blotch from the costa to the middle of the cell and slightly interrupted by a lighter horizontal line. The lower part of the median band reaches from the anal angle to the median fold, forming a subquadrate brown spot, which is bordered inside and outside by a thin dark line. The whole outer part of the wing fuscous with greyish brown crossed by a thin lighter postmedial line. Near the apex a darker area, which bears on its outside a small black spot. Below this area a lighter and greyer zone which is traversed by darker veins. Termen white, near the apex with 3 dark dots on the veins. Fringes white.

Hindwing dark fuscous grey, lighter towards the base. Termen and fringes white. Underside of both wings pale grey with a broad dark outer band. 4 small dark dots on the veins near the apex. Termen and fringes white.

This remarkable new species belongs according to the shape of its head process to Warren's Section III, and is best placed near *Armada secunda*, Ersch. It differs from all other species of *Armada* by its pointed apex of the forewing, its pure white ground colour and the interrupted median band. In fact this species resembles at the first aspect very much the genus *Tarache*, Hbn., especially the species *T. biskrensis*, Obth.

*Cotypes*: Keredj, 1600m. 4.vi.1936. 2 ♂♂ 1 ♀ in coll. Brandt, 1 ♂ in coll. Bytinski-Salz.



lines. Structurally it seems nearest to the American *C. frederici*, Grote, but differs very much by its whitish ground colour which is even whiter than in *C. messalina*, Guen., by the narrow median band of the hind-wing and by many other characters. The lines of the fore-wing are somewhat similar to those in the *C. abbreviatella*, Grote-group but even straighter and less dentate.

*Cotypes*: Keredj, 1400 m., 30.vi.1936. 3 ♂♂ 1 ♀ in coll. Brandt, 2 ♂♂ in coll. Bytinski-Salz.

*Armada tarachoides* sp. nov.

Span 24 mm., length of fore-wing 11 mm. Head process with a cone-shaped protuberance. Frons whitish, collar, tegulae and thorax covered with brownish scales. Abdomen brown with whitish tip. Apex of the fore-wing pointed.

Ground colour of fore-wing chalk white. A brown basal band constricted in the middle. The dark brown median band interrupted by the white ground colour, forming an oval blotch from the costa to the middle of the cell and slightly interrupted by a lighter horizontal line. The lower part of the median band reaches from the anal angle to the median fold, forming a subquadrate brown spot, which is bordered inside and outside by a thin dark line. The whole outer part of the wing fuscous with greyish brown crossed by a thin lighter postmedial line. Near the apex a darker area, which bears on its outside a small black spot. Below this area a lighter and greyer zone which is traversed by darker veins. Termen white, near the apex with 3 dark dots on the veins. Fringes white.

Hind-wing dark fuscous grey, lighter towards the base. Termen and fringes white. Underside of both wings pale grey with a broad dark outer band. 4 small dark dots on the veins near the apex. Termen and fringes white.

This remarkable new species belongs according to the shape of its head process to Warren's Section III, and is best placed near *Armada secunda*, Ersch. It differs from all other species of *Armada* by its pointed apex of the fore-wing, its pure white ground colour and the interrupted median band. In fact this species resembles at the first aspect very much the genus *Tarache*, Hbn., especially the species *T. biskrensis*, Obth.

*Cotypes*: Keredj, 1600 m., 4.vi.1936. 2 ♂♂ 1 ♀ in coll. Brandt, 1 ♂ in coll. Bytinski-Salz.

*Pseudohadena banghaasi* sp. nov.

Span 45-46 mm., length of fore-wing 21 mm. Palpi, head, thorax and abdomen dull "pale pinkish cinnamon" with a rosy tinge. Tarsi of middle and hind legs blackish ringed with light grey. Fore-wing dull "pinkish buff" slightly suffused with pink. Lines as in *Ps. coluteae* with 6 dark points at the costa followed by 3 light ones. Lines very pronounced, a basal, a double antemedial and a postmedial line present. The median shade broad and very pronounced. Marginal line inconspicuous with arrow-shaped streaks between veins 3-7. Orbicular and reniform lighter than the background, the latter completely encircled with a dark line. Terminal line black. Fringes light at the base and tips, darker in the middle. Hind-wing lighter than in



*coluteae*. Underside pale silky grey with a brownish hue. Darker median lines on both wings present, also a narrow dark termen.

This new species comes nearest to *Ps. coluteae*, Bien. As *coluteae* is also described from Persia, it was at first difficult to establish the fact what really is the true *coluteae*, Bien., as descriptions and figures in Hampson, *Catalogue*, Vol. III, p. 464, pl. 119, fig. 13, and Warren-Seitz, Vol. III, p. 184, pl. 43 b, can be attributed to both species. I received through the courtesy of Mr O. Bang-Haas a specimen labelled with the handwriting of his father, A. Bang-Haas: "*Pseudohadena coluteae*, B. . . . Hamps. hat type examiniert im Wiener Museum (Hamps)." As this specimen agrees well with two other specimens of my collection from Aksu and Kysyl-Fart, and with a specimen of *coluteae* Bien. in the Museum at Vienna (which, however, is not the type!) I think the name *coluteae* can be attributed to the lighter of the two Persian species, which till now has been regarded in most collections as *Ps. coluteae*, Bien. *Ps. coluteae*, Bien., is a very light and unmarked *Pseudohadena* and corresponds best with the figure of *Ps. sergia*, Pglr., in Hampson's *Cat.*, Vol. VII, pl. 99, fig. 5, but shows the marking more pronounced and lacks, of course, the black basal streak. On the contrary, *Ps. banghaasi* is much more heavily marked somewhat as the figure of *coluteae* in Hampson's *Cat.*, Vol. VII, pl. 99, fig. 13, but has the ante- and postmedian lines double, which in *coluteae* are single and often interrupted. It differs from *coluteae* also by the lighter grey colour of the hind-wing, the underside of the fore-wing, which lacks the dark central area so conspicuous in *coluteae*, and also the ringed tarsi which are uniform in *coluteae*.

Dr Zerny, to whom I am very much indebted for the comparison of this new species with the material in the Vienna Museum, thinks it may be *Ps. arvicola*, Christ., but I cannot agree with his opinion. *Ps. arvicola* is described and figured in Romanoff, Vol. V, p. 18, pl. 1, fig. 7, and Hampson's *Cat.*, Vol. VII, p. 463, with a very distinct bluish suffusion, which completely lacks in *coluteae* and in *banghaasi*. I have a specimen from Aksu in my collection which shows this suffusion, as in some *Rh. renigera*, Hbn., forms as var. *turana*, Stg., very well, and which I am considering to be the true *arvicola*, Christ. *Arvicola* differs from *coluteae* and *banghaasi* by its colour but also by its much broader shape of the wings and less conspicuous designs.

Named after Mr O. Bang-Haas in recognition of his useful help clearing up the *coluteae* problem.

*Cotypes*: 4 ♂♂, Keredj, 1400 m., 26.iv-7.v.1936, in coll. Bytinski-Salz, other cotypes in coll. Brandt, Bang-Haas, and Wiltshire.

*Eulocastra schah* sp. nov.

Span 24 mm., length of fore-wing 11 mm. Ground colour of the fore-wing dirty white, sparingly powdered with brown scales. Median band dark brown-black, its shape as in *E. platyzona*, Led., but the tooth on the outside narrower. Costa near the apex with 3 dark dots. Margin suffused with brown. Fringes dark, chequered with white. Hind-wing uniform middle grey, somewhat darker at the margin; fringes lighter. Underside of the fore-wing light grey, median band and apex darker grey. Hind-wing light grey, powdered with dark scales at the costal margin.

This species comes nearest to *E. platyzona*, Led., but differs from the very good figure of this species in *Ann. Soc. Ent. Belg.*, Vol. XIII, pl. 1, fig. 13, by the whitish colour of the fore-wing, the complete absence of the white antemedial and postmedial lines as in *platyzona*, the darker hind-wings and the lack of a dark marginal band on the underside of the fore-wing, which is indicated only by the dark apical blotch.

*Holotype*: 1 ♂, Keredj, 1600 m., 4.v.30, in coll. Brandt.

### **Brandtina** gen. nov.

Proboscis fully developed; palpi upturned, the second joint reaching above the vertex of the head, the third joint short, both clothed with hair. Eyes large, round, clothed with hair (sub-family: *Mominae*). Thorax clothed with hair, abdomen with hair and scales. Thorax and abdomen seem to be without dorsal crests though both are a little rubbed.

Forewing long and narrow, the apex acute, termen evenly curved. Cell long, almost of  $\frac{2}{3}$  of the wing. Veins 3 and 5 from near the lower angle of the cell, 6 from the upper angle. 9 from 10 anastomosing with 8 to form a rather long and slender areole.

Hind-wing with the cell about half of the length of the wing. Veins 3 and 4 from the lower angle of the cell. Vein 5 fully developed almost from the middle of the cell and not near vein 4. 6 and 7 from the upper angle of the cell.

This new genus seems to come nearest to *Elydnodes*, Warr. It differs from this genus by the palpi and thorax which are covered only with hair, by the long and narrow wings, the acute apex, which, however, is not falcate as in *Elydnodes*, and the termen, which is evenly curved and not excised and excurved at vein 4 as in *Elydnodes*. A unique character of *Brandtina* is the position of vein 5 in the hind-wing, which comes off from nearly the middle of the cell and which is not found in any other Quadrifine genus of *Mominae*.

Named after Mr Fred Brandt, who discovered this interesting genus high up in the Persian mountains.

### *Brandtina albonigra* sp. nov.

Span 37 mm., length of fore-wing 17 mm. Palpi greyish white, head, antennae, thorax and abdomen white. Fore-wing pure silky white without any design. Hind-wing dark grey, veins 2-4 white up to the cell. Fringes pure white. Underside of the fore-wing silky grey about as the upperside of the hind-wing. Costa and terminal area lighter; fringes white. Hind-wing very light silky grey with a faint discal point. Fringes white.

*Holotype*: 1 ♂, Nissa, 2300 m., July 1936, in coll. Bytinski-Salz.

*Allotype*: 1 ♀, Nissa, 2300 m., July 1936, in coll. Brandt.

### *Scopula iranaria* sp. nov.

Span 23-24 mm.; shape of the wings as in *Sc. flaccidaria*, Z., and *albidaria*, Stgr. Ground colour of the wings yellowish white, sparingly covered with dark scales. Markings as in *flaccidaria*, Z., but less conspicuous; the dots of the postmedial line very small. Discal spots also very small; they may often be absent in the fore-wing.

♂ Genitalia: (two specimens dissected) nearest to *flaccidaria*, Z. Cranial border of the chitinous plate of the 8th sternite (not the map-pa!) with an obtuse middle lobe as in *flaccidaria*, and not straight as in *albidaria*, Stgr. Cerata with very little asymmetry as in *flaccidaria*; the shorter one about  $5/6$  of the longer. In *albidaria* the cerata are more asymmetrical, the shorter being only  $2/3$  of the longer. In *iranaria*, the shorter arm much stouter and more curved than in *flaccidaria* but not sigmoid as in *albidaria*; the longer arm also broader and shorter than in *flaccidaria* and more curved. Sacculus of the valve larger than in *flaccidaria* and more chitinized, but not so stout as in *albidaria*. Bulb at the blind end of the aedoeagus larger than in *flaccidaria* but much smaller than in *albidaria*.

This new species stands between *flaccidaria*, Z., and *albidaria*, Stgr., which, according to the differences in the genital armature, must be treated as a valid species. Externally *iranaria* resembles more *albidaria*, Stgr., of which species I have a ♂ from Margelan (Type population), ex coll. Staudinger for comparison. *Iranaria* differs from *albidaria* in having all designs even less conspicuous and especially the discal spots in the hind-wing smaller, but these differences are only slight. The chief difference lies in the genitalia which indicate that *iranaria* is nearer related to *flaccidaria*, Z. It is easily distinguishable from this species by its greyish ground colour which in *flaccidaria* has always a brownish or rosy tinge.

*Cotypes*: 4 ♂♂ 2 ♀♀, Keredj, 1400 m., 18-21.v.1936, in coll. Bytinski-Salz, other cotypes in coll. Brandt, Wehrli, and Wiltshire.

One ♂ has no discal points on both wings: ab. *depuncta* ab. nov.

*Holotype*: 1 ♂, Keredj, 1400 m., 21.v.1936, in coll. Bytinski-Salz.

#### *Ortholitha elbursica* sp. nov.

Span 30 mm., length of fore-wing 17 mm. Ground colour of the forewing a light greyish brown. Basal band double followed inside by a dark line. Space between basal and antemedial band whitish, crossed by a shade of dark grey scales and followed by a yellow brown line parallel to the latter. Antemedial band dark brown, tripled, bent outward on vein II, then leading straight across the wing. Median space whitish. One round black discal spot present. Postmedian band dark brown, tripled, forming an oblique sharp angle with the costa, leading rather straight across the wing and bowed a little inside at veins III. and IV.; no intervenal arcs present. In the type the antemedial and postmedian bands are touching each other at the inner margin. Marginal area light grey. Postmedian band followed by two parallel yellow-brown lines. A dark brown apical streak continuing into a dark sub-marginal shade. A brownish marginal band followed by black terminal intervenal dots. Fringes grey, whitish in their outer part.

Hind-wings grey at their base, lighter at the distal half, crossed by six darker lines. One dark discal spot present. Termen with a row of black intervenal dots. Fringes as in the fore-wing.

Underside of fore-wing light grey. The costal part suffused with grey. Discal spot comma-shaped. A dark postmedian line followed by a light band, which is divided by a very narrow darker line. Another light line in the terminal area. Termen with a row of dark intervenal dots. Fringes grey, whitish in their outer part.

type prior name. The only figure of *hyperborea* is a poor, very poor, brown form with slender indications of marking in black.

Underside of the hind-wing light grey; discal spot and postmedial band as in the fore-wing. Terminal area crossed by a darker band. Dark terminal dots very faint.

This new species comes nearest to *O. subvicinaria*, Stgr., the types of which could be compared by one of us (W. Brandt) with this specimen through the courtesy of Mr O. Bang-Haas. *O. elbursica* differs from this species by the almost straight lines as in *chenopodiata*, L., which however are not curved against the costa, the lack of intervenal arcs and the different shape of the antemedial and postmedial bands.

*Holotype*: 1 ♀, Nissa, 3500 m., 10.vii.36, in coll. Brandt.

*Paratype*: one specimen from the same locality in coll. Prout.

*Lithostege griseata*, Schiff., var. **gigantea**, var. nov.

The Persian *L. griseata* differs especially by its larger size. Span: ♂ 32 mm., ♀ 29 mm., in comparison with 26-29 mm. in the ♂♂ and 24-26 mm. in the ♀♀ in specimens from Europe and Asia Minor. Ground colour of the wings as in European specimens and those from Brussa, perhaps even a little lighter. They belong therefore not to the ab. *obscurata*, Stgr., which at Ankara forms a constant race. The Persian race shows a tendency to form transversal bands, of which the distal one is always indicated in the ♂♂. In the ♀♀ the distal band is always well developed, the median band at least indicated. The genitalia agree with those of *L. griseata*.

*Cotypes*: 5 ♂♂, 3 ♀♀, Keredj 1400 m., 20.iv.-3.v.1935, in coll. Bytinski-Salz, other cotypes in coll. Brandt, Wehrli and Wiltshire.

One ♀ has all transversal bands well developed, the antemedial band single, the medial band broad doubled with a continuous light interspace. Distal band also very broad: f. **transversaria** f. nov.

*Holotype*: 1 ♀, Keredj, 1400 m., 20.iv.1936, in coll. Bytinski-Salz.

*Anaitis obsitaria*, Led., var. (?) **pseudopallidata** var. nov. (?)

Ground colour of the wings a pale "avellaneous" as in ssp. *evanescens*, Whli. All designs of the fore-wing reduced. Only a narrow basal band, a dark double antemedial and postmedial band present. The latter triple at the costa, single at the inner margin. Discal spots pronounced. Marginal lines indicated only by two spots at the costa.

This new form comes near to ssp. *evanescens*, Whli., by its colour and the poverty of designs, but differs by its very contrasting transverse bands, which give this form the aspect of a light *A. efformata*, Guen. (var. *pallidata*, Stgr.), but the male genitalia conform with those of *A. obsitaria*, Led., as figured by Wehrli in *Mittl. Münchn. Ent. Ges.*, Vol. 24, p. 1f, 1934.

As I have at present only this specimen, I am not sure that it is a valid geographical race, but I do not think that it is merely an individual aberration.

*Holotype*: 1 ♂, Nissa, 3000 m., 10.vii.1936, in coll. Brandt.

*Tephroclystia prouti* sp. nov.

Span of the ♂ 20 mm., of the ♀ 19 mm., length of fore-wing 10 mm. Wings elongated with the apex pointed. Basal band narrow, greyish brown, followed by a broad whitish field. Antemedial and postmedial

lines double, linear and angled on the subcosta, including a broad white median field. Discal spot well developed; an angled median shade from the costa to the discal spot. Behind the post median line a white band, bifurcate at vein III<sub>1</sub>. The outer branch runs almost straight to the apex, while the inner branch curves in an angle of about 120° towards the costa. Marginal area with a row of brownish lines interrupted near the apex by the forementioned white band. A row of intervenal dark marginal streaks. Fringes chequered brown and white.

Hind-wing greyish white with a few faint lines at the base. Discal spot large, followed by broad, dark postmedian and marginal bands which enclose a lighter area. At the margin dark intervenal streaks. Fringes chequered brown and white.

Underside with all lines paler than on the upperside. Marginal band not interrupted; discal spots conspicuous.

This species comes nearest to *T. furcata*, Stgr., the types of which I had the opportunity to compare through the kindness of Mr O. Bang-Haas. *T. prouti* agrees with *T. furcata* by the bifurcate white band. The most remarkable differences between these two species are: the larger size in *prouti* (19-20 mm.) against 16 and 17.5 mm. in *furcata*. *Prouti* has all designs more contrasting; the white bands on the forewing much broader; the median field, which is almost completely covered with grey in *furcata* is pure white in *prouti*. The hind-wing of *furcata* is uniform grey, shows no bands and only a very faint grey discal spot, whereas in *prouti* it shows two very distinct bands and a large discal spot. In *furcata* the underside of both wings is almost uniform; only faint traces of the bands visible. In *prouti* all bands are very well visible in both wings.

Named in honour of Mr L. B. Prout.

*Holotype*: ♂, Keredj, 1800 m., 16.vi.-4.vii.1936, in coll. Brandt.

*Allotype*: ♀, Keredj, 1800 m., 16.vi.-4.vii.1936, in coll. Brandt.

*Paratypes*: some specimens from the same locality and date in coll. L. B. Prout.

*Abraxas wehrlii* sp. nov.

Span 33-36 mm. Head, thorax and abdomen yellow. Wings white, basal band narrow brownish; no antemedial band; postmedial band indicated by a larger costal spot, a row of 4-5 little dots on the veins, which, however, may be also completely absent. "Eye-spot" at the anal angle indicated by a light brown blotch, sometimes limited to the interspace between vein 1 and 2 and not reaching the inner margin. Hind-wing pure white, sometimes with some light dots at the anal angle.

Underside pure white with almost no markings; only the costal spot and the anal blotch sometimes feebly visible.

♂ *Genitalia*: similar to those of *A. pantaria*, L., but valva with 3 smaller claws at the anal part of the outer margin instead of 2 larger ones as in *pantaria*. Toothed crest on the inner plane of the left valva very slender in *wehrlii*, high and well developed in *pantaria*. Aedoeagus pistillate without the strong truncate thorn near the orifice as in *pantaria*; in *wehrlii* only a tiny chitinized knob present.

This species comes nearest to *A. pantaria*, L., and especially its light form ab. *cataria*, Guen. It differs from ab. *cataria* by the lack of the spots in the cell which are always indicated in ab. *cataria*, at least on

the underside, by the lack of the postmedial band in the hind-wing and especially by the underside, which in ab. *cataria* shows always well developed discal spots, a row of postmedial dots and a large spot at the anal angle. The postmedial row of dots in the hindwing, which *wehrlii* lacks is also always present in ab. *cataria*. Other differences in the genital apparatus as mentioned before.

*Cotypes*: 5 ♂♂, 3 ♀♀, Keredj, 1600 m., 14.vi.-4.vii.1936, in coll. Bytinski-Salz, other *Cotypes* in coll. Brandt, Wehrli, Osthelder and Wiltshire.

One ♀ has the postmedian band much reduced, the costal spot absent, only a tiny spot at vein 1 and the anal blotch present. Hind-wing and underside of both wings pure white without any markings: ab. ***asignata*** ab. nov.

*Holotype*: 1 ♀, Keredj, 1600 m., 14.vi.1936, in coll. Bytinski-Salz.

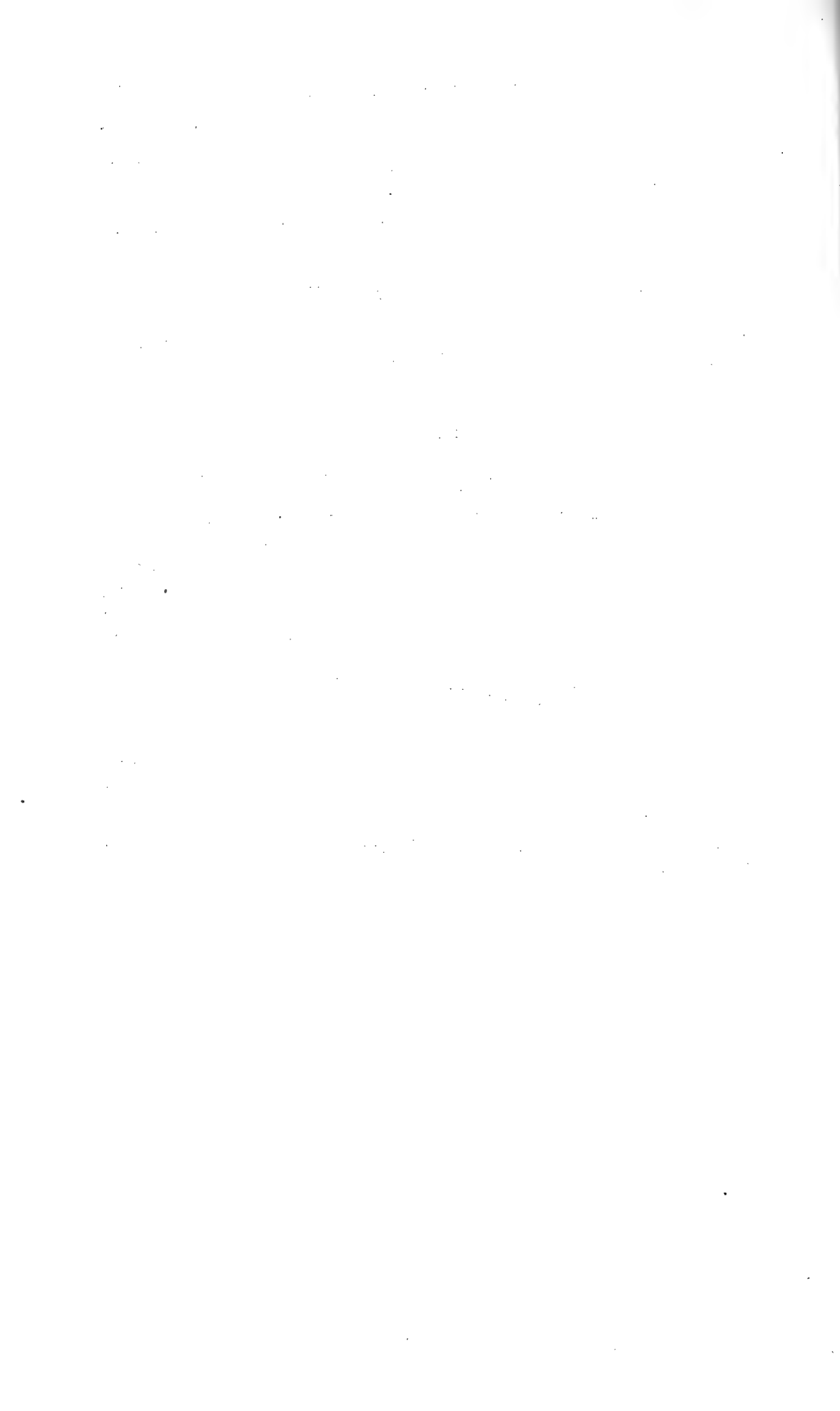
*Eilicrinia cordiaria*, Hbn., gen. vern. *roeslerstammaria*, Stgr., f. ***astigmara*** f. nov.

The Persian *E. cordiaria*, Hbn., shows a distinct tendency for the disappearance of the discal spots and a subsequent brightening of the apical lunules also in the spring generation (gen. vern. *roeslerstammaria*, Stgr.). But the ground colour and the other designs remain the same as in *roeslerstammaria*, Stgr. Specimens, which lack the discal spots completely and in which the apical lunules are of a light pale brown colour may be called: f. ***astigmara*** f. nov.

*Holotype*: 1 ♀, Keredj, 1400 m., 17.v.1936, in coll. Bytinski-Salz.

*Paratype*: 1 ♂, Keredj, 1400 m., 20.v.1936, in coll. Bytinski-Salz, shows the apical lunule a little darker.

At the same time and at the same place also several specimens of *E. acardia*, Stich., were taken which in contrast to the greyish f. *roeslerstammaria* have a distinct yellow ground colour as the summer generation *cordiaria*, Hbn. This seem to indicate that *E. cordiaria*, Hbn., and *E. acardia*, Stich. are two different species and not forms of the same one.



proper specimens of the latter, so that I can only say I am very surprised at the criticism Tutt has thought it necessary to make of them, which is entirely wrong.

Group : *Everidi*.

*Cupido minimus*, Fuessl. race *minimus*, Fuessl. : Mt. Olympus, at 300m. (May).—Very local, so that it was only found in 1936.

*C. (Tiora) sebrus*, Hüb.-Geyer race *moreana*, Tutt : Salonika, up to 500m. (May-June) and Mt. Olympus, at 300m. (June).—This race agrees with Tutt's description of *moreana*, which he drew out as though it were a variety of *minimus*. I suggested in the *Ent. Rec.* of 1925, p. 76, that it was probably a *sebrus* and Riley, then, confirmed it by examining the genital armature of Tutt's "type," in the Brit. Mus. collection.

Group : *Tarucidi*.

*Tarucus balkanica*, Fr. race *balkanica*, Fr. : Salonika, up to 1500m. (May).—All my specimens from this locality are rather smaller and frailer than the typical figures of Freyer, but this seems often to occur in most regions.

*Syntarucus pirithous*, L. = *telicanus*, Lang, race *pirithous*, L. : Mt. Olympus, up to 1200m. (June).—It is somewhat surprising that no one should have, once for all, revived the Linnean name of this species, for his description unmistakably applies to it, although he does not mention the tails, which his specimen had, presumably, lost. The Olympus race, like that of nearly all the European localities, is quite similar to the original one of "Barbaria" = Algiers.

Group : *Lampididi*.

*Cosmolyce boeticus*, L. race *boeticus*, L. : Mt. Olympus, up to 1200m.

Subfam. : *Theclinae*. | Tribe : *Strymonidi*.

*Callophrys rubi*, L. race *rubi*, L. : From sea-level to 1500m.—My specimens of Salonika (May) are more or less similar to the nominotypical race of Central Europe, but they do not quite reach the aspect of its more highly characterized form, found chiefly in the north, as they betray some southern features by their larger size and warmer colours, pointing to *virgatus*; Vrtv.

*Strymon (Chattendenia) w-album*, Knoch, race *w-album*, Knoch : Mt. Olympus, at 300m. Only found in 1936.

*S. (Nordmannia) ilicis*, Esp. race *inornata*, Vrtv. : From sea-level to 1500m.—None of my numerous females from Salonika (June) and from Mt. Olympus (June) have as broad a fulvous patch, on the forewing, as Esper's figure and many do not have any trace of it, so that the race corresponds exactly to *inornata* of Italy.

*S. acaciae*, F. race *frigidior*, Vrtv. : Bermion Mts., from 850 to 1200m. and Mt. Olympus, at 300 (June).—The discovery of this race, I had described from the western Alps (Oulx and Moulinet, near Mentone), at such a distance, in eastern Europe, reveals it as widespread as the distinctly different *nostras*, Courv., of central Europe, from which it differs by its larger size, longer tails, colder, grey, underside, larger and much brighter orange lunules, or the equally



distinct nominotypical race of anterior Asia, usually wrongly known as *abdominalis*, Gerh., according to Courvoisier.

*S. (Tuttiola) spini*, Schiff. race *major*, Obth.: From sea-level to 1500m., but I have received specimens, to determine the race, only from 300m. on Mt. Olympus (June).

Tribe: *Theclidi*.

*Thecla quercus*, L. race *interjecta*, Vrtv.: Mt. Olympus, from 850 to 1200m. (June-August).

Fam.: *Erycinidae*. | Subfam.: *Nemeobiinae*.

*Nemeobius lucina*, L. race *lucina*, L.: Mt. Olympus, from 300 to 1200m. (May and beginning of June).

Division: *Papilionida*. | Fam.: *Pieridae*.

Tribe: *Gonepterygidi*.

*Gonepteryx cleopatra*, L.: From sea-level up to 1500m.—It would have been interesting to find out whether the race of this region is the usual *europaeus*, Vrtv. or the peculiar Balkanic *dalmatica*, Vrtv., but Querci neglected collecting any and he has none to send me. He informs me, in 1936, he found two couples of the very fine form *fiorii*, Turati, described from Rhodes.

*G. farinosa*, Z. race *farinosa*, Z.: Salonika (May, very worn) and Mt. Olympus (13th July, very fresh).—These specimens are of large size, like the one collected in Lonhaki (Greece) by Miss Fountaine and figured by me, in *Rhopal. Pal.* LXXII., f. 10, which was the first of the species recorded from Europe.

*G. rhamnii*, L. race *transiens*, Vrtv.: From sea-level up to 1500m. (my Salonika specimens of May are very worn and have evidently hibernated, whilst the Olympus ones, of June and July, are fresh).

Tribe: *Coliadidi*.

*Colias croceus*, Fourcr.=*edusa*, F.: From sea-level to 1500m.—I have received the following: I gen. *vernalis*, Vrtv.=*mediterranea*, Stauder: Salonika (April-May); II gen. *ampla-croceus*, Vrtv.-Fourcr., consisting in a mixture of the two forms, of the same locality, in June. From Mt. Olympus the I gen., of June, and the II, of August, both are of a remarkably pale colour and respectively smaller than the corresponding ones of Salonika, so that they very well agree with the dwarf local form of high altitudes, Grumm-Grshimailo has described from the Pyrenees and named *pyrenaica*. I have seldom met with it in any mountains, so that its frequency and apparent constancy here is interesting, although it would, no doubt, be a mistake to call it a real race: *croceus* is too much of a wanderer to produce any.

Tribe: *Leptideidi*.

*Leptidea duponcheli*, Stdgr. race **fragilis**, nom. nov. I gen. *fragilis*, Vrtv.: Salonika (May).—The smallest and frailest form of the species, with a slightly thinner scaling and a distinctly yellowish tinge, is quite constant in this locality and thus gives one the impression of a local race, worthy of a name, to record it. The same one applies well to my series from Ak-Chehir, in Anatolia.

*L. sinapis*, L.: From sea-level, up to 1500m.—The specimens I have received exactly agree with the largest race of some localities in Peninsular Italy and, are, more precisely: I gen. *cana*, Vrtý.: Salonika (April-May) and Mt. Olympus (June); II gen. *grandis* Vrtý.: Mt. Olympus (June to August).

Tribe: *Euchloidi*.

*Anthocaris charltonia*, Donz. race *thessalica*, Mazger, *Lambillionea*, 1936, p. 35 and p. 63: Mt. Olympus, between 850 and 1200m.; one male on 3rd June 1935 and no others seen, although keenly looked out for, neither that year nor in 1936.—The author of the racial name states that “*thessalica* exhibits a great deal of analogy with race *penia*, Freyer, from Asia Minor”; considering his judgment is based on a single specimen, which he thought was the first European one, it seems rather a rash procedure to have, in such a case, separated it as a distinct race and not very serious to have erected a name for it without even mentioning what the slight distinctive features might, to his mind, be: he simply describes what might be a *penia* and makes no attempt to compare them.

*A. gruneri*, H.-S. race *gruneri*, H.-S.: Salonika, up to 500m. (April-May).

*A. cardamines*, L. race *cardamines*, trans. ad *meridionalis*, Vrtý.: Salonika (April-May).—The series I have before me stands decidedly nearer to the nominotypical race by the extent of the orange patch and of the black apical crescent, as well as by the extent and tone of colour of the green pattern on the underside, not accompanied by any yellow suffusion along the neuration, but a few individuals are, in most respects, quite similar to *meridionalis* and others are an approach to it, although they never exhibit the aforesaid yellow neuration.

*Euchloë ausonia*, Hüb. (= *belia*, auct. nec L.) race *originalis*, Rothsch.: Salonika, up to 500m.: early emergence *originalis*, Rothsch. (April) and late emergence *maxima*, Vrtý. (May and beginning of June).—The race is quite like that of Smyrna, whence *originalis* was named as a substitute for *belia*, Cramer nec L.; the early emergence has broader and darker black markings than *graeca*, Vrtý., which is probably identical with nominotypical *ausonia*, as really figured by Hübner, presumably from the Venetian province; the latter is, on the contrary, characterized by grey markings, rather restricted in extent and particularly so in the case of the narrow, kidney-shaped, discocellular spot, resembling very much that of *simplonia*, for which Rothschild and others have actually mistaken it, whereas in *originalis* it tends to be thicker, quadrangular and blacker, so that it somewhat reminds one of that of the western races, belonging to the *crameri*, Btlr. group, as it is well shown by Cramer's figures.

Tribe: *Pieridi*.

*Pontia daplidice*, L. race *expansa*, Vrtý.: From sea-level up to 1500m. My specimens consist of the following:—

I. gen. *bellidice*, O.: Salonika (April). Similar to the true *bellidice* of central Europe, which has more pronounced and darker markings on both surfaces than the southern *zellerica*, Vrtý. (= *messanensis*, Z.),

in which the grey is lighter and more effaced and the green brighter, not being as much mixed with black scales.

II gen. *expansa*, Vrtý.: Salonika (May) and Mt. Olympus (June-July). Very large and highly characterized at Salonika: less so on the Olympus.

III gen. *daplidice*, L.: Mt. Olympus (August). No tendency to the facies of *subalbidice*, Vrtý., which constitutes this generation in Peninsular Italy and in Sicily, but this may be the case at the lower elevations, where no collecting was done by Querci in August.

*Pieris napi*, L. race *meridionalis*, Rühl.: Mt. Olympus, from 850 to 1700m. and Bermion Mts., from 850 to 1200m.—I gen. *vulgaris*, Vrtý.: A few very worn individuals, similar to the form of Peninsular Italy and most of the south of Europe, still on the wing at the beginning of June. II gen. *meridionalis*, Rühl, in June: All the males, I have received, are of the characteristic giant size of this form, but the females are quite small and of the *tenuitermaculosa* size and pattern; I do not know whether the two sexes come from the same locality, but it would not be surprising if they did, for that very contrast between them has been observed by me in several localities of Italy and other countries. III gen. *tenuitermaculosa*, Vrtý.: end of July and August.

*P. rapae*, L. race *tertia*, Vrtý.: From sea-level up to 1500m.—I gen. nominotypical *rapae*, L.=*metra*, Steph.: Salonika (April-May). It has the darker markings of the I generation of northern and central Europe, rather than the lighter and more effaced ones of *verna*, Z. of the southern one. II gen. *secunda*, Vrtý.: Salonika (end of May) and Mt. Olympus (July). Not as large as the most highly characterized *secunda*, but markings quite characteristic. III gen. *tertia*, Vrtý.: Mt. Olympus (August). This generation fully and constantly exhibits the features of *tertia*, the form peculiar to the south of Europe, and which chiefly characterises its race, so that the name must be applied to it as a whole.

*P. ergane*, Hüb.-Geyer, race *ergane*, H.-G.: Mt. Olympus from 850 to 1200m. and Bermion Mt. at the same altitudes. The II generation, of June-July, and the III, of August, which is what has been sent to me, both consist of nominotypical *ergane*.

*P. manni*, Mayer, race *manni*, Mayer: Salonika, Mt. Olympus, up to 1200m. and Bermion Mts. at the same altitudes.—I have: I gen. **antemanni**, nom. nov.: Salonika (15th May) and Mt. Olympus (June): II generation (June) and III generation (August) *manni*, Mayer: Mt. Olympus.

I must take this occasion to note that Mayer's "types" were "of the end of June and of the whole of July, on the chalk mountains near Spalato." We have just seen that in the Balkans, judging from Macedonia, the III generation of August is not different from the II one of June, as it is in Italy. Therefore, the name of *asta* given by Frühstorfer to the "summer form" of *manni* from the Balkans, can be nothing else but a synonym of the nominotypical form, whereas the spring one, which he had wrongly taken to be typical, is that which requires to be described and named, as it differs very markedly from the I generation of Italy, called *farpa* by Frühstorfer. I should, thus, name the former *antemanni*, selecting as "co-types" a series of May, in my possession, collected by Gründ at Spalato and distinguished as follows: Size smaller than that of the subsequent, June, generation

*manni*: base of wings with a broader and darker black dusting; black markings replaced by grey, of a darker or lighter shade, according to the individual, and less extensive, especially in the female sex. The underside, which is of a colder tone of colour and which is covered by a very much thicker black dusting than in the following generations, in *farpa* of Italy, distinguishing it sharply from them, can, on the contrary, scarcely be spoken of here, in *antemanni*, because nominotypical *manni* is considerably colder in tone and more dusted with black than either of the summer generations of Italy, so that, in the Balkans, the seasonal polymorphism is much less also in this respect. The Italian *farpa*, besides, has more reduced and often paler black markings, on the upperside, than *antemanni*. It is noteworthy that a series from Attica in my collection is decidedly *antemanni*, so that this form seems to be that of the Balkans at all latitudes, whereas in Asia Minor one again finds a *farpa*, and a May series of it, I have from the Sultan Dagh in Anatolia, is still more extreme in character than I have seen it from anywhere in Italy, on account of its extremely effaced and pale grey markings above (spot of disc, in male, and lower one of the two, in female, often entirely obliterated), corresponding in this respect to the individual form Stauder has described from Spalato and Trieste, as occurring occasionally amongst the *antemanni*, and named *semipicta*, but differing from the latter by its underside black suffusion of the hind-wings, which is still thicker than in *farpa* and actually renders even the upperside rather dark, by showing through.

*P. krueperi*, Stdgr. race *krueperi*, Stdgr. with I gen. *vernalis*, Stdgr.: Salonika (I generation in April) and Mt. Olympus from 850 to 1200m. (II generation in June).

*P. brassicae*, L.: from sea-level to 1500m. I have only received specimens of the I generation of April, from Salonika. Like the spring form of *rapae* and *daphidice* they resemble the northern and central European *chariclea*, Steph., rather than *verna*, Z. of most of the Mediterranean region, on account of their extensive and dark black markings, so that I can only presume that the race, on the whole, as in the case of the other *Pieridi*, produces, nevertheless, more southern forms in the following generations and notably *aestiva*, Z. = *catolenuca*, Röber, in the II one, so that it should bear this name, on the whole.

#### Tribe: *Aporidi*.

*Aporia crataegi*, L. race *crataegi-augusta*, L.-Trti.: From sea-level up to 1500m.—My large series from Mt. Olympus, at 300m. (end of May and first days of June) exhibits a curious mixture of the extreme northern, nominotypical, form and of the extreme southern *augusta*, Trti., described from Sicily, but known from the south of Greece and Rhodes: most males are perfectly nominotypical, having pale and rather diffused grey nervural streaks and not the deep black sharp ones of *augusta*, nor the prominent ones and the suffusion of black scales it often has on the underside, but, on the other hand, the females are rarely of the opaque, white form, resembling the male, which characterizes the northern races: they are nearly all extremely thinly scaled and translucent all over, as they are in *augusta*. Therefore, I think the composite name, mentioned above, is the correct one, by which to designate a race of this sort. It produces no *meridionalis*, Vrty., entirely lacking in dark scaling up to the end of the nervures.

Fam. : *Papilionidae*. | Tribe : *Parnassiidi*.

*Parnassius mnemosyne*, L. race *bureschi*, Bryk : Mt. Olympus, from 300 to 1700m. (May and June). The series of specimens I have, apparently agrees with the one of Hudowa, in Macedonia, described under this name.

*P. apollo*, L. race *olympiacus*, Kol.-Rbl. (*Int. Ent. Zeit.*, 1934, N. 29) = *thessalicus*, O. B. Bang-Haas (*Ent. Zeit. Frankfurt-M.*, 1934, N. 16) : Mt. Olympus, at Prionia, between 1200 and 1700m. (June-July).—Querci informs me that, amongst his *apollo*, there are very few, which agree with the figures of the forms mentioned above. He, furthermore, remarks that in 1936 the emergence took place from the 14th to the 21st of June and to a very slight degree in July, after a bad wave of cold, whereas Ganatsias and Wagner both found this species on the wing in August. These differences may have altered the look of these insects, proving it is not constant and racial.

Tribe : *Zerynthiidi*.

*Zerynthia hysipyle*, Schultze = *polyxena*, Schiff. race *creusa*, Meigen : Cortiati Mts., near Salonika, from 700 to 800m. (end of April).—In *Seitz's Supplement von Rosen* refers his specimens from Macedonia to *demnosia*, Freyer, on account of the marked red spots of the underside, but in Geyer's figure of *cassandra* these are quite as extensive as in that of *demnosia* by Freyer, so that the latter name is nothing but a synonym of the former. On the other hand, the race of Macedonia is not *cassandra* at all, but is considerably darker and corresponds perfectly to *creusa*, Meigen, as figured by him and as it exists in northern Italy and in the south of France, whereas *cassandra* is the race of peninsular Italy, Dalmatia (Zara, in my collection) and presumably southern Greece.

Tribe : *Papilionidi*.

*Papilio machaon*, L. : Mt. Olympus, from 850 to 1200m.—Seen by Querci in this locality and represented in the university collection of Salonika, but not collected by him.

*P. alexanor*, Esp. : Same as preceding, but not represented in the aforesaid collection, so that there is no way of establishing whether the race is the large *magna*, Vrtý., or the small *attica*, Vrtý. of other regions in the Balkans.

*Iphiclides podalirius*, L. race *podalirius*, L. : From sea-level to 1500m.—I have received the I gen. *podalirius*, L. of Salonika (April to June) and the II gen. *zanclaeus*, Z. of the same locality (from the end of May) and of Mt. Olympus (June to August). They both exactly agree with the typical Italian specimens and not with the gigantic *creta*, Vrtý., described from more southern parts of Greece.

Division : *Nymphalida*. | Subfam. : *Maniolinae*.

Fam. : *Satyridae*. | Tribe : *Coenonymphidi*.

*Coenonympha pamphilus*, L. race *marginata*, Rühl : From sea-level up to 1000m. I gen. *australis*, Vrtý. : Salonika (April-May) ; II gen. *marginata*, Rühl : Mt. Olympus (June-August).

*C. arcania*, L. race *triumphans*, Frühst. = *amyntas*, Scopoli (homonym of Poda's): Mt. Olympus, from 850 to 1700m. (June) and Bermion Mt., from 850 to 1200m. (on 5th July).—This very large and handsome race, described from Carniolia is, thus, apparently, widespread in the northern Balkans as far as the eastern coast.

Tribe: *Maniolidi*.

*Hyponphele lupinus*, Costa, race *lupinus*, Costa: From sea-level to 1600m. My specimens are from Salonika (June), Naussa on the Bermion Mts. (5th July) and Mt. Olympus (July-August).

*H. lycan*, Rott. race *caticta*, Trti.: Mt. Olympus, from 850 to 1200m. (July) and Bermion Mts., at the same altitudes (July).—This race seems to exactly agree with Turati's figure from Zeitun, in the Anti-Taurus, but, as neither he nor I have any females, this sex from the two localities must be compared before one can be sure those races are quite the same.

*Maniola jurtina*, L. race *emihispulla*, Vrty.: From sea-level up to 2500m. The series I have from Salonika (May-June) and Mt. Olympus (June-August) are perfectly similar to my Italian ones of that race and there is no tendency, even individually, as one might have expected to find it, to the production of the eastern variation I have named *telmessiaeformis*.

Subfam.: *Erebiinae*. | Tribe: *Erebiidi*.

*Erebia medusa*, Schiff. race *euphrasia*, Frhst.: Mt. Olympus, from 1200 to 2000m. (June).

*E. melas*, Herbst. race *schawerdae*, Frhst.: Like the preceding.

Subfam.: *Agapetinae*.

*Agapetes* (syn. *Melanargia*) *larissa*, Boisduval, race *salonicae*, (Gibbs, *i.l.*) Barraud, *Entomol.*, 51, p. 88 (1918): Hills of Salonika, from 200 to 400m. (May and first days of June); race *salonicae* trans. ad *larissa*, Barr.-B.: Mt. Olympus, up to 850m.—Collected chiefly from 300 to 400, between Litocoro and Scala in June, at a few miles distant from the little town of Larissa. The latter, distinctly smaller race, is transitional to the one figured by Hübner-Geyer and usually considered the nominotypical one, although the latest researches by Hemming on the dates of publication of their great work have shown that the *larissa* plate is amongst those published in 1830, whereas Boisduval's is of 1828, so that the latter was the author of the name and his locality of "Corfu" is that of the nominotypical race, which consequently has nothing to do with the town bearing the same name. The forewing of the latter measures about 25mm. in length in both sexes, whereas the race of Larissa measures 30 to 32, like *taurica* of Asia Minor, but much less melanic, and that of Salonika ranges from that size to 35 in the male and to 38 in the females and is, thus, the most gigantic one of the species.

*A. galathea*, L. race *tenebrosa*, Frhst.: Mt. Olympus, from 850 to 1200m. (June-July) and Bermion Mts. at the same altitudes (5th July). Described from Carniolia and Croatia, this extreme, dark, race, evidently spreads across the whole of the Northern Balkans, without changing

aspect in the least. Lower down on the Olympus, at Scala, 300m., the race is larger and the white spaces are considerably broader in the basal half of the wing.

Subfam.: *Hipparchiinae* | Tribe: *Parargidi*.

*Pararge roxelana*, Cr. race *roxelana*, Cr.: Mt. Olympus, at about 300m. (June), but so scarce it was only found in 1936. Quite similar to the original figures from Constantinople.

*P. aegeria*, L. race *egeatas*, Frhst.: From sea-level to 1500m. My specimens from Salonika (April) and from Mt. Olympus (August) show no seasonal dimorphism, as they do in most regions, and are striking by their small size, pale, yellowish, tone of fulvous and the limited extent of the spaces of this colour, so that they exactly correspond to this race, described from Dalmatia.

*Lasiommata megera* L. race *lyssa*, Hüb.-Geyer (nec Freyer, nec Boisd., according to Higgin's latest remarks on the subject): From sea-level to 1500m. I gen. *lyssa*, H.-G.: Salonika (April-May) and Mt. Olympus (May and June). II and III gen. *emilyssa*, Vrty.: Mt. Olympus (July) and other specimens, in my possession, collected by Montague at Kalabak, Kireckoi and Cotos, from July to October.

The latest conclusion, in connection with the author of *lyssa*, is Higgins', who seems to be right in sustaining that Hüb.-Geyer have the right of priority (1827-32), not only over Boisduval (1833), who has been credited for it hitherto, but also over Freyer, whom Hemming had lately taken to be the earliest. This is important, because Boisduval's figure, from a Dalmatian specimen, exhibits such a thin black pattern on the upperside that it seems to belong to the summer generation *tigellyssa*, Vrty. of race *australis*, Z., such as it exists in Sicily, whereas Geyer's figures represent a heavily marked form, evidently of the first generation from the Balkans or Asia Minor. Consequently, *lyssa* becomes the name for the well characterized race of these eastern regions and precisely for its spring generation, and the one of *emilyssa*, I have given to summer individuals, comes in useful for the II and III generations. The materials I have obtained, since writing my little monograph on this species in the *Entomol. Rec.* of 1923, have cleared up the existence of the aforesaid definite eastern race, showing that its distinctive feature is the association of an extensive black pattern on the upperside, similar to the one of nominotypical *megera* of central and northern Europe, and of a comparatively dull tone of fulvous, with a silvery white underside, quite equivalent, and often even more accentuated, than in the more western races of the south: *australis*, Z. and *praeaustralis*, Vrty. in the first generation and *tigellyssa*, Vrty. in the following ones. The usual definition of *lyssa*, in Staudinger and in all the text-books, which only considers the more uniform grey underside, does not agree entirely with the habitat they mention of "Balkans and Asia Minor," because it would fully include also the summer generations of peninsular Italy, and, as a matter of fact, till Boisduval was taken as the author, it would have applied to the latter rather better than to the more eastern races and my name of *tigellyssa* would have been a synonym of it.

*L. maera*, L. race *silymbria*, Frhst.: Mt. Olympus, from 300 to 1700m. (May to August) and Bermion Mts., from 850 to 1200m.—As rightly remarked by Frühstorfer, this is the widespread race which

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replaces, in south-eastern Europe, race *adrasta*, Hüb. of the south-west. At the end of August it presumably produces the II gen. *postsilymbria*, Vrtv., as it does on the Adriatic coast.

*L. ominata*, Krul. (or *petropolitana*, Fabr.-Btler., according to some opinions) = *hiera*, auct. nec Fabr. : Mt. Olympus, from 1200 to 1700m. —Not having seen any, I cannot determine the race.

Tribe : *Hipparchiidi* (= *Satyridi* : later name).

*Hipparchia statilinus*, Hufn., probably race *vettius*, Frhst. : Mt. Olympus, from sea-level up to 1200m. (August).—Extremely scarce, so that only one female has reached me and it is impossible to judge quite certainly from it what the race may be; it certainly is not the one of Constantinople, I have named *fatuaeformis*, but it exhibits a much whiter and less brown hindwing, suggesting *vettius*.

*H. syriaca*, Stdgr. race *attikana*, Frhst. : Mt. Olympus, up to 850m. (August).

*H. fagi*, Scop. = *hermione*, L. race *alcyoneformis*, Vrtv. : Like the preceding (July-August).—Agrees exactly with the Italian mountain race I have described under this name.

*Aulocera circe*, F. : Mt. Olympus, at about 300m.—Very local and scarce, so that only one or two specimens were found, in 1936, and none were sent to me.

*Eumenis anthelea*, Hüb. race *amalthea*, Friv. : Mt. Olympus, up to 850m., and Bermion Mts.

*E. semele*, L. race *senthes*, Frhst. : From sea-level up to 1500m.—My series from Mt. Olympus (June-August) agrees well with the description of this race; two females from Salonika (June) seem to indicate that, there, the race is larger and more boldly marked above and has a more uniform underside, so that it is transitional to *mersina*, Stdgr. of Asia Minor.

*E. briseis*, L. race *magna*, Rühl : Mt. Olympus, from 300 to 1700m. (June-August).—Rühl credits Staudinger with this name, but it is nowhere to be found in literature, so that the former's description from "Armenia and the Kuldja district" and erection of it, in his *Pal. Grossschm.*, p. 531, are the originals. It is queer how Gaede goes on attributing it to Staudinger quite lately, in *Strand's Lepidopt. Catal.*, as he had done in the *Addenda to Seitz's Supplement*, p. 181, stating the original description to be in the *Stett. Ent. Zeit.*, 1886, p. 242, where it does not exist at all, there only being that of *meridionalis* and no mention of *magna*.

Jachontov, has very rightly pointed out in the *Revue Russe d'Ent.*, 1911, p. 419, that Seitz's figures of *fergana*, on pl. 42c, do not represent this variety in the least, but are drawn from two specimens of Rühl's *magna*: the underside of the male shows it, more than anything, by the prominence and coldness of its pattern, which, in *fergana*, is on the contrary, of a characteristic light chestnut colour and very much effaced, transitional to the still more extreme *maracandica*, in this respect.

Now, the race of Mt. Olympus corresponds most exactly, in size, in shape and in every detail of colour and pattern to those two figures of Seitz, which might be drawn from some of my specimens, except that the underside of the latter is slightly lighter and colder in tone. It thus corresponds to the enormous size of Rühl's measurements from



tip to tip of the forewings: "male 51-62mm., female up to 72 mm.," far surpassing *meridionalis* of southern France, whose female only occasionally gets up to about 60mm., being the largest European race. The upper-side of my males, not shown by Seitz, very much resembles, in some individuals, his figure of *hyrcana*, as they have the white band of even width across all the forewing and slanting from the apex towards the base, which characterizes, as a rule, the African and the Asiatic races; the underside of the Olympus females can be described as light grey, the ground-colour being of a cold tone of dirty white and more or less uniformly covered over by capillary streaks of a grey colour, so that there is nothing of the yellowish or pinkish hues one sees in some races; all this is exactly the same as in *meridionalis* of southern France and thus agrees well with Rühl's particular remark about the resemblance of *magna* to the latter, and with his description of the underside as "light coloured in both sexes"; also the Olympus males, as mentioned above, resemble *meridionalis* a little more than Seitz's figure, by being slightly less thickly suffused with capillary streaks and having a lighter and less brown premarginal band, on hind-wings, on the inner side of the grey, marginal one.

Fam.: *Libytheidae*.

*Libythea celtis*, Laicharting race *celtis*, Laich.: Salonika and Mt. Olympus, up to 1200m. (second half of August).—Some specimens are unusually large.

Fam.: *Apaturidae*. | Subfam.: *Apaturinae*.  
Tribe: *Apaturidi*.

*Apatura ilia*, Schiff.: Represented from Macedonia in the University collection, but not found by Querci.

Tribe: *Charaxidi*.

*Charaxes jasius*, L. race *septentrionalis*, Vrty.: Like the preceding.

Fam.: *Nymphalidae*. | Subfam.: *Limenitinae*.  
Tribe: *Limenitidi*.

*Limenitis drusilla*, Bergstr. (= *camilla*, auct., nec L. = *reducta*, Stdgr. = *rivularis*, Stichel, nec Scopoli) race *reducta*, Stdgr.: From sea-level up to 1000m.: I gen. *reducta*, Stdgr.: Salonika (May) and Mt. Olympus (at its end in June); II gen. *reducta*, Stdgr.: Mt. Olympus (middle of July to beginning of August).

Subfam.: *Vanessinae*.  
Tribe: *Melitaedi*.

*Melitaea trivialis*, Schiff.: From sea-level up to 1500m.  
race *trivialis-fascelis*, Schiff.-Esp.: Salonika (May).—Here, as in a great many regions, variation is enormous, individually, but the size is never as large as on Mt. Olympus and the black markings of the individuals referable to the *fascelis* form are, on an average, less heavy, especially in the female sex, whereas the opposite variation, with a light ochreous ground-colour and very thin black spotting and, thus, referable to the form *aabaca*, Frhst., is frequent. This last form was described

from Spain as being a *didyma*, but Belter states he has examined the holotype and found it to be a *trivia*.

race *fascelis*, Esp.: Mt. Olympus: I gen. *fascelis*, Esp., but often much larger than the original figure and also darker (June); II gen. *trivia*, Schiff., of August, very much smaller than the preceding and with smaller black markings, so that it quite resembles the nominotypical form of Vienna.

*Melitaea didyma*, Esp.: From sea-level up to 1500m.

race *oreithyia*, Frhst.: Salonika (June).

race *oreithyia trans. ad graeca*, Frhst.-Stdgr.: Mt. Olympus (June-July).—Whereas the Salonika race agrees very well with my series from Trieste, the specimens from Mt. Olympus exhibit a far greater amount of variation and give one the impression of having been produced by a mixture of races, rather than by one, characteristic, strain: many males are perfect *graeca* by their extensive black marginal markings, but the more melanic females, entirely covered by a grey suffusion, which are the perfectly constant form in some localities of that race, such as Brussa, whence I have a large series, are not produced at all, here. A considerable number of females recall more *caucasica*, Stdgr., by having large black spots standing out sharply on a fulvous ground colour, of a lighter or darker tone; nevertheless, they are never exactly *caucasica*, as they never exhibit, for instance, its peculiar white area, near the costal margin of the forewing; the more varied sizes of their various black spots also reminds one very much of some mountain races of the Alps and of the Apennines. From these darker *alpina*, Stdgr. forms, variation passes, through intermediate, *oreithyia*-like individuals, to the extreme, small, light ochreous forms, with a thin black pattern, usually called quite wrongly *occidentalis*, Stdgr. and figured under this name by Seitz; my female individuals of this sort bear the same dates of capture as the dark ones (28th June to 30th July), so that they are not the product of any, special, late emergence. When one compares the mountain races of the Balkans, such as this one, or *lesora*, Frhst. of Carniola, or *druentia*, Frhst. of Bosnia, with those of the Apennines, it is noteworthy one is, at once, struck by the different shape of the wings, especially in the male sex, which are often much more elongated and more pointed at the apex than they ever are in Italy.

*Melitaea cinxia*, L. race *delia*, Schiff.: Mt. Olympus, from 300 to 1700m. (end of May and June).—Although it exhibits considerable individual variation, the large series before me, collected at 300m., is perfectly similar to that of the neighbourhood of Vienna, as it is more heavily marked than the widespread *pilosellae*, Rott. of Central Europe.

*Melitaea phoebe*, Schiff.: From sea-level to 1500m.

race *ogygia*, Frhst.: Salonika (May).—The race which flies along the path from Salonika to Asvestocori, from 100 to 400m. of altitude, agrees with Frühstorfer's description by its small size, pale and dull fulvous colour and thin black markings, recalling the races of dry localities in Anterior Asia, although it may not be as extreme in all these as that author's "co-types," which were, presumably, from a much more southern locality of Greece.

race *narenta trans. ad tusca*, Frhst.-Vrty: Mt. Olympus (June-July) and II gen. *emipauper*, Vrty. (August).—The race of Mt. Olympus differs most strikingly from the preceding by its variations in the extreme

opposite direction to it. Whereas *ogygia* is, in all probability, a pure strain of the Central exerge, whose largest size and whose most pronounced black markings are exhibited by *tusca*. Vrtý., of Italy, the Olympus race betrays a very strong affinity with the Northern exerge and namely with the nominotypical *phsebe* of Vienna, as well as Austria, in general, and Hungary, and with the giant *narenta*, Frhst. of Herzegowina, Serbia and Montenegro, by its large size, reaching even the gigantic proportions of the latter in many individuals, and by the heavy black markings in the male sex and, as in *narenta*, also in some females. On the other hand, many females exhibit, on the contrary, an effacement of those markings, especially on the disc of the forewing, such as is never seen, or only as a rare aberration, in the races of the Northern exerge, so that one is justified in taking that Olympus race to be a synexerge, produced by a mixture of the two strains, just the same as one has the impression the race of Trieste must be, as well as *rovia*, Frhst. of the Tessin, both of which resemble the former considerably. This hypothesis is, furthermore, sustained by the fact that all three of these races produce a II generation, and that it is, in all three, exactly the same as the one of *tusca* described by me from Italy under the name of *emipauper*.

*Melitaea athalia*, Rott. race *mehadiensis*, Gerh.: Very local and scarce, at Prionia, 1500m., on Mt. Olympus (14th to 18th June, 1935).

race *suessula*, Frhst.; At about 300m. on Mt. Olympus, more abundant than the preceding, during the whole of June, 1936.—The first of these two allied races is considerably larger than the second; it has more elongated wings and, on an average, the tone of colour is richer, and the black pattern less variable and rather thicker; it, therefore, agrees perfectly with my series from Hungary, whereas the second one is similar to those of Vienna and of Trieste.

#### Tribe: *Argynnidi*.

*Argynnis (Brenthis) euphrosyne*, L. race *eminens*, Vrtý.: Mt. Olympus, from 300 to 2000m.—This race is perfectly similar to the large one of the Pyrenees, the Ural Mts. and, presumably, many intermediate localities of Central Europe, as well figured by Hübner, fig. 28-30, which I have described in the *Ent. Rec.* of 1932, p. 113, pointing out that, according to all probabilities, it is produced by the crossings of the Northern and of the Central exerges.

*Argynnis (Brenthis) dia*, L.: Cortiati Mts. from 600 to 1000m. and Bermion Mts., from 850 to 1200m., but not seen by me.

*Argynnis (Brenthis) hecate*, Schiff.: Mt. Olympus, from 1200 to 1700m., but same as preceding.

*Argynnis daphne*, Schiff. race *daphne*, Schiff.: Mt. Olympus, from 850 to 1700m. (June) and Bermion Mts., from 850 to 1200m.

*Argynnis lathonia*, L. race *emiflorens tran. ad florens*, Vrtý.: From sea-level to 1500m.—A single, June, specimen I have from Salonika belongs to *emiflorens*. A series of the Olympus, collected from June to August (only females in the latter month) is extremely variable, both in connection with the tone of the ground-colour, which varies from the pale and dull one of *nigroprivata* of the Northern exerge, in a few specimens, to the vivid and warm one of the Italian *emiflorens* and *florens* in all the others, and in connection with the extent of the black markings, which keep, however, distinctly to the reduced extents and

exhibit a considerable number of individuals with the particularly reduced patterns of *nigroprivata* and *florens*. As a few individuals with a duller colour are found even in the typical series of *florens* and *emiflorens* of Italy, that of the Olympus, although it does not reach the largest size and the most vivid colouring of the most extreme *florens*, quite agrees with those of *emiflorens* and belongs decidedly to this race. This confirms the existence of a Central exerge in *lathonia*, stretching across the Balkans to Italy, as in other widespread *Argynnis* and according to the general rule. I had anticipated this fact in my little Monograph on the geographical variations of *lathonia*, in the *Ent. Rec.*, 1933, p. 56, and, before seeing any Balkanic specimens, I had forecast they should be similar to the Italian ones.

*Argynnis aglaja*, L. race *emilocuples*, Vrtý.: Mt. Olympus, from 850 to 1700m. and Bermion Mts., from 850 to 1200 (July and August), but extremely scarce, so that only two worn males have reached me and the judgment of the race, I draw from them, cannot be considered quite definite, although no other known one is likely to exist in Macedonia and this makes it about sure to be correct.

*Argynnis niobe*, L. race *kuhlmanni*, Seitz: Mt. Olympus, from 300 to 1700m. and Bermion Mts., from 850 to 1200m. (June-July).

*Argynnis adippe*, Rott. race **olympena**, nom. nov.: Mt. Olympus, from 850 to 1700m. and Bermion Mts., from 850 to 1200m. (June to August).—The races, which this one resembles most, are those of the S.-E. of France I have described in the *Ent. Rec.*, 1936, p. (85) as presumably being synexerges produced by the crossings of the Northern and of the Central exerges. Of the features of the latter it exhibits to the highest degree the lack of the silver markings on the underside, and the effacement of the black streaks that surround them, so that the surface of the wing is of a very uniform yellow, quite devoid also of green or russet suffusion, precisely as in the most highly characterized *clarens*, Vrtý., of Italy. In *semicclarens*, Vrtý., of the Cévennes (Hospitalet, 800m.) these features of the underside are not as accentuated and in *magnaclarens*, Vrtý., of the Valboune, near Pont-St.-Esprit, in the Gard, the silver spots exist in many individuals and the black streaks and the rest of the pattern are much more accentuated. On the other hand the Macedonian race resembles the French ones more than *clarens* by its larger size, by the warmer tone of the fulvous of the upperside in most individuals (some extreme ones even recall *adelassia*, Frhst. of the Riviera, by the very warm, reddish, tone of that colour, such as it is never shown by *clarens*) and by the much more accentuated black markings, including the darker basal suffusion, which are only equalled by *adelassia*. All the latter characteristics are quite proper to the Northern exerge and their combination with the underside of *clarens*, as described above, therefore, strongly suggests a synexerge, which I propose to call *olympena*.

*Argynnis (Dryas) maja*, Cr. = *pandora* Schiff. race *maja*, Cr.: From sea-level to 1500m.—My specimens of Salonika are of May and those of Mt. Olympus of June-July.

*Argynnis (Dryas) paphia* race *magnifica*, Vrtý.: Mt. Olympus, from 850 to 1700m. and Bermion Mts., from 850 to 1200m.—These specimens thus establish the fact that they belong to a Central exerge, as in the case of *lathonia* and as I suspected they would, when I wrote about it in *The Entomologist* of 1934.

Tribe : *Vanessidi*.

*Vanessa cardui*, L. race *universa*, Vrtý.: From sea-level to 1500m. The I generation emerged at Salonika in May and on the Olympus in July.

*Vanessa atalanta*, L. race *atalanta*, L.: Like the preceding, but, at 300m., old, hibernated, individuals existed till May and the emergence took place in June.—Red band narrow, but no southern features, in general.

*Aglais urticae*, L. race *urticae*, L.: Mt. Olympus, from 300 to 2000m. (worn in May, fresh in June).—It is somewhat surprising that no signs of the features of the Central exerge should be detectable in this race, as one might quite have expected it to be *turcica*, Stdgr. or, at least, its preceding degree *opima*, Vrtý., as in peninsular Italy; on the contrary, it does not even belong to the large southern race *variegata*, Querci, of the Northern exerge, but it is, like the *atalanta*, perfectly similar to the nominotypical northern race.

*Nymphalis io*, L. race *sardoa*, Stdgr.: Mt. Olympus, from 300 to 1700m. (worn till June, fresh in August).—Remarkably large.

*Nymphalis antiopa*, L.: A few seen on Mt. Olympus, between 850 and 1200m.

*Nymphalis polychloros*, L. race *pulchrior*, Vrtý.: Salonika and Mt. Olympus, at about 300m. (June).—Average size larger than I have seen it from any other region and some individuals of both sexes unequalled anywhere else.

*Nymphalis xanthomelas*, Schiff. race *xanthomelas*, Schiff.: Mt. Olympus, at 300m. and at 2000m. (June-August).

*Polygonia egea*, Cr. race *egea*, Cr.: Salonika and Mt. Olympus, up to 1200m. (June).

*Polygonia c-album*, L. race *c-album*, L.: Mt. Olympus, from 850 to 1200m.—My specimens belong to the I gen. *hutchinsoni*, Robs., which evidently emerges early in June, for they were already worn on 5th July.



## VARIATION OF SOME BUTTERFLIES IN ANTERIOR ASIA AND IN MOROCCO.

By ROGER VERITY, M.D., F.R.E.S.

*Carcharodus fritillarius*, Poda = *alceae*, Esp.:—This species exhibits, in Anterior Asia, its most extreme variations, including two features which can be considered peculiar to that region, as nothing like the degree they attain there, even predominantly, in some localities, is ever seen, even individually, in Europe. One of these features is the clear, tawny, colour on the upperside, which reaches a pure sand-colour in the extreme form *insolatrix*, described by Le Cerf, from Iraq, in the *Ann. Hist. Nat. Paris, Ent.*, 2, p. 70, pl. 1 (1913), and possessed by me from Duktan, in the Zarafshan, collected in June. The other feature is the extreme lightness of the underside colour, which acquires a soft, milky and yellowish-white appearance, in that the whitish spaces are not set off any more by the usual grey and blackish, but only by yellowish, so that they are only faintly seen in the most extreme examples; these remind one, remarkably, of *C. stauderi*, Rev., and might very easily be mistaken for it, as, at first sight, they look much more like it than like the usual aspect of *fritillarius*. These two features, on broad lines, accompany each other on the two surfaces, but their degrees may differ to some extent, so that we will presently see that Malatia examples, in my possession, are even of a paler yellow and whiter than the *insolatrix* on the underside, although they are not of such a light tawny on the upper one.

Pfeiffer was perfectly right in distinguishing the form of Central Anatolia, he has named *centralanatolica* in the *Mitt. Münch. Ent. Ges.*, xvii, p. 45, as the II generation, collected from 1st to 10th of July 1928 at Ak-Chehir by Fritz Wagner and specimens of which have been sent to me, as well as to Pfeiffer, exhibit plainly the first grade of the variations described above. The I generation, collected from 16th to 31st of May, in the same locality, is, on the contrary, exactly similar to that of Austria and Central Europe in general and typical of *fritillarius*, as well as of *alceae*. I also possess a little series of the second half of September, from the coast of Anatolia, and that is identical with the III generation *fulvogrisea*, Vrtý. of Central Italy, with its cold, dark grey underside.

The local name of *centralanatolica*, given by Pfeiffer, has been rather unfortunate, for that form, apparently, has a broad range all over Anterior Asia and up to Central Asia. I see, in fact, that a series of specimens collected by Brandt in July at Nissa, 2100 m., in the Elburz mountains (N.E. Persia) are just the same as my Ak-Chehir ones and I see that some from Duktan, dated July, received mixed with the aforesaid *insolatrix* and with transitional forms, are like them too.

The next remark to make is that, in many localities, there exists a form which could not be properly called either *centralanatolica* or *insolatrix*, because the tawny of the upperside and the paleness of the black markings are intermediate between the two, whilst the underside is quite as pale yellow as *insolatrix*, and, occasionally, even whiter; to this is to be added that the size of the insect is, on an average, the smallest known, and is reduced to most minute dimensions in the

most extreme individuals, such as only *insolatrix* ever produces. Pfeiffer gives 29 to 32 mm. as the expanse of his *centralanatolica* and I can confirm it, whereas the form I am describing now measures from 20 to 25 and the average is rather under 23. The other smallest forms of the species are *tripolina*, Vrtý., of Africa, and *australis*, Zeller, of Sicily, both of which vary from 23 to 25 and average 24. The paleness of the Asiatic form, on both surfaces, but more especially on the underside, affords another striking difference from the two latter, which are always of a more or less rich and deep chestnut, with little white spaces standing out on it sharply. I lay stress on these points, because there has been a habit of naming *australis*, Z. all the small and warmly-coloured southern examples, and, for instance, even as late and as accurate an author as Graves states in the *Trans. Ent. Soc. London*, 1925, p. 36, that the "Palestine II and III gen. are *australis* and some of the latter from Umm el Kilab are very pale indeed." I have some of his own examples from Mt. Carmel, in Transjordan, of 4th July, and, comparing them with my series of Sicily, whence were Zeller's types, I find that not one from this island or anywhere else in Italy ever resembles them in the least, precisely on account of their peculiar Asiatic paleness. Just as I have, for other reasons, separated from *australis* the African *tripolina*, I now think this Asiatic form should, therefore, be distinguished, too, by the name of **claraustralis**, nom. nov., which points out its distinctive feature and its parallelism to *australis* at the same time.

According to a series of specimens I have from Limassol, in Cyprus, this form actually replaces *australis* in that island in the II generation, or, at least, in the later part of its emergence, as my examples are dated 8th August, whilst the two other generations do not differ from those of Sicily, the first of March and April being *praeaustralis*, Vrtý., and the third *fulvogrisea*, Vrtý., quite as dark, on both surfaces, as in this island. The race of Cyprus, thus, stands to that of Anatolia exactly as *australis* of Sicily stands to *magnaustralis*, Vrtý., of Peninsular Italy, whose I generation is nominotypical *fritillarius* and whose II generation is *magnaustralis*, which differs from *centralanatolica* by being darker and warmer in tinge on both surfaces, but is equal to it in size.

We must, finally, notice the peculiar I generation, of April, of Tecde, near Malatia, in western Kurdistan, where most butterflies exhibit a remarkably small form, quite constantly: the II generation, of July and August, is a highly characterised *claraustralis*, with a particularly white underside, which I choose as typical of this latter form; the I is quite as small and nearly as light in colour, contrary to what happens in all the other localities; the upperside markings are only of a deeper brown, mixed with a little more black; the ground-colour is slightly colder in tone above and the underside of a distinctly colder and distinctly darker grey, but nothing like the black of the spring forms of other localities: I name it **claraminima**, nom. nov.

*Carcharodus marrubii*, Ramb. = *boeticus*, Ramb.:—It is worthy of record that two specimens, sent to me by W. Brandt for determination and collected by his brother, Fred. H. Brandt, at Keredj 1425 to 1800 m., about 40 km. to the west of Teheran, turn out to belong to this species,

affording unmistakable differences from the *C. orientalis*, Rev., found in the same locality, on 16th June 1936, and more commonly distributed in the Elburz mountains, whence I have also a series collected by Fritz Wagner at Pelur, 2000 m., and Kendevan, 3000 m. The two *marrubii* do not differ in the slightest degree, on either surface, from the I generation of Marseilles and Albarracin I have named *grisea* in the *E. Rec.*, 1925, p. 42. As the most eastern localities of this species, hitherto known, were, to the best of my knowledge, in Syria and in Transjordan, these specimens, from the Elburz, now reveal that its area extends very much further, in that direction, into Asia. It evidently does not, however, produce any geographical variation. One of these specimens is, now, in my collection; the other I sent back to Brandt, who may have more, as far as I know.

*Lysandra (Agriades) bellargus*, Rott.:—Information about this species in Persia is nearly nil, except for a few records simply of its existence in that region; even Tutt does not seem to have seen any specimen of it either in the British Museum or elsewhere, as he makes no remarks about its aspect in that country. Some years ago, Bang-Haas sent me two males collected, on 19th May, at "Kulisar, in Northern Persia," and on 6th May in "Northern Persia," stating they were the only specimens of the species in existence in collections. I do not know whether this was quite correct, but, anyhow, they were not sufficient to convey a proper idea of the Persian *bellargus*, and I was, thus, very pleased to receive a fine series of both sexes, collected during the first days of May in the locality of Keredj mentioned above, in connection with *marrubii*. It confirms my impression that, especially considering the limited extent of geographical variation in this species, its Persian representatives must be considered as belonging to a distinct race, proper to that region, which I, therefore, propose naming **persae-magna**, nom. nov., and which can be described as follows: Size strikingly larger than is ever produced in Europe or in Asia Minor, except for the remarkable local form produced in some spring individuals and in most summer ones at Intra, on Lake Maggiore, in N. Italy, which look like giants amongst those of every other region; the latter, however, exhibit the colours and pattern of the bright and light *etrusca*, Vrtý., or transitions to it, whereas the Persian examples are less variable and decidedly stand nearer the nominotypical *bellargus* of Central Europe: the underside of the male is, in fact, of a dull and cold light grey tone, that of the female also very light for that sex, and only slightly warmer, whilst in both sexes, the orange lunules, too, are of a light, dull, colour, very different from the bright ones of *etrusca*, and also lesser in size, including the upperside of the female. The two males sent by Bang-Haas are still more closely related to the northern form by the deep grey tone of the underside. Furthermore, a striking peculiarity of all my examples of both sexes is the large size of all the black dots, such as is only met with individually and rarely in Europe, and nearly exclusively in the I gen. *maja*, Vrtý., of the south. On the male upperside the premarginal dots of the hind-wings are perceptible in most specimens, but sharply marked in none; the black or grey streaks on the fringes are very inconspicuous. The blue is of the sky-blue tinge, preserved even in my two first and very old specimens. The females have



a considerable amount of blue suffusion, thus resembling the nominotypical form also in this respect.

A striking contrast to the preceding form is afforded by another of Anterior Asia, which is perfectly constant, and, therefore, probably racial in some localities, such as Tecde, mentioned in connection with *fritillarius*, where many butterflies exhibit their smallest and weakest facies, owing to drought and heat. It is, thus, the equivalent of *lucetta*, Culot of *P. icarus* and *microsephyrus*, Vrtý. of *P. sephyrus*, and, like them, it is remarkably peculiar to that part of Asia, as it is extremely rare one should meet in Europe even with single individuals resembling its less highly characterised ones. The only ones of this sort I have seen are from a locality of Tuscany, south of Leghorn, which is well known for its persistent summer droughts, lasting from the beginning of May to the end of October, so that its leguminous food-plants are always parched to the highest degree. This is, no doubt, what happens in Asia and the result is that both generations of such localities are small in size, lightly coloured, and with very thin black patterns. These features are conspicuous in the *bellargus* we are dealing with: the I generation, of May, is already on the smallest side of the species, whilst the II generation surpasses that of every other locality in this respect, becoming, in some examples, so much as one-third smaller than the average *bellargus* size; the upperside of the male is of the clearest sky-blue, with the white fringes only inconspicuously and partly chequered with grey and a constant lack of the premarginal dots of the hindwing; underside of a particularly light, white, tone of grey, which does not vary individually, as in most other races, and is the same on fore- and hind-wing; in the II generation there is only a scarcely perceptible warmer tinge on the hindwings; all the black dots are of an unusually minute size, and so are the orange lunules, whose colour is also very pale and yellowish or even quite yellow; the metallic suffusion, at the base of the hind-wing, is light, dull, and limited in extent in both generations. In the female the brown is dull and tends to being greyish, with a suffusion of blue, even in the II generation, which rather surprises one, considering its usual total absence in this generation of the other arid, southern countries, but its tone is, in both generations, more pale and silvery than in the I of Southern Europe, and the orange lunules are duller and paler. I name this form and race **arentissima**, nom. nov., taking the most highly characterised II generation as typical, and I think the I should be distinguished by the name of **arens**, nom. nov. My series of "cotypes" of both are from Tecde, in the Malatia region of western Kurdistan, collected respectively from 21st July to 26th August and in May; I also have, from there, a few specimens of 4th October, which exhibit the *arentissima* facies to a still higher degree than most of the summer ones, including a very small size, and I have similar ones, of October 1918, from the pine-woods of Yuzgat in the Angora province; I presume all these to be a third, very partial, emergence, such as occurs in Tuscany.

My specimens of the Erjias-dagh region of Asia Minor, west of the Antitaurus, collected by Penther in 1902, also belong to *arentissima* by the underside aspect, but are of the individual size, which is to be seen exceptionally at Tecde as the largest, and, normally, in most regions, as the smallest.

As to the two series of *bellargus* in my possession, collected by F. Wagner, during May, at Ak-Chehir and on the Sultan-dagh, in Anatolia, they certainly resemble *arens* much more than they do any other form and this name could even be applied to them, but, to be quite exact, it must be noted that, together with some perfectly characterised individuals of the latter, there are a good many with a darker underside and more accentuated black and orange markings on that surface, which point to *etrusca*, Vrtý., of Peninsular Italy, being about equivalent, in those respects, to its high mountain form *apenninigena*, Vrtý., except that they are never as small. I unfortunately have no knowledge of their II generations in those two localities of Anatolia, but there cannot be much doubt that they belong to the same form as the one just described from the Erjias-dagh and that the race, as a whole, is that of Asia Minor in general. As it differs distinctly from *arentissima* by not being of its dwarf size and from *etrusca* by exhibiting colours and pattern similar to the former or transitional to it, it seems to me it can only be designated correctly by a name of its own, which might be **arentior**, nom. nov., applied typically to the II generation, as being the most characteristic one, whilst **antearentior**, nom. nov., can be used for the I generation, so as not to mistake it for the smaller and more extreme *arens* of race *arentissima*.

As I am dealing with *bellargus*, I must take the occasion to point out that its race *punctifera*, Obth., from Algeria and Morocco, affords distinctly different facies in the spring (May) and summer (July) generations, which no author mentions; even Oberthür, who has described in detail many individual variations in his *Études Léop. Comp.*, X, p. 387, only mentions that the second is usually of smaller size than the first. What seems, however, quite constant, judging both from a series, I have, of Tingad (Constantine, in Algeria) and from some larger specimens of the Middle Atlas, collected by Ellison, is that the underside of the second has a warmer, either tawny or chocolate-coloured, ground colour, instead of a perfectly cold grey one, like the first, and has decidedly larger and brighter orange premarginal lunules, showing faintly, also in the male sex, on the fore-wing, in the three hinder internervular spaces, whereas they never occur on this wing in that sex of the spring generation; finally, the suffusion of metallic greenish-blue scales, at the base of the hind-wing, is less extensive and of a more green and golden colour. As Oberthür's original description furnishes no special clue, in connection with either generation, but, if anything, he mentions the existence of particularly large individuals, which are only produced by the first, in Algeria, I restrict his name to it and I propose calling the II gen. **postpunctifera**, nom. nov., taking as typical the small specimens from Tingad, whilst the large and boldly marked ones from Ifrane in Morocco, of 1st October, might well be distinguished by the name of **magnapunctifera**, nom. nov., but they are not proper to that country, for Oberthür's figure of form *rubromaculata*, Obth., from Sebdu (September) is exactly like them in size and underside pattern.

*Agrodiaetus* [*marcida*, Led. ?] *parameleager*, Vrtý.:—Herr Ernst Pfeiffer, of Munich, informs us in the *Mitt. Münch. Ent. Ges.*, XXVII, p. 31 (1937) that he, too, has, last year, found in the Elburz mountains, the hitherto unknown butterfly, which I have described, in the

*Ent. Rec.* of November 1936, from two specimens discovered by Brandt. Pfeiffer was more fortunate and secured two specimens, including a female, which is similar to the male, in general appearance, but lacks its golden sheen on the uniformly brown upperside. It should be added to my description of the male that, on the basal half of the wings, as well as on the thorax, it exhibits some very slightly bluish-grey hair, especially along the neurulation. Although it is very inconspicuous, this feature is worthy of notice, because in Pfeiffer's example this colour is more prominent and his view is that it is transitional to *marcida*, Led., so that he concludes *parameleager* can only be a slightly modified form of the latter, hitherto, scarcely known species. In Lederer's original figure it looks like a tiny male *meleager*, with the blue of a much duller, paler and more grey tone, a rather thicker marginal black streak, the fore-wings less pointed, the hind-wings less scalloped, and, in fact, scarcely scalloped at all, the underside of a darker, ashy grey than it ever is in male *meleager*, but not of the brownish hue of its female either. Comparing my *parameleager* "type" with this figure, it seems scarcely possible that two such different looking insects should belong to the same species: \* they are somewhat parallel to, but more distinct from each other, at least, at first sight, than *dolus* and *admetus*, in which the two same sort of facies unquestionably accompany specific distinction between them. Here, the *marcida* figured by Lederer goes further than *dolus* in that its upperside exhibits no trace at all of brown shade or hairs, the fringes are entirely pure white, the wings are more rounded, the underside of a much colder tone. Instead, *parameleager* is decidedly larger (length of fore-wing, from base to apex, 17 mm., and expanse 36, against 12 and 25, respectively) and affords a sharp contrast to it by being remarkably like an *admetus*, by its pointed fore-wings, entirely brown fringes, uniformly brown upperside, with a strong golden sheen in the male, and brown underside, in the stead of grey. Compared with *meleager* it has exactly the same shape of wings and scalloped hind-wing as its male, whereas the underside colour and pattern are identical with those of its female, except that the brown marginal dots are larger. It is of considerable interest to note, in this connection, as Mr Stempffer of Paris has recently done, that the penis of *meleager*, when set and examined in the right position to show its dorso-ventral aspect, can be seen to belong decidedly to the *Lysandra* and *Agrodiaetus* type rather than to the *Polyommatus* one, as it had been thought for some time past. This new view falls in much better with the general aspect of the insect, which recalls, broadly speaking, *admetus* and *dolus* more than any *Polyommatus* and falls in with the actual direct connection, which *marcida* and *parameleager* obviously establish between them and *meleager*; this is, furthermore, confirmed by the fact, found by Pfeiffer, that the genitalia of Lederer's two specimens of *marcida*, examined by him, in the Staudinger collection, are exactly the same as those of *meleager*. Whatever the degree of relationship between *marcida* and *parameleager* may be, we, anyhow, have before us a group of several very close allies, amongst which those two seem to repeat, on a lesser scale, the far greater differences existing between the extreme *meleager* and *admetus* species, whilst *dolus*, too,

\*According to Pfeiffer it is Lederer's figure, which does not represent properly the look of his two typical and hitherto only known specimens.

differs from this last, in a parallel way, and *mithridates*, Stdgr., and *rippertii*, B., are specifically distinct from it, according to the latest views, although they scarcely differ in general aspect. In short, it is, on the whole, a most interesting and instructive little group.

*Polyommatus candalus*, H.-S. II gen. **postcandalus**, nom. nov.:—The specimens collected by Wagner at Ak-Chehir, in Central Anatolia, during August, and evidently belonging to a second generation, differ from those of the first, collected in the same locality, in May and June, to a slight, but distinct degree, on account of the tone of colour of the underside, which is of a lighter grey on all the wings and even exhibits a trace of yellowish on the hind-wings, whilst their basal suffusion of blue metallic scales is absent, or nearly so. As Herrich-Schäffer's original figures clearly represent the I generation and that of Freyer's *cornelia* probably does too, or, anyhow, does not convey in the least the impression of the second in any particular way, I think the latter should receive the new, distinctive, name mentioned above.

*Polyommatus loewii*, Z., race *schwingenschussi*, Pfeiffer., *l.c.*, p. 34:—The position of this race can be determined better than its author has done by remarking that it is very closely connected to the more extreme eastern ones. The series of specimens collected by Fritz Wagner, on 18th and 19th of July 1936, at Pelur, 2000 m., in the Elburz mountains, and a few from Rehne to Demavend, 2700 to 3600 m., are equivalent in size to the nominotypical race of Asia Minor, but the males are totally different from it, in connection with colour and pattern, in that they are more similar to those of race *sanoga*, Evans, of Chitral and Kashmir, as represented in my collection by examples collected in June and July 1910 by Major F. Wall. The latter males have a length of fore-wing of about 15 or more mm. and an expanse of 30, whereas the Elburz ones only attain 13 in the first case and 26 or 27 in the second. In the way of colour they both exhibit the same purplish-blue, but in *sanoga* the black is restricted, as a rule, to a broad band of about even breadth on all the wings and to a series of deeper black premarginal round dots on the hind-wing, whereas in *schwingenschussi* only a few individuals have this aspect and, even in these, the band is so dark and broad, it renders the dots nearly invisible; in most individuals the black colour expands much more, in an irregular manner, along the nervures, forming long projections, which often reach the cell; in extreme, melanic, examples these broaden so that they blend together, especially in the hind part of both fore- and hind-wings, to such an extent that the latter can better be described as being black, with purplish-blue streaks radiating from the base in the internervular spaces and mostly in those of the fore-part of the wings. There is, evidently, a certain parallelism between this form and the *baroghila* of Tytler, from the Baroghil Pass, in N.E. Chitral, which, no doubt, derives from *sanoga* by very much the same sort of variation, but is more local and more constant, where it occurs, besides being distinct from the darkest Persian individuals by several other features. The underside of *schwingenschussi* is, more or less, like the one of *sanoga*, except, perhaps, that the premarginal lunules are sharper and of a deeper black tone. My females all seem perfectly identical with that of *sanoga*, on both surfaces.

*Pieris ergane*, Geyer-Hüb., race *elbursina*, Byt.-Salz. & Brandt. II gen. **alterelbursina**, nom. nov.:—This race, collected at Keredj, at an altitude of 1500 m., on the south-western slope of the Elburz mountains, has a remarkably new aspect on account of its enormous size, hitherto entirely unknown in any other race of this species, being roughly describable as fully one-third larger than the average size of nominotypical *ergane*, corresponding to a length of fore-wing of about 20 mm., from base to tip and to a wing expanse of 37 from apex to apex, as I make it out in my series of the II, nominotypical, generation from Spalato, in Dalmatia; one male from Ragusa, which stood out amongst the other *ergane* of all sorts in my collection, measured 22 mm.; now, the smallest of my Keredj males is just a trifle larger than this and the largest actually reaches 25, whilst the female is 24; it need scarcely be remarked that such a difference in the length of one wing means a very great increase in the total wing surface.

The *co-types* of Bytinski-Salz and Brandt have been collected from 4th April to 20th May, so that they must chiefly, if not entirely, belong to the I generation and the description of their markings, of the costa of fore-wing and of the underside of the hind-wing, "suffused with grey with the exception of the anal part," confirms it. The specimens I have before me, from the same locality, but of the end of May, unquestionably have the aspect of the II generation, which makes its appearance, precisely at that time also along the Adriatic coast, beginning to emerge when the latest individuals of the I generation are still doing so. It is true Keredj is at a high altitude, but, even in Italy, the II generation of the tiny mountain race *exigua*, Vrtý., begins to emerge towards 10th June, although the latitude is considerably higher than that of the Elburz mountains.

These specimens, compared with the nominotypical II generation of Spalato and with the other races of the species, differ from them by the development of the grey markings in the male sex and their dark, blackish tone; in other countries one meets with a small percentage of individuals which are an approach to it, but, here, this form is prevalent and reaches a greater extent in some individuals, the broad apical patch being sharply quadrangular and lengthened out posteriorly by a suffusion of grey scales between the second and third branch of the median nervure, which joins it to the discal spot; the latter is not round, as usual in the Balkans and in Italy, when it is exceptionally large and it has a sharp outline, but it is semilunar or oblong. The underside of the hind-wings is of the usual very pale sulphur yellow, which scarcely varies at all in *ergane*, contrary to what one sees in the other Palaearctic *Pieris*; in the specimens I have before me, a thin suffusion of grey scales covers either the whole wing or only its basal half. I think it is advisable to have a distinctive name for the II generation of this newly described race, and I propose the one mentioned above, restricting *elbursina* definitely to the I generation.

*Maniola telmessia*, Z., race **marinigrans**, nom. nov.:—Since this insect has been accorded specific distinction from *jurtina*, one race from northern Persia has been separated by Le Cerf, on the strength of the even breadth of the fulvous band in the male fore-wing, which does not form a projection towards the cell, as it does in nominotypical *telmessia*,

15.i.37.

or even completely wanting. The claviform alone is always present and very emphasized." Pamirs.

Hamps. *Cat. Lep. Ph.* IV. 353 (1903), "Paler; forewing whitish-grey."—Spain; C. Asia.

ab. *dufresnei*, Lamb. *Rev. Mens. Namur*, VII. 26 (1907).

ORIG-DESCRIP.—"A little larger than ordinary males. Ground of forewings a yellowish grey, with the costa, nervures and a large marginal band a brownish grey as in the females. Ordinary lines absent; reniform half obliterated, the orbicular invisible and the claviform, always so well marked as a sign of exclamation in the type, obliterated, leaving scarcely any pale traces. Hindwings pure white, with nervures scarcely deeper." Frameriès, Belgium.

ab. *cuspidata*, Culot, *Noct. et G.* I(1). 70 (1909-13).

FIGS.—*l.c.* plt. 11, fig. 8 ♀.

ORIG. DESCRIP.—"With six lancet shaped jet-black marks pointing outwards in the centre of the wing on the outer boundary of the reniform stigma and below it; the bottom one representing the claviform is the largest. Both the orbicular and reniform are visible but not emphasized." St. Lothian (Jura). Coll. Oberthür. This form, extremely curious, appears to have some analogy with ab. *plaga*, Steph. It seems to me however that the original description of *plaga* does not describe the present form. The description of *plaga* says "Orbicular and reniform obliterated and replaced by an obscure spot." Whereas, not only is no mention made of the fascia of lancet characters, which occupy the middle of the wing, but in the example figured (8) the orbicular and reniform remain very distinct.

ab. *posteli*, Culot. *Noct. et G.* I(1). 70 (1909-13).

FIGS.—*l.c.* plt. XI. fig. 5 ♂, 6 ♀.

ORIG. DESCRIP.—"Ground of forewings very smoky, with all the subterminal area and the reniform sooty black. The subterminal area entirely of a uniform black." Pas-de-Calais.

ab. *conjuncta*, Hirschke. *Verh. z.-b.* LX. 416. (1910).

ORIG. DESCRIP.—"From the lower margin of the reniform runs a black margined longitudinal streak to near the lower margin of the orbicular without quite reaching it. A female from near Prague."

ab. *wehrlii*, Vorbrdt. *Schm. Schw.* II. (Nacht) 622 (1914).

ORIG. DESCRIP.—"A very striking ♀ form of *picea*, Haw. with 4mm. wide shining ochre-yellow base of the fore-wings and transverse bands." Frauenfeld, Switzerland.

ab. *quadrinacula*, Wehrli, *Schm. Schw.* II. (Nacht.) 622 (1914).

ORIG. DESCRIP.—"With an isolated dark brown spot between the stigmata, lower half of the orbicular." Frauenfeld, Switzerland.

ab. *invertilinea*, Le Charles, *Cat. Lep. Fr.* (Am. Pap.) 155 (1926).

FIG.—*Am. Pap.* III. 128, plt. 2, f. 5 (1926).

ORIG. DESCRIP.—"Generally smoky. Fore-wings a uniform deep reddish brown. Usual lines of the type absent, leaving only a trace of

the subterminal visible. Reniform black, enlarged by cloudy contours. The median shade, which is absent in the type, is strongly marked in the form of a cross below the reniform. Orbicular absent, claviform thickened by a cloudy contour. Lower wings suffused with brown, fringes light." Seine-et-Oise.

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*Agrotis*, Ochs. and Treit. (1816-25). Most authors and Corti-Draudt-Seitz [*Rhyacia*, Hb. (1822) Warr.-Stz.: *Lycophotia*, Hb. (1822) Hamp.] *ripae*, Hb. (1823).

Tutt, *Brit. Noct.* II. 67 (1892): Barrett, *Lep. Brit. Is.* III. 321, pl. 128, 2 (1896): Stdgr. *Cat. III* ed. 148 (1901): Hamp. *Lep. Ph.* IV. 527 (1903): Splr. *Schm. Eur.* I. 159, pl. 36, 26a-b (1905): South, *Moths. Br. Is.* I. 210, pl. 106, 1-2 (1907): Warr.-Stz. *Pal. Noct.* III. 41, pl. 9a, b (1909): Culot, *N. et G.* I(1), 71, pl. 11, 10-12 (1909-13): Corti-Draudt, *Pal. Noct. Supp.* III. 50, pl. 9ab, and 6f (1933).

Hübner's figure, *Saml. Noct.* 702 (1823) is a good average form except that the sagittate marginal marks are much too strongly expressed. It does not represent our light Sussex form in any way.

Treit. *Schm.* V(1). 174, 1825, says that just as he was going to press, the portion of Hb. *Noct.* with figures of *ripae*, came to hand. He recognized the figures as representing 10 specimens, which were in the Vienna collection under the MS. name *baltica*. It was at first thought to be one of the numerous forms of *cursoria*. But he (Treit.) was satisfied that the characters of *ripae* were indicative of a separate species.

Steph. *Ill.* II. 127, pl. 22. f. 1, describes and figures a clouded form of *ripae* with nebulous, indistinct marking, under the name *nebulosa*. There are numerous markings additional to the usual stigmata. There is a very dark subterminal narrow band.

Dup. *Hist. Nat. Sup.* III. 220. pl. 20, 3, has a good figure of a dark variegated *ripae*, in which the markings are small, with the costal dots united in pairs having a white centre. In *l.c.* 476, pl. 41, 1, is a good figure of an ochreous form, with deeper ochreous markings.

Both Dup. and Gn. place *desillii*, Pierr. as a var. of *ripae*.

H.-S., *Sys. Béarb.* f. 492, gives a somewhat similar, clouded figure, but with less cloudy markings and a partial suffusion of very light reddish colour, under the name *deserticola*, Ev., which in the index he gives as a var. of *ripae*. He says that Hb.'s figure is good. He places the *desillii* (*desyllesi*), Pierr. as a synonym of this form.

Frr., *Beitrag*, III. 78, pl. 116, 4 (1830), gives a figure unrecognizable as *ripae*, in shape, colour and marking. The specimen was in bad condition.

In his *Neu. Beitr.* V. 130, pl. 466, 3 (1845) Frr. gives a figure of a very markingless form, *weissenbornii*, pale cream with the 3 stigmata represented and the inner trans. line. His text does not connect it with *ripae*. In VII. *l.c.* pl. 697, is given a figure named *obstritica*, Schmdt. which appears to represent a very pale bluish white *ripae* with strong sagittate marginal marks and outlines of the stigmata, with black specks on the costa.

Newman, *Brit. M.* 328, 2 figs., a moderately dark form and a light form.

Barrett, *l.c.* pl. 128, 7 figs. Not one shows the beautiful delicate texture and tint of the usual British southern form, in fact only one fig. *viz.*, 2e, gives a semblance of a form of *ripae*.

Spuler, *Schm. Eur.* I. 159, pl. 34, figs. 26a, 26b, 27, are very fair but rather smudgy. 26a and 27 are dark, perhaps too dark, and 26b is not light enough.

South, *Moths Br. Is.* I. pl. 106, gives figures of ♂ and ♀, which are not at all good as they are affected by the general brown colour of the plate.

Warren-Stz. *Pal. Noct.* III. 41, pl. 9 a b c, considers *instructa* as a synonym of *ripae*, and treats *deserticola* and *alexandrensis* as synonyms of *desertorum*. He figures *ripae*, *desertorum* ♂ and ♀, *weissenbornii* ♂ and ♀, and *desillii* ♂ and ♀.

Culot, *N. et G.* I(1). 71, pl. 11, figs. 10-12 (1909-13), gives three excellent figures. 10 usual pale greyish form with slight traces of reddish ochreous, 11 the almost unicolorous form *weissenbornii*, and 12 the *desertorum*, pale grey, indistinct markings.

Corti-Draudt-Stz. *Pal. Noct. Sup.* III. 50, pl. 6f (1933), correct the illustrations in the Main Volume, 9a, *ripae*=*desillii*; 9b, *weissenbornii* ♂ = *ripae* ♀; 9b and 9c, *desillii*=*weissenbornii*; 9b, *desertorum* ♂ and ♀, should be a shade paler. They go on to say that *obotritica*, Schmidt, is *weissenbornii*, Frr.; *desillii*, Pier. (recte "*desillesi*"); and that *duskei*, Gr.-Gr. and *chamyli*, B.-Hs.=*albovenosa*, Tschiv. They figure *albovenosa*, as yellowish grey with markings darker and somewhat diffuse, while the veins are generally evidenced by their lighter colour; the costa is lighter, the outer margin shaded darker and the sagittate marks still darker and longer than normal. Both *duskei*, Gr.-Gr. and *chamyli*, B.-Hs. are marked (*i.l.*).

Of the Variation Barrett says—"This species is subject in a remarkable degree to local variation. On our south-western coasts it is often well, or even strongly marked, showing all the markings distinctly; on the coasts of Hants and the Isle of Wight, and generally in the south and south-east the tendency is often to shades of reddish on a white ground, or to a very opaque whiteness, the markings in both cases being often obscured; on the coast of the Eastern Counties the ground colour is usually whitish, though not of so opaque a quality, or perhaps more of a whitish drab and the markings are rarely very strong, usually faint or partially obsolete; on the north-western coasts more tinged with grey. These forms melt into each other, so that the ground colour varies from pure white through pale reddish, reddish drab, yellowish drab, and various shades of pale brown to brownish grey, and the markings to all degrees of distinctness or obliteration—especially the latter."

Barrett records a specimen "the forewings of which are of a rich, bright, light red with the markings and nervures edged or lined with white."

Another "with thorax and wings clear, smooth white, except faint indications of the three stigmata, and part of the first and second lines."

Another "of whitish ground colour, but with all the markings clearly shown, and all the interspaces delicately dashed and clouded with grey, reddish and brown."

Another "of a creamy yellow, with the three stigmata distinctly marked but the transverse lines totally absent."



Another "of a greyish-white with a reddish flush, and the stigmata faintly indicated in reddish-brown."

Mr. A. J. Wightman has kindly furnished me with the following notes on the large number of forms represented in his collection. He says—

"To my mind all Sussex *ripae* have, in fact a pale ground colour, but this is often so much obscured by the markings that the insect appears to have a dark ground colour.

"There are five main groups.

A. Only occurs, as far as I am aware, in white, bluish white, cream, and pale ochreous. No markings beyond faint outline of stigmata. Clear and smooth in appearance.

B. As in A. but has a rough appearance due to marking being present in very pale shade on slightly paler ground colour, and with the addition of pink forms.

C. As in A. but with transverse lines as well as outlines of stigmata clear and smooth in appearance, but with no pink forms.

D. Well marked but with ground colour showing plainly. Ground colour always white, bluish white, cream, or pale ochreous. Markings may be any shade of yellow to red, grey to black, and in many specimens several colours are present.

E. So heavily marked that ground colour is lost except for tiny areas. Compared with dark specimens from the Lancashire coast where the ground colour is normally dark, it can be readily seen that the dark Sussex forms have really a pale ground colour. These forms appear very unicolorous and dark, except for the costal area and perhaps the nervures. Colours as in D.

"[This dark group thus consists of a southern and a northern subgroup.]

"Outside these general groups, there are peculiar forms in which some area has developed unusually intense marking—the banded form is an example of this, but I have examples with the submarginal area heavy and broad; again it may be the central fascia and basal area, which are especially heavily marked. On the whole red or pink are rare."

Mr. Wightman has very carefully gone through his long varied Sussex Coast series and picked the following more or less individual forms.

1. Deep rich red, whitish nervures and costa.
2. Deep ashy grey, ditto.
3. ditto, suffused with reddish ochreous, pale costa.
4. White ground colour, markings in ochreous, so pale that insect appears unicolorous bone white.
5. Rich ochreous yellow ground colour, transverse lines brown and stigmata even darker brown.
6. Orange suffused form, pale costa.
7. White, only markings pale outlines of reniform and orbicular; claviform a dark spot.
8. Ditto, but transverse lines fine and sharp.
9. As 7, but bluish white, and some dark shading in outer area.
10. Pale ground colour, deep colour of stigmata and basal patch.
11. Deep marking of submarginal line.
12. Dark outer band.

The Forms and Names to be considered are—

*ripae*, Hb. *Sam. Noct.* 702-3 (1823).

ab. *nebulosa*, Steph. *Ill.* II. 127, pl. 22, 1 (1829).

ab. *desillii*, Peirr. *Ann. Soc. ent. France.* 95, pl. 8, 2 (1839).

(*desillesi*) (*desyllesii*).

r. *desertorum*, Bdv. *Ind. Meth.* III. (1840).

(r. *deserticola*, Eversm. *Bull. Mosc.* III. 544, pl. 5, 2 (1842).)

ab. *weissenbornii*, Frr. *Neu. Beitr.* V. 140, pl. 466, 3 (1845).

*instructa*, Walk. *Cat. Lep. B.M. Noct.* X. 352 (1856). No locality.

Specimen in B.M.

r. *obotrictica*, Schmidt. *Stett. e. Zeitg.* 377 (1858).

ab. *albicosta*, Tutt. *Brit. Noct.* 70 (1892).

ab. *brunnea*, Tutt. *l.c.* 71.

ab. *grisea*, Tutt, *l.c.*

r. *alexandriensis*, B.-Baker. *Tr. Ent. S. Lond.* 37, pl. 1, 5 (1894).

ab. *albovenosa*, Tschetv. *Jahr. Martjanov, Minussinsk.* Bd. III. p. 53 (1925).

{ ab. *duskei*, Gr.-Gr. } only MS. names.  
{ ab. *chlamyli*, Bg.-Hs. }

ssp. *wagneri*, Corti-Drdt. *Pal. Noct. Sup.* III. 50 (1933).

Tutt dealt with the forms

1. White, with faint ochreous tint, stigma and transverse lines distinct = *obotrictica*.

2. White, etc., with stigmata, etc., indistinct = *weissenbornii*.

3. Pale ochreous, reddish tinge, stigmata, etc., distinct = *desillesi*.

4. Ditto with white costa = *albicosta*.

5. Pale greyish, inner margin reddish ochreous, distinct stigmata, etc. = *ripae*.

6. Pale greyish, without reddish tinge, base and outer margin fuscous = *nebulosa*.

7. Pale greyish, with indistinct stigmata, etc. = *desertorum*.

8. Reddish brown, distinct stigmata, etc. = *brunnea*.

9. Dark greyish, slightly slaty, much suffused = *grisea*.

The ORIG. DESCRIPT. of *desertorum*, Bdv. was given in the appendix Vol. IV. p. 116.

Tutt recognized that his account was deficient for want of material (*B.N.* II. 68). My own material is also extremely small, but I am relying on the very kind help of Mr. A. G. Wightman who has had many hundreds and has a long and very varied series, especially from the Sussex Coast. I append his analysis of the variation with which he has furnished me.

“I have bred many hundreds of Sussex *ripae*, no two are quite the same. To my mind all Sussex *ripae* have, in fact, a pale ground colour, but this is often so much obscured by the markings that the insect appears to have a dark ground colour.

“There are five main groups.

A. No markings beyond a faint outline of stigmata; clear and smooth appearance. Only occurs in white, bluish white, cream and pale ochreous yellow.

B. Ditto, but rough appearance due to markings being present in very pale shade on slightly paler ground colour. There are also pink forms.

- C. As A. but with transverse lines as well as outlines of stigmata; clear and smooth appearance. There are no pink forms.
- D. Well marked, but with ground colour showing plainly. Ground colour always white, bluish white, cream, or pale ochreous, but markings may be any shade of yellow to red, grey and red, grey to black, and in many specimens several colours are present.
- E. So heavily marked that the ground colour is lost except for tiny areas. These forms appear very unicolorous and dark, except for costal area and perhaps the nervures. Colours as in D.

“Outside these general groups there are peculiar forms in which some area has developed unusually intense marking. The banded form is an example of this, but I have an example with the submarginal area heavy and broad, or again it may be the central fascia or the basal area which is especially heavily marked.

“Such *ripae* as I have seen from other localities, as the Lancashire coast and Dorset, are distinctly of a different facies to those from W. Sussex and S.E. Hants (a single locality I think).”

*instructa*, Wlkr. *Cat. Lep. B.M. Noct. X. 352* (1856).

ORIG. DESCRIPT.—“*Cervina*, subtus alba; thorax fascia antica angusta fusca; abdomen albido-testaceum; alae anticae fusco subconsersae, lineis duabus transversis angulosis incompletis fusco guttatis, lunulis marginalibus fuscis, sat magna fusco subnotata, reniformi subrotunda obscure fusca albido marginata; posticae albae.” Locality unknown. 1 example in B.M.

f. *desertorum*, Bdv. *Gen. Ind. Meth. III.* (no. 849) (1840).

ORIG. DESCRIPT.—“Alae anticae angustae, cinerae, strigis tribus punctisque, marginalibus nigris; macularis ordinariis fuscis; rotunda longitudinali, minuta; alae posticae niveae; omnibus subtus albis, puncto discoidali nigro.” Found in South Russia by Kindermann.

This was subsequently named *deserticola* in 1842 by Eversman, *Bull. Mosc.* 544, pl. 5, f. 2, which name does not stand.

race *alexandriensis*, Baker, *Trans. Ent. Soc.* 37, pl. 1, f. 5 (1894).

FIG.—*l.c.* pl. 1, f. 5.

ORIG. DESCRIPT.—“♂ Primaries yellowish-grey, first transverse line from discal cell to inner margin fawn colour, but rather indefinite, preceding which are three small black spots—one on the costa, one on the median vein, and a third on the submedian, the latter being nearer the base than the preceding ones; there is a dark dot close to the base on the costa and median vein. The second transverse line beyond the reniform stigma is also fawn colour, extending from sub-costal to submedian vein, but rather broken, the area between the first and second lines is tinged with fawn colour, beyond the second line is a curved row of dark dots from subcostal to submedian vein. Orbicular stigma almost obsolete. Reniform stigma outlined in fawn colour, with a similar coloured crescentic continuation below the extremity of the discal cell; directly above this stigma the costa is darkly dotted. Posterior margin darkly dotted; fringes yellowish grey with paler extremities. Secondaries silvery grey. Fringes entirely snow white.

♀ Primaries uniform brownish grey, slightly lustrous, no marking

at all visible except a small darker spot representing the orbicular stigma; the reniform stigma is finely outlined and pupilled with darker grey. Posterior margin darkly dotted. Fringes whitish with dark extremities. Secondaries silvery gray, brownish towards outer margin, slightly lustrous. Fringes silvery grey."—Alexandria.

ab ditto. "One specimen. An uniform pale ochreous fawn colour, the first and second line as in the type, but the former extended up to the costa and rather broken, the latter being followed immediately by a curved row of very fine dark minute dots, from which to the posterior margin the ground colour is darker, interrupted only by a doubly curved paler transverse line from the costa to the anal angle."

This species will follow *desertorum*.

ssp. *albovenosa*, Tshtv. *Jahr. Mart.-janov. Minussinsk.* Bnd. III. p. 53 (1925).

ORIG. DESCRIPT.—*Alis ant. fuscis aut brunneis saepe albovenatis striolisque triquetris spatii submarginalis distinctis atro-fuscis; posticis (♂ ♀) albidis, vix infuscatis, linea marginali fusca, subtus lunula discoidali distincta; cum trans. ad sbsp. desertorum, B.*"

*r. wagneri*, Corti-Drdt.-Seitz, *Pal. Noct. Sup.* III. 50 (1933).

ORIG. DESCRIPT.—"I denominate a new silvery grey form from Asia Minor (Ak-shehir) and probably from Syria which may prove to be a genuine race."

The darkest form so far dealt with is Tutt's *grisea* "dark greyish, slightly slaty, much suffused." There occurs along our southern coasts of Devon a dark form, which has been called "blackish" because of its outstanding dark coloration. My own example (bred from Devon coast) stands out darker than it really is in a series of this beautiful usually light coloured insect. The ground is wholly mottled with very slightly reddish tinge, with the usual markings, stigmata, transverse lines, etc., blurred and of little emphasis, without suspicion of ochreous white, the dominant colour in most specimens. The basal portion of the costa is, however, slightly marked out in grey. The hindwings are darker grey with indistinct lighter rays from the base.

It is not *brunnea*, which is of a beautiful rich brown, but it closely resembles the dark *grisea* of Lanes. Two of this last form have just come into my hands, one from St. Anne's and one from Torquay (!) Both are comparable with my dark Dawlish one.

*Agrotis*, Ochs. and Treit (1816-25) most authors [*Euxoa*, Hb. (1822) Hamps., Warr.-Stz., Mey., (2)] *puta*, Hb.

Tutt, *Brit. Noct.* II. 72 (1892): Barrett, *Lep. Brit. Is.* III. 301, pl. 125 (1896): Stdgr. *Cat.* IIIed. 147 (1901): Hamp. *Cat Phal.* IV. 183 (1903): Splr. *Schm. Eur.* I. 157, pl. 34, f. 19 (1906): South, *Moths Brit. Is.* I. 204, pl. 104, f. 2, 7 (1907): Warr.-Stz. *Pal. Noct.* III. 28, pl. 6a (1909): Culot, *N. et G.* I(1), 18, pl. 10, figs. 17, 18 (1909-13): Corti-Drdt. Seitz *Pal. Noct. Sup.* III. 51, pl. 6d.e.f. (1933).

Hübner's fig. 255 *Samml.* (1802) is the type, but is an extremely rare form unknown to most entomologists: Tutt saw only one example. (numbered 55 in error on plate).

Hübner—Geyer's figs. 715, 716, 717 (1826-8) are of the usually met-with form in this country and is named *renitens*. The clear grey ♂ with dark grey ♀.

Godt. *Hist. Nat.* V. pl. 67 (1824) figs. 5-6. ♂ and ♀ *lignosa*, are very fair, f. 7 *puta* ♂ is rather extraordinary in markings. The figure and description do not agree. The description says "grey." The figure is clear ochreous inclined to reddish. From the posterior transverse line to the base is a fuscous suffusion. Anterior and posterior lines double. Very black narrow irregular band between stigmata, not parallel to either transverse lines. Few sagittate marks very plain below apex. Orbicular indistinct, reniform with light contour. Hind-wings same ground, lighter basally.

Stephens, *Ill.* II. 119, fig. 1 (not 3 as printed) *radiola* (from Haw. MS.) is a very dark brown grey form, with all the ordinary marking only faintly visible.

Guen. *Noct.* V. 267 (1852) says that *lignosa*, Gdt. and *renitens*, (1852) are identical.

Ernst. and Engr., *Pap. d'Eur.* VII. fig. 440b. is doubtless the ordinary dark ♀, and 449a is possibly intended for the red typical *puta*, Hb. (fig. 255.)

Spuler, *Schm. Eur.* pl. 34, fig. 19, has a very good figure of *renitens* ♂.

South, *Moths Br. Is.* I. 204, pl. 104 (1907) gives good figures of the ordinary British form.

Her.-Sch. *Bearb.* II. 352 (1846), says that fig. 255 of Hb. is useless; wings much too variegated. His own figure 541 has the markings far too definite for a *puta* form. His figure 28 *erythroxylea* is undoubtedly a true *puta* form.

Barrett, *l.c.* III. pl. 125, gives 4 figs. ♂ very dark, ♀ black, no transverse lines, a marginal series of small square whitish spots; a slightly darker ♂ with dark base of fore-wings and well emphasized lines, orbicular absent, reniform a dark irregular blotch; a ♀ with doubled transverse lines, emphasized with dull white or grey, and clouding of reddish brown around the reniform near the base and in the submarginal area. Ground dark grey not black.

Warr.-Stz. *Pal. Noct.* III. 28, says that the type form is Italian and very rare. He puts *erythroxylea* and *catalaunensis* as synonyms of *puta*. Figs. 6a *renitens* are good figures of the usual British form.

Culot, *N. et G.* I. (1) *renitens* and *erythroxylea* are treated as synonyms of *puta*. On pl. 10, fig. 19, is given as a copy of Hüb. type and fig. 18 an example of the French *lignosa*, are two very good figures but fig. 17 is not at all the Hüb. type as the text says; there is no trace of red in it as in Hüb. fig.

Corti, Draudt-Seitz go much into detail on this species *Pal. Noct.* Sup. III. 51 (1933). On pl. 6, 6a is given as *puta* typical, which, although of a reddish brown, is not distinctively red as Hübner's figure. They figure *andreasi*; a figure of *radius* said to be better than that in the main volume; one of *syricola*; another of *saracenic*; another of *retrovi*, and one of *silvestrii*, which last is a dark coppery red. These figures are all quite good.

15.iii.37.

Berio, *Ann. Mus. Civ. di. Stor. Nat. Genova*, LIX. (1936) discusses this species at very great length, naming no less than 26 mostly very trivial forms, making a total, with the previous 21 named, of 47 aberrational or form names, of which he has given 38 figures in black and white on 3 plates. Figs. 17 to 38 are notably enlarged. The first 16 figures are reproductions in black and white of the original figures of the older denominations from Hübner onwards,

Of the Variation Barrett says—"Not very variable, but a recurrent form of the male, in which the whole of the basal portion of the fore-wings, to the first line, is more or less filled in with blackish, and the transverse lines are more distinct, was formerly described as a separate species under the name of *radia* [*radius*, Haw.] A variety of the female in which a brown transverse stripe lies along the second line was described as its female. The late M. Bentley, when writing upon these varieties and showing that they were of the same species as the typical form then known as *A. radiola*—also pointed out that the variation in colour of the hindwings is very remarkable, and described a form of the female in which they are silvery white. A very fine male of this variety *radius* was taken in Devonshire."

He describes another, a female, "of which the fore-wings are the colour of the male, but set off by two conspicuous, straight, perpendicular, blackish, transverse bars; this was taken at Portland."

The Forms and Names to be considered are

- puta*, Hb. *Samml. Noct.* 255 (1802).  
*f. radius*, Haw. *Lep. Brit.* 119 (1803).  
*f. lignosa*, Godt. *Hist. Nat.* V. 241, plt. 67, 6 (1821). [= *golignosa*, Berio]  
*f. venitens*, Hb. *Samml. Noct.* 715, 716, 717 (1822).  
*f. erythroxylea*, Treit. *Schm. Eur.* V.(3) 31 (1826).  
*f. radiola*, Steph. *Ill.* II. 119, plt. 20, 3 (1829).  
*r. catalaunensis*, Mill. *Rev. Mag. Zool.* IIIs, plt. 1, p. 4 (1873).  
*ab. obscura*, Tutt, *Brit. Noct.* II. 75 (1892).  
*ab. nigra*, Tutt, *l.c.*  
 ♀ *ab.* Hamp. *Cat. Lep. Phal.* IV. 184 (1903).  
*ssp. meridionalis*, Splr. *Schm. Eur.* I. 157 (1908).  
*ab. amartia*, Schaw. *Verh. z. b. Wien.* LXI. 82 (1911).  
*ab. rostroui*, Roths. *Nov. Zool.* XXVII. 29, plt. XVII. 11 (1920).  
*ab. major*, Roths. *l.c.* XXVII. 33 (1920).  
*ab. silvestrii*, Trti. *Att. Soc. It. Sc. Nat. Milano.* LXIII. 62 plt. III. fig. 15 (1924).  
*ab. minima*, Trti. *l.c.* plt. III. 7-8 (1924).  
*ab. andreasii*, Trti. *l.c.* 67 (1924).  
*ab. saracenica*, Tams, *Ann. Mag. N. H.* (9) 15, p. 145, fig. (1925).  
*ab. nuda*, Dnhl. *Mitt. Munch.* 19 (1929).  
*ssp. subrubra*, Dnhl. *l.c.*  
*ab. joannisi*, Dufrane, *Mem. ent. Belg.* XXIII. 61 (1930).  
*ab. marianii*, Berio. *Boll. Soc. Ent. It.* LXIV. 140 (1932).  
*ssp. syricola*, Corti-Drdt. *Seitz. Pal. Noct. Supp.* III. 51, plt. 6 (1933).  
*ab. unica*, Berio. *Ann. Mus. Civ. Stor. Natur. Gen.* LIX. 90, fig. 19 (1936).  
*ab. juncta*, Berio. *l.c.* fig. 20 (1936).  
*ab. perfusa*, Berio. *l.c.* fig. 23 (1936).

- ab. *cremea*, Berio. *l.c.* 91 (1936).  
 ab. *algerina*, Berio. *l.c.* fig. 22 (1936).  
 ab. *pheroa*, Berio. *l.c.* 92, fig. 15 (1936).  
 ssp. *toisca*, Berio. *l.c.* fig. 17 (1936).  
 ab. *tutti*, Berio. *l.c.* 93, fig. 21 (1936).  
 ab. *obscurina*, Berio. *l.c.* (1936).  
 ab. *erythrosimilis*, Berio. *l.c.* fig. 27 (1936).  
 ab. *agenjoi*, Berio. *l.c.* fig. 31 (1936).  
 ab. *transfixa*, Berio. *l.c.* 94 (1936).  
 ab. *debilis*, Berio. *l.c.* (1936).  
 ab. *umbra*, Berio. *l.c.* 94, fig. 35 (1936).  
 ab. *tricolor*, Berio. *l.c.*  
 ab. *monochroma*, Berio. *l.c.* 96 (1936).  
 ab. *uniformis*, Berio. *l.c.* fig. 33 (1936).  
 ab. *paupera*, Berio. *l.c.* fig. 36 (1936).  
 ab. *purolimbata*, Berio. *l.c.* 97 (1936).  
 ab. *masculina*, Berio. *l.c.* (1936).  
 ab. *transiens*, Berio. *l.c.* (1936).  
 ab. *extrema*, Berio. *l.c.* 98 (1936).  
 ab. *feratra*, Berio. *l.c.* (1936).  
 ab. *venata*, Berio. *l.c.* 99, fig. 37 (1936).  
 ab. *lignosina*, Berio. *l.c.* fig. 34 (1936).  
 ab. *composita*, Berio. *l.c.* fig. 38 (1936).

Tutt dealt with the typical form (1) suffused with red, (2) clear grey with base, stigmata and outer margin darker, *renitens*, ♂, (3) Dark grey ditto, *renitens* ♀. (4) Grey, much reticulated with faint longitudinal lines, *radius*. (5) Grey, with trans. shade between orbicular and reniform, *lignosa* ♂. (6) Blackish brown, with two black trans. bands, *lignosa* ♀. (7) Greyish-black much obscured markings, *obscura*. (8) Entirely black, *nigra*. (9) Brownish grey with pale central area, *radiola*.

f. *erythroxylea*, Treit. *Schn. Eur.* V. (3), 31 (1826).

FIG.—H.-S. *Bearb.* II. fig. 28.

ORIG. DESCRIPT.—“The size is about that of *N. plecta*. Head, collar and thorax appear bone-colour. The collar has in front a wide, deep brown border, the abdomen is somewhat whiter, flat pointed towards the anal end. The antennae in the ♂ are strongly pectinated. The feet light brown, annulated below with white. The forewings have the ground colour agreeing with that of the thorax. The first transverse line consists of a double row of brown crescents. The outside from the base is dark brown with reddish gloss. The reniform is similar in colour. The orbicular as a smaller ring lies hidden under a quantity of fine longitudinal streaks. The costa has brown and pale yellow dots. The second transverse line is present, but indistinct. The waved band is expressed by brown dots and reddish arrow-streaks. The margin next to the fringe is wide, brownish, mostly with a red gloss. The fringes are yellow with reddish dots. The hind-wings are white, they have brownish veins and similar bordering of pure white fringes.” Italy and S. France.

Tutt says this is *puta*, see *Brit. Noct.* II. 72.

r. *catalaunensis*, Mill. *Rev. Mag. Zool.* 3a. S. (1873).

FIG.—*l.c.* plt. 1, fig. 4.

ORIG. DESCRIP.—“The whitish ground is tinged with violet, with the costa, the cellular area and the base of the wings violet brown. Several elongated black spots lie, one on the costa, another at the centre of the wing, separating the base from it and extended up to the level of the reniform stigma. A third spot, black, elongate, abuts on the fringe, crosses the reniform, which is large, brown at the centre and encircled with black. A series of small sagittate black spots lie with their points inwards. Two other small oblong spots, superimposed, the one white and the other brown, precede the reniform. The lower wings are whitish with the nervures brown. A series of brown lunular dots lie at the edge of the fringe, which is entirely white. Below, the wings are white, but the upper ones are very largely suffused smoky to their centre. On the lower wings is shown a cellular point, very distinct although it is scarcely visible above. The thorax is square, hairy, and of the colour of the fore-wings. The abdomen is slender, slightly depressed and whitish.”

♀ ab. Hamp. *Cat. Lep. Phal.* IV. 184 (1903).

ORIG. DESCRIP.—“Forewings suffused with fuscous; hindwings usually pale brown.”

ssp. or r. *meridionalis*, Splr. *Schm. Europas*, I. 157 (1908).

ORIG. DESCRIP.—“From Andalusia a larger, darker form lies before me, with the bright margined reniform standing out clearly and with very strongly darkened marginal spots on the hindwings.”

ab. *amartia*, Schaw. *Verh. z.b. Wien.* LXI. 82 (1911).

ORIG. DESCRIP.—“The fore-wings are conspicuous, light brown with whitish marginal waved line. The brown colour is only present in the reniform and only slight in the costal portion of the base.” Bosnia and Herzegovinia.

ab. *retroui*, Roths. *Nov. Zool.* XXVII. 29. (1920).

FIG.—*l.c.* plt. XVII. fig. 11.

ORIG. DESCRIP.—“Exactly intermediate in appearance between *E. radius* and *E. trux*. Antennae serrate, brown; head pale pinkish mauve: tegulae darker with dark brown edge: patagia and rest of thorax pinkish mauve; abdomen wood-grey. Forewing pinkish mauve, basal one-fourth above vein 1 dark brownish mauve, an oblique transverse, convex, dentate line of same colour separated from this deeper coloured patch; a darker brown mauve patch surrounding reniform stigma from which a shadow line runs straight to inner margin; postmedian, convex, dentate, blackish line; post-discal area clouded with brownish mauve. Hindwing white with nervures, costal, and abdominal areas suffused with mouse-grey.” Algeria, Oran, etc.

ab. *major*, Roths. *Nov. Zool.* XXVII. 33 (1920)

ORIG. DESCRIP.—“From Oran we have 5 ♀ ♀ of gigantic size and of the black aberration, which for the present I will name ab. *major*. Length of f.w. 20mm. Expanse 46mm. The largest *erythroxylea*, 17mm. and expanse 39mm. from Oran in 1913.”



f. *silvestrii*, Trti. *Att. Soc. It. Sc. Nat. Milano*. LXIII. p. 62 (1924).

FIG.—*l.c.* plt. iii. f. 15.

ORIG. DESCRIP.—“Fore-wings fuscous red brown, largely covered along the costa by a blackish suffusion, which does not reach to the apex, but covers the space above the orbicular and reniform stigmata. This termination is quite obscure. The proximal transverse line is almost obsolete but well-marked at the lower part of the orbicular stigma; the distal transverse line is indicated by very small black traces upon the costa. An obscure median shade runs down from the reniform diminishing in size to end on the dorsal margin. The antemarginal sagittate spots are well defined in black. The limbal line very finely expressed in black, precedes the reddish-brown fringe. The hind-wings of a greyish, dusty ground, especially shaded along the anterior margin. The limbal line finely dark. Fringes greyish. Below, the four wings greyish, lustrous; the fore-wings less than the posterior, suffused with obscure scaling. An obscure distal very small lunule on all the wings.” Bengasi, Italian N. Africa. Cyrenaica.

ab. *minima*, Trti, *Att. Soc. It. Sc. Nat. Milano*. LXIII. 62 (1924).

FIG.—*l.c.* plt. iii, f. 7, 8.

ORIG. DESCRIP.—None. Expanse of figure 8, 25 mm. This was placed by Turati to the species *hoggari*, Roths. Misurata, N. Africa.

f. *andreasi*, Trti.-Corti. *Att. Soc. It. Sc. Nat. Milano*. LXIII. 67 (1924).

FIG.—Seitz. Cort.-Drdt. *Pal. Noct. Sup.* plt. 6.

ORIG. DESCRIP.—“With very white ground is the example of *andreasi* Corti. with stigmata and strigae strong and of intense black colour, with any suffusion of red-brown” Venice, Bulgaria, etc.

r. *saracenicæ*, Tams, *An. Mag. N.H.* (9) XV. 145, fig. (1925).

ORIG. DESCRIP.—“Facies of *hodnae*, Obthr. but darker in colour. Head and thorax drab, white and sepia mixed, many of the darker scales white tipped, tegulae whiter than the rest of thorax. Pectus cartridge buff. Abdomen above and beneath cartridge buff, irrorated with drab. Forewing ground colour drab, the veins and pattern fuscous-black, with white splashings on each side of the veins and in and above the orbicular. Claviform marking outlined with fuscous-black, extending along the anal fold to a point opposite to the junction of vein Cu2 with the cell. Orbicular elongate but not confluent with the reniform; finely outlined with fuscous-black, with a central patch of drab scales, surrounded by white and cream buff scales: reniform large, filling the end of the cell, heavily outlined with fuscous black and almost filled with fuscous black; a heavy fuscous black shade on the costa above the reniform; an obscure fuscous-black band from the reniform to inner margin, slightly black arrow-head dashes below vein M1., the dash above the anal vein being less well-defined than the others, etc. Hind-wing white, with a fine fuscous terminal line, thickened interneurally black: fringe fuscous, with a cream buff line at base, etc.” Jahrin, Huful, Arabia.

15.iv.37.

*f. nuda*, Dnhl. *Mitt. Münch. Ent. Ges.*, 19 (1929)

ORIG. DESCRIP.—“Resembling the last (*andreasii*), completely markingless with yellowish white-grey ground colour.” Messina, Palermo, Capri, etc.

*f. subrubra*, Dnhl. *Mitt. Münch. Ent. Ges.* 19 (1929)

ORIG. DESCRIP.—“The ground colour in this is reddish-grey, the markings like those of *renitens*, Hb. Transverse lines wanting. Hind-wings pure white. In the female sex the form is nearest to the *lignosa*, Godt.; but the reddish tone is emphasized. This *subrubra* is found in Central Italy everywhere: *nuda* appears in the higher lake region.”

*ab. joannisi*, Dufrane. *Mem. Soc. ent. Belg.* XXIII. 62 (1930).

ORIG. DESCRIP.—“Head, thorax, abdomen and fore-wings, including the fringe, pale yellow slightly greenish. The base of the wings, especially the costa slightly powdered with blackish-brown. Ordinary lines completely wanting. The three usual stigmata, of the ground colour, and marked by very thin but sharp contours, of a blackish-brown; the orbicular and claviform are quite evident, but the reniform is somewhat hidden in the area of blackish-brown, separated from the contour by a ring of the ground colour. Nervures slightly blackish brown; each interval between the nervures, on the outer margin, a well marked blackish-brown point is continued by a little paler sagittate mark, following the outer border, into the fringe. Hind-wings very white. Underside of all the wings without any trace of marking, white except at the costa of the fore-wings and on the nervures, where one sees a little very pale yellow, like a very thin line terminating the outer border.” El Golea.

*f. marianii*, Berio. *Boll. Soc. Ent. It.* LXIV. 146 (1932).

ORIG. DESCRIP.—“The ground of the fore-wings is of a uniform but obscure coloration; in this form the lines are not united together as one; there remains in the ♂ only visible the basal spot and the small cuneiform spots on the distal margin (pure black); scarcely perceptible is the white edging of the orbicular. In the ♀ the markings are a little more expressed, although always slightly developed. The ♀ is not actually more obscure than the ♂. This form with many little spots is a southern one.” Palermo.

*f. syricola*, Corti.-Draudt.-Seitz. *Pal. Noct.* III. Sup. 51 (1933), Germ. issue.

FIG.—*l.c.* plt. 6.

ORIG. DESCRIP.—“While the spring generation is like that of Central and Southern Europe and agrees with the form *renitens*, Hb., the autumn generation has a quite different appearance from all the *radius*-forms (*puta*).”

“The specimens are, as a rule, distinctly larger; the ♂♂ grey, without red brown, very sharply marked; the ♀♀ exhibit for the most part the usual *lignosa*-form, but on the hind-wings, as a rule, are somewhat less dark and fairly well marked.”

*f. unica*, Berio. *Ann. Mus. Civ. Stor. Nat. Genova.* LIX. 90 (1936).

FIG.—*l.c.* plt. iii. fig. 19.

ORIG. DESCRIP.—“Head thorax, antennae, fore-wings, abdomen, clear reddish; tegulae and patagia apically marked with testaceous. Quadrate basal spot, costal fringes, antemarginal sagittate spots, interior of the reniform and the orbicular, and the apex of the fore-wings with ground colour of burnt sienna. Ante- and post-median lines absent. Outline of claviform and of two antemarginal sagittate spots black (those between veins 4 and 6). A continuous black edging, wider below, encloses the reniform and the orbicular in one ring, following the outline; the rings of these two stigmata are confluent. The hind-wings white with antemarginal testaceous lines.” Palermo.

*f. juncta*, Berio. *l.c.*

FIG.—*l.c.* fig. 20.

ORIG. DESCRIP.—“Head, thorax, antennae, abdomen, fore-wings and costal area of the hind-wings uniform brown. Tegulae and patagia, margined with a darker brown. Basal, costal, sagittate, ante- and post-median, contour of the claviform, and a contour line enclosing the orbicular and claviform spots, black. Hind-wing white suffused slightly with brownish. Resembles the preceding (*unica*), but with the ground much more suffused with colour and hence contrasting less with the black of the markings. The orbicular and the reniform confluent as in the preceding species.” Palermo.

*f. perfusa*, Berio. *l.c.* p. 91.

FIG.—*l.c.* f. 23.

ORIG. DESCRIP.—“Head, thorax, fore-wings and abdomen bright cream; face, tip of the tegulae, a line along the middle of the patagia and the tip of the crest of the mesonotum, reddish. On the fore-wings the veins, the basal line doubled but stopped at the cell, the antemedian completely doubled, the postmedian formed of a series of dots on the veins, the costa, the two cuneiform between veins 4 and 5, a space between these and the distal margin, which extends to the fringe, another between veins 1 and 2, a series of points on the distal margin, which vanish in the fringe, the contour of the claviform and the interior of the reniform, are all finely marked in black. The white contour of the orbicular agrees with that of the reniform, also white, therefore the two stigmata become one, very closely united, without the black contour. Hindwings, white.” Palermo.

*f. cremea*, Berio. *l.c.* 91.

ORIG. DESCRIP.—“Head, thorax, forewings and abdomen uniformly cream, patagia with a reddish brown median line, antennae of the same colour. On the fore-wing this coloration, much paler, forms the basal spot, fills up the cellular space between the two typical stigmata, and is the colour of the apex of the wing and marks the antemarginal sagittate spots. Marked freely in black are the double subbasal line, the antemedian, the contour of the claviform, the lower edge of the orbicular and the reniform which is somewhat square in shape.

“The post median is represented by a series of points on the veins. On the distal margin between veins 1 and 2, and 5 and 7 are two dark spots, as dark as the interior of the reniform spot. The orbicular has a cream coloured contour and is of an oval elongate shape. The hind-wings are white.” Calabria, Palermo.

f. *algerina*, Berio. l.c. 91.

FIG.—l.c. f. 22.

ORIG. DESCRIP.—“Head, third joint of the palpi, the distal half of the patagia, tegulae and extremity of the abdomen of a cream colour; the tip of the tegulae, antennae and median area of the wings of a reddish ochreous colour. The basal area and that of the disc (from the post median to the whole of the fringe) of a fuscous fulvous shade. The basal blotch, the second joint of the palpi, the basal half of the patagia, the reniform, the centre of the orbicular, and the costa feebly black. The subbasal is not distinguishable, and the antemedian is simple and imperfect. The claviform is absent. The postmedian is marked by points on the veins. In the uniformly fulvous postmedian area between veins 1 and 2, and 4 to 7, there are many little wedge-shaped spots of an ochreous colour. The eyes doubly lined with ochreous. Hind-wings very white including the fringes.” Algiers, Spain.

f. *pheroa*, Berio. l.c. 92.

FIG.—l.c. 18.

ORIG. DESCRIP.—“Fore-wings clear reddish ochreous (as *subrubra*); transverse lines clearly marked; claviform contoured with brown; orbicular little conspicuous and with a contour concolorous with the wings; the black basal blotch and the reniform are the only dark parts of the costal area; thus there is no black, but only brown suffused generally, giving the scales the earth colour of burnt sienna. The hind-wings white, slightly tinged yellowish.” Casteldaccia.

f. ♂ *toisca*, Berio. l.c. 92.

FIG.—l.c. fig. 17.

ORIG. DESCRIP.—“Ground yellowish white, straw-colour, with the claviform, basal area, reniform, the space between that and the orbicular, and a mark on the termen (vein 1 and internervular 5-7) marked in black. Hind wings absolutely white, including the fringe. Abdomen white; the form is well characterized by the size being slightly below the average; by the light ground and by the much obscured markings; by the spot on vein 1 and by the very white hind-wings.” Tripoli, Altomira, El Escorial, etc., Spain, Palermo, etc., etc.

f. *tutti*, Berio. l.c. 93.

FIG.—l.c. fig. 21.

ORIG. DESCRIP.—“This is the form said by Tutt to be the *radius*, Haw. having the median shade divided from the reniform. On the hind wings the white appearance is speckled with marginal spots between veins 2 and 7; perhaps similar to *meridionalis*, Spr.,” Madrid, etc.

♂ f. *obscurina*, Berio. l.c. 93.

ORIG. DESCRIP.—“The ♂ has the wings of an obscure grey, just as the females have normally, but differing from *obscura* in having the hind-wings white.” Liguria, Albania, Bologna, etc.

f. ♂ *erythrosimilis*, Berio. l.c. 93.

FIG.—l.c. f. 27.

ORIG. DESCRIP.—“As *erythroxylea*, Tr.: but the antemedian and postmedian lines are completely marked; the lunules are simple.” Bologna, Emilia.

f. ♂ *agenjoi*, Berio. l.c. 93.

FIG.—l.c. f. 31.

ORIG. DESCRIP.—“The forehead and 3rd joint of the palpi, reddish; 2nd joint of the palpi black. Clypeus white; patagia grey with black median line; tegulae grey dotted with violet especially at the apex; prothorax of the same colour; abdomen ochreous grey. Fore-wings wine-colour with the quadrate basal area, the reniform and the points on the costa besides those such as also the doubled ante- and postmedian, are all indicated in dark shade but not in black. The orbicular with its ochreous contour appears slightly more white than the ground colour. The hind wings white, with ochraceous veins and a median shade from the costa to near the anal angle.” Spain, Jaén, Mus. Madrid.

f. ♂ *transflua*, Berio. l.c. 94.

ORIG. DESCRIP.—“Fore-wings with white ground, and marked with very diffuse longitudinal lines on the veins and between them. The chief character of this form is afforded by the very conspicuous claviform and especially by its dark brown colour, which is indeed prolonged without interruption to the base of the wing. The dark basal blotch is not very pronounced.” Cyprus, Limasol.

f. ♂ *debilis*, Berio. l.c. 94.

ORIG. DESCRIP.—“Head, tegulae, hind-wing very white; patagia with fine dark streaks and the tegulae with brown dots. The ground of the fore-wings yellowish-rosy-white bone colour; basal blotch grey; distal area largely tinted with reddish. Post-median simple, apparent on the veins which are finely marked in brown. Characterized by a more delicate aspect than the forms *radius*, *renitens*, etc.; and by the apex of the fore-wings, which is much more pointed. There is an absence of longitudinal contrasting markings. Abdomen greyish. In a series of this form from Spain there is well pronounced a dark median shade arising on the costa, which meets and renders the reniform indistinct. There are numerous gradations.” Belgium, El Escorial, Oran, etc.

f. ♀ *umbra*, Berio. l.c. 95.

FIG.—l.c. f. 35.

ORIG. DESCRIP.—“Head, antennae, with the base of the patagia, the spots of the tegulae, the collar of the metanotum, and the ground of the fore-wings, burnt sienna earth colour. With the upper part of the patagia and tegulae yellowish white, as is the abdomen. On the fore-wing the doubled and strongly angulated antemedian stand out in black: the postmedian also double: a distal blotch from veins 5 and 7 and a decided median shade runs between the stigmata. The rim of the orbicular, the interior of the ante- and post-median, and the points of the cuneiform are white to the distal margin, like the fringes which are doubly streaked with brown. Hind-wings brown with white fringes.” Palermo.

f. ♀ *tricolor*, Berio. l.c. 95.

ORIG. DESCRIP.—“Head, thorax, antennae, abdomen, posterior wings milky-white; the fore-wings divided into three areas; one black, which reaches from the base up to the antemedian, which is double and sparsely developed; a dark grey, which extends from this up to the postmedian; the last a black-red, which extends from this last to the fringes. Claviform wanting; the orbicular contoured with white and produced towards the costa by two white extensions; the reniform disappears in the ground colour. The antemarginal sagittate marks ochraceous, very small. The fringes are ochreous and have two wavy brown striations; the two joints of the palpi laterally, the lines on the middle of the patagia and the tip of the tegulae are reddish brown. On the hind-wings the nervures are lined in dark.” Tunisia, Madrid.

f. ♀ *monochroma*, Berio. l.c. 96.

ORIG. DESCRIP.—“Head, thorax, abdomen, hindwings suffused dirty white. A very delicate brown line divides the patagia; the point of the tegulae, the distal area of the hind-wings of the same colour. The fore-wings are mouse-grey, except the orbicular, the costal marks, the contour of the reniform and the distal cunei, which are white; and the basal area, which is black. Nevertheless black marks lie on the costa, near to the white, and the veins are marked black. The postmedian is represented by an interruption of the colour on each vein, while the antemedian is marked and is doubled. The claviform is wanting; the fringes white doubly striated with brown.” Tunis.

f. ♀ *uniformis*, Berio. l.c. 96.

FIG.—l.c. fig. 33.

ORIG. DESCRIP.—“Head, patagia, the inner edge of the tegulae, basal area of the hind-wing ochreous-white. Fringes of the fore-wings white. The remainder unicolorous grey-brown. The basal blotch of the fore-wings, the antemarginal (double and strongly angulated); the reniform and postmedian (double), marked in very dark grey brown (not black). Some white in the interior of the antemedian and postmedian, besides in the contour of the orbicular and in a costal mark also. The sagittate marks appear perceptibly a little whiter than the ground. The fringes white with two brown lines.” Bologna.

f. ♀ *paupera*, Berio. l.c. 96.

FIG.—l.c. fig. 36.

ORIG. DESCRIP.—“Head, thorax, fore-wings ochraceous-yellow suffused with reddish brown. Lines on the patagia, tip of the tegulae, two joints of the palpi, antennae, basal blotch of the fore-wings, ante- and post-median, contour of the claviform, of the orbicular, of the reniform, and the veins, all of a reddish brown colour. The orbicular is ringed with ochraceous yellow. The predistal cunei are very conspicuous; and agree with the extremity towards the exterior, thus forming an ochraceous distal band whiter, zigzag, which goes from the apex of the wing to the tornus, and is limited proximally by reddish brown, with which the wing is suffused, and distally by the black points between the nervures, to the base of the fringes. These are ochreous, with a double marking of whitish brown. Hind-wings dark brown, with ochreous fringes separated from the wings internally by a white line and by a dark one.” Palermo.

f. ♀ *purolimbata*, Berio. *l.c.* 97.

ORIG. DESCRIP.—“Fore-wings brown, hind-wings white at the base and slightly obscured at the margin. The fringes of the fore-wings are ochraceous-white. Completely devoid of markings either longitudinal or transverse. This gives the insect the appearance of having the fore-wings fasciated by a wide white border. The remainder is much like *renitens*, Hb.” Limassol, Cyprus.

f. ♀ *masculina*, Berio. *l.c.* 97.

ORIG. DESCRIP.—“Surprisingly like the ♂ of *syricola*, Corti, by the white ground colour, the transverse markings and the robustness of the wings. The antemarginal wedge spots are united together by the points forming a white festooned line on the reddish distal area. The orbicular is notably approaching the reniform at one point. In another example and from the same locality, the last two particulars are wanting, necessary exactly to resemble ♂ *syricola*, Corti.” Bulgaria.

f. ♀ *transiens*, Berio. *l.c.* 97.

ORIG. DESCRIP.—“Head, thorax, base of the hind-wing and fringes of the same, white. Fore-wings dark ochraceous. Margin of the tegulae and median line of the patagia brown colour. The subbasal, the antemedian double and sharply broken off between vein 1 and the internal margin, the contour of the claviform; the postmedian (also doubled), the wedges between veins 4 and 6 and the spots on the margin before them are brown black. Contour of the orbicular and the distal wedges white; fringes ochreous yellow-white threaded with brown. Hind-wings brown as the abdomen, with the base a little clear.” Palermo.

f. ♀ *extrema*, Berio. *l.c.* 98.

ORIG. DESCRIP.—“Head, thorax, antennae, fore-wings, and the end tergite of the abdomen of a dark wood-brown colour. Abdomen, posterior wings dark brown. Tegulae and patagia variegated with black. Basal blotch of the fore-wing, antemedian, contour of the claviform, of the orbicular, a median shade (the much larger part of which from the costa encloses the reniform and finishes waved at the inner margin), the post-median lunule (simple), and a spot between veins 5 and 7 at the distal margin, of a deep brown almost black. The contour of the orbicular and of the antemarginal wedges white, with the fringes of the hind-wings and the base of the abdomen. Fringes of the fore-wings brown with a single white line.” Palermo. *Paupera*, *transiens*, *extrema*, represent three gradations of colour of an identical plan of marking.

f. ♀ *feratra*, Berio, *l.c.* 98.

ORIG. DESCRIP.—“As in the f. ♀ *nigra*, Tutt, which is wholly black without white markings, nevertheless the orbicular is visible, because it has the basal colour of the fore-wings a deep coal black; therefore the orbicular is seen because of its light white contour. Fringes of the four wings ochreous; hind-wings become dark at the base.” Jandula, Jaen, Cuenca, Spain.

f. ♀ *venata*, Berio, *l.c.* 99.

FIG.—*l.c.* f. 37.

ORIG. DESCRIP.—“Is the ♀ with the fore-wings dark and the hind-wings white. On these the veins 2, 3, 4, 6, 7 are clearly marked in black.” Bologna, Oran, etc.

f. ♀ *lignosina*, Berio. *l.c.* 99.

FIG.—*l.c.* f. 34.

ORIG. DESCRIP.—“Coloration identical with f. ♂ *golignosa* = *lignosa*, Gdt. only a little more rufous coloured; hind-wings brown, much less in size.” Biskra, Tripoli.

f. ♀ *composita*, Berio. *l.c.* 99.

FIG.—*l.c.* f. 38.

ORIG. DESCRIP.—“Basal and median area deep black; postmedian dark fuscous-maroon ending at the fringe. Hind-wings uniformly dusky, with pale fringes. The antemedian and postmedian on the fore-wings are marked in pure black, and the orbicular in shining white.” Jandula, Spain, N. Africa.

*Agrotis*, Ochs. (1816-25) most authors: [*Euwoa*, Hb. (1822) Hamp. Meyr. (Rev.) Warr.-Stz.] *cinerea*, Schiff. (1775).

Tutt, in this species, again did not take the original description, but based his notes on the figures in the *Samml.* of Hübner, 155, 156, 157, (1802) of which he gave a description, *Brit. Noct.* II. 75.

*cinerea*, Schiff. *Verz.* 80. (1775).

ORIG. DESCRIP.—“Noctuae rusticæ.” Imago. “With black collar. Ashy-grey, finely marked.” This, of course, is an extremely inadequate description, but in 1801, Illiger. *Verz. neu. Ausg.* I. 257, certified the identity with the reference Bork. *Eur. Schm.*, IV. 547 (1792) where is found a fuller and much more adequate description of the insect we know in this country.

Tutt, *Brit. Noct.* II. 75. (1892): Barrett, *Lep. Br. Is.* III. 298. pl. 126, f. 2. (1896): Stdgr., *Cat. III* ed. 148 (1901): Hamp. *Cat. Lep. Phal.* IV. 174 (1903): Splr. *Schm. Eur.* I. 158, pl. 34, 22 (1905): South, *Moths Brit. I. I.* 204, pl. 105, f. 9-10 (1907): Warr.-Seitz. *Pal. Noct.* III. 27, pl. 5gh (1909): Culot. *N. and G.* I. (1), 58, pl. 11, f. 2-4 (1910): Corti-Stz. *Pal. Noct. Supp.* III. 48, pl. 6a, 7a. (1932).

Haworth, *Lep. Brit.* I. 133 (1803) described a species *denticulata* as a *Bombyx* but later II. 205 (1809) referred it to the *Noctua*, which has been identified with *cinerea*, Hb. ♂.

Hübner's *Samml.* fig. 157, *obscura*, is difficult to distinguish from his figure 156 called *cinerea*, a ♀, nor does the other fig. 490 *obscura* enlighten us, for it is almost identical with the other two. The *obscura* form is only slightly darker than the female, *cinerea*. Tutt says that this is a form almost confined to the female. I have not seen an *obscura* male.



Tutt remarks that the ♀ fig. 156 Hb. has rather a purplish than ashy grey tint; this is so.

Godt., *Hist. Nat.* IV. pl. 71, figs 5-6. The ♂ is too dark and the ♀ too light compared with Hübner. On p. 274 he says that Ernst and Engr. fig. "la decolore" is a ♂ of *cinerea*, while the female is given in fig. 387d as a variety of *ferruginea*. Of Godart's figures, Duponchel (*Hist. Nat. Sup.* III. 180) says they were copied from Hübner so badly as to be unrecognizable, and gives two figures on pl. XVII. fig. 1-2, both good, but the female does not agree with the text "gris-noirâtre."

Curtis, *Brit. Ent.* IV. 165, gives a very good figure of a large ♂. He identifies it with *denticulata*, Hb.

Herrich-Schäffer's fig. 439, *Sys. Bearb.*, is of the *obscura* form, with somewhat narrow wing, with the paler (slight) part between the stigmata.

Gn. *Noct.* I. 282, says it is difficult to say in what *obscura*, Hb. differs. He also says that Tr. in referring to Ernst and Engr. VII. figs 447a, b, and 454d as *cinerea* forms is in error. To me the former figures represent ♂ and ♀ *cinerea*, a view strengthened by the ashy grey, etc. of the ♂ and the *obscura*-like colour of the ♀. The text referring to the plate on which these figures with those of two other species seems to be inverted, since figs. 445 are termed *cinerea*, which they very obviously cannot be, whereas figs. 447 are labelled *valligera*, which they certainly are not (*Pap. d'Eur.* VII. 59.)

Barrett, *l.c.* Plate 126, 6 figs: colour bad, grey shading suppressed, brown dominant. 2a ♀ very dark fascia through the reniform, inner line dark, thick waved submarginal dark band succeeding the light edged outer line; 2c ♂, very uniform, only marking a central fascia, a submarginal line, both dark, and a black reniform; 2d ♂, with 4 single dark lines, no stigmata, a dark innermarginal cloud and a small blotch above position of reniform also dark, and trace of a basal line.

Spuler, *Schn. Eur.* I. pl. 34, f. 22, has a good figure of the ♂.

Warr.-Seitz, *Pal. Noct.* III. 27, treats the *obscura*, Hb. and *murina*, Ev. as synonyms of the type. Warren says "Tutt, evidently with only British specimens before him, did not notice that the British race was per se distinct from continental forms, so that the aberrations, which he put forward must be considered as applying solely to the British race." Three ♂ examples I have from S. Tyrol (1), Wagram, Lower Austria (1), and near Vienna (1), are practically identical with English examples; an ab. *obscura*, Hb. (♀) from Klosterneuberg (hilly ground above the Danube marshes N.W. of Vienna) is so obscure black brown, as not to be comparable with the dark ♀ *obscura*, Tutt (nec. Hb.), of our English form. On the above evidence alone I do not agree with Warren's suggestion of a British race, but on the evidence of Mr. Wightman's amazingly beautiful specimens, which have been caught by him and others in Sussex in hundreds, I feel that our British *cinerea*, while agreeing generally with the continental *cinerea*, has a racial section of it in the S. of England of amazing variation, aberration, colour and marking, strong enough to be marked by a racial, if not a subspecific, name. (Probably *r. tephрина*, Stdgr.)

Culot, *N. et G.*, I(1). pl. XI. 2-4, gives good figures of, ♂, not quite so light dove-colour as many of our English ones, ♀ dark but hardly as dark brown as *obscura* (to which name he only refers in a

postscript), and *eximia*, Obthr. the small variegated form from England. He expresses doubt on *fusca*, Bdv.

The figures in Seitz are very poor and quite unrecognizable in colour.

Corti-Stz. *Supp.* III. 48, says *alpigena* is the prevalent pale type of Central Europe and *obscura*, Hb. (nec Tutt) the dark form, of which the *livonica*, Teich. is only a synonym, and *tephrina* is the name of the definitely British race, hitherto known only from England, to which Tutt's aberrations *pallida*, *virgata*, and *obscurata* belong.

Barrett, *l.c.*, says of the Variation:—

"Rather variable in the ground colour, which in the ♂ is often tinged with brown or with slate colour, but in the female varies from light umbreous to smoky black, in the latter case with all the markings obscured, or with the central shade intensified into a black central transverse bar. In the paler forms a suffusion of smoky-brown, or smoky-grey is not unusual, sometimes in the middle of the wing, oftener toward the hind margin. West of England specimens are larger than ordinary, with paler colour and less distinct markings—in these respects drawing nearer to the much larger form found on the Continent of Europe."

Mr. Wightman says "I have never bred *Agrotis cinerea*, except oddly, but have found many females (about 150), and the variation is amazing. I never had but three or four of any given form. The males I have taken in great number and here again there are any number of forms. I am satisfied that while dark females and pale males are usual, all forms occur in both sexes. All forms occur large and small."

He details the following forms:—

Females from Lewes, Sussex.

1. Pale whitish grey ground; transverse lines, subterminal and some shading in outer area are blackish brown.
2. Pale brown ground; marking as in 1 but in darker brown.
3. Purplish grey ground; marking as in 1 but in black.
4. Dark brown; central fascia very dark; basal area paler than rest of wing.
5. Black; central fascia intense black; basal area whitish-grey; submarginal pale edged.
6. Unicolorous black.

Males from Lewes 7, rest Storrington.

7. Pale brownish grey; basal, inner, and outer, submarginal and central shade all in deeper brown; also a row of dots bordering cilia.
8. Lavender grey ground; reniform a dot, brownish grey marking.
9. Ditto; reniform a large spot; brownish grey marking.
10. Ditto; deep brown central shade.
11. Slightly whitish grey; pale brown suffused on outer half of forewing.
12. Ditto; basal area outer half dark; dark trans. narrow band through reniform.
13. Lavender-grey; trans. lighter central band; all markings present, clearly expressed.
14. Same form as 2 ♀, very dark brown ground, still darker wide brown band.

15. Dark grey ground; varied amount of marking, but all more or less fragmentary.
16. Dark grey ground; slightly lighter central trans. band divided by narrow darker band.
17. Dark grey ground; narrow trans. band through reniform; other markings slight.
18. Same form as 3 ♀.
19. Same form as 12 ♂, but basal outer half not dark.

I have gone over these specimens of Mr. Wightman's and quite agree with his notes on them. They are a wonderful set of individual forms.

The Names and Forms to be considered are—

- cinerea*, Schiff. *Verz.* 80 (1775).  
*cinerea*, Hb. *Samml.* 155, 156 (1802).  
*f. obscura*, Hb. *l.c.* 157 (1802), 490 (1808-18).  
*denticulatus(a)*, Haw. *Lep. Brit.* I. 133 (1803) II. 205 (1809).  
*ab. fusca*, Bdv. *l.c.* pl. 78, fig. 4 ♀ (1832).  
*ab. murina*, Evers. *Bull. Mosc.* XXI. 213 (1848); and *l.c.* XXIX. 190 (1856).  
*r. alpigena*, Trti. *Bull. Soc. ent. It.* XVI. 75 (1883); Calbr. *Iris*, I. 226, pl. XII. 7-8 (1888).  
*ssp. livonica*, Teich. *Stett. e. Zt.* 169 (1886).  
*ab. turatii*, Stndf. *Iris*, I. 216, pl. 10, f. 5 (1888).  
*ab. pallida*, Tutt, *Brit. Noct.* II. 76 (1892).  
*ab. virgata*, Tutt, *Brit. Noct.* II. 76 (1892).  
*ab. tephрина*, Stdgr. *Cat.* III ed. 148 (1901).  
*ab. eximia*, Culot (Obthr.) *N. et G.* I (1), 69, pl. XI. f. 4 (1909-13).  
*ab. albescens*, Zerny, *Eos. Lep. Albarracin*, 363 (1927).  
*ssp. aragonensis*, Schaw. *Int. Ent. Zt.* XXVIII. 416 (1934).  
*ab. variegata*, Schaw. *l.c.* 417 (1934).

*denticulatus(a)*, Haw. *Lep. Brit.* 133 (1803) *Bombyx: l.c.* 205 (1809)  
*Noctua*.

ORIG. DESCRIP.—“Thorace antice atro, alis cinerascentibus postice saturatoribus, strigis 2 denticulatis atris.” “Antennae pectinatae rachi grisea. Thorax cinereus antice ater. Alae anticae usque ad medium glaucae, postice saturatiores seu cinereae, basi punctis duobus oppositis atris, striga tenuissima ante medium denticulata atra; tunc striga obsoletissima fuscens, in qua macula majuscula loco stigmati postici, et pone hanc, striga tenuissima atra. Alae posticae albicantes.”

Curtis, *Brit. Entomology*, IV. 165 (1827) identified this name as a syn. of *cinerea*, Schiff. (Hb.)

Tutt dealt with the following forms—(1) Hübner's figure 155 pale ashy-grey, with an abbreviated, followed by a complete, black wavy transverse basal line; no claviform, orbicular a tiny black dot. (2) *pallida*, ashy blue grey as the type but pale, less emphasis of markings. (3) *ab. virgata*, strongly marked median shade replaced by a clear but narrower red median shade, central band between the stigmata. (4) *obscura*, Hb. 157, deep unicolorous dull brown with 2 darker trans. basal lines, darker markings.

ab. ♀ *fusca*, Bdv.  *Ic. Lep. Eur.* pl. 78, fig. 4 (1832).

FIG.—The figure is large and a deep black brown. There is no description.

r. *murina*, Evers.  *Bull. Mosc.*, XXI. 213 (1848).

ORIG. DESCRIP.—“Thorax fusco-griseus, collari atro; alae anticae fusco-griseae, macula media obsolete fusco signato: linea transversa basale et altera externa flexuosa dentatis nigris; postico pallide nigricantis, puncto medio nigriore.”

EXPANDED ORIG. DESCRIP.—“*Murina* has a very great similarity with individuals of *cinerea*, which have the fore-wings griseous; it is a little smaller, but slightly more robust, with the fore-wings somewhat shorter; of an ashy-grey, with the fringe separated from the ground-colour by black dots; the median lines have almost the same alignment as in *cinerea*, are equally simple, crenulate, black and very thin; the reniform is slightly encircled with blackish powdering and slightly centered with the same powdering; the orbicular and claviform are not present. The lower wings are of a uniform whitish grey. The thorax is of the ashy colour of the forewings, with the collar edged with black. The antennae of the ♂ are slightly pectinated or strongly ciliated.”  
Oural Mts.

The above was taken from *Noct. Russ.* III. (*Bull. Mosc.* 1856, p. 190) Eversmann.

race *alpigena*, Trti.  *Bull. Soc. Ent. It.* XVI. 75 (1883).

ORIG. DESCRIP.—“Standfuss, Calberla and Struve collected this species in the Abruzzi (5-6000 ft.) on the 8th, 9th, and 14th of July, in very perfect examples and of a size less than that of the typical form; as a local variety it may be distinguished by a name = v. *alpigena*, Stndfuss.

This reference (scarcely a description) was subsequently completed by Calberla.—

ssp. *alpigena*, (Turati) Calb.  *Iris.* I. 226 (1888).

FIG.—plt. XII. 7-8. (quite different forms).

ORIG. DESCRIP.—“Their fore-wings are whitish or violet grey, with more or less yellowish, or brownish powdering; the first half and the first complete transverse line are distinct, the outer not always in a specimen wanting the latter. The reniform is distinctly produced in black, the central shading partly indistinct, partly sharp, wide, rusty, brown coloured. In one example the orbicular is present, in two others it is a dark point. The waved line is unbroken towards the base and indistinctly shaded, most distinct on the costa; the marginal line is mostly present as sharp black dots between the veins. Head the colour of the forewings, thorax paler, hind-wings yellowish white with darker costa, darker marginal line, discoidal and yellowish white fringes. Underside yellowish as usual; the hindwing from the inner margin to the subcostal whitish and not dark powdered; discoidal not always distinct; fore-wings with two more or less distinctly curved streaks, of which the inner is continued on the hind wing mostly up to the upper radial; from thence up to the inner margin it is indistinct, only marked on the veins, or it is wanting.”

This form is shortly described by Stdgr.  *Cat.* III ed. (1901), 148.  
“Dilutior, al. ant. violaceo-cinereis minus signatis.”

ssp. *livonica*, Teich. *St. ent. Z.* (1886), 169.

ORIG. DESCIP.—“Two specimens of a species up to the present not yet observed, but which diverge pretty noticeably from the usual type of *cinerea*. The forewings are black brown, the marking less distinct, the two transverse lines somewhat toothed. The hindwings are black grey, at the base somewhat paler. The thorax is grey, with a lens one sees that it is furnished with black and white hairs; body and feet are also very dark. This insect, of which Herr Bang-Haas notes that he has not met with this form, I name var. *livonica*.”

Hampson, *Lep. Phal.* 175 (1903) “Much darker fuscous brown.”

race *turatii*, Stndfs. *Iris*, I. 216 (1888).

FIG.—*l.c.* plt. 10, fig. 5.

ORIG. DESCIP.—“Of this species my friend Röder furnished me with two good female examples from the South of France, which he took in April, 1887, in the mountains near Digne about 3000 ft. up. This species is recognized by the brown-yellow coloration, which characterizes the whole upperside, with the exception of the antennae, which are black brown, so that by the extraordinary simplicity of their markings they are furthest removed from *Ag. culminicola*, but have shortened, strongly rounded wings of 39-42 mm. expanse, shorter than *A. culminicola*, which measures 42-45 mm. The orbicular stigma is produced along the direction of the costal vein and occurs only in a darker shade without linear setting, also the reniform stigma only as a more shady reniform spot with sharp margining. The dentate lines intersecting the fore-wings at the ends of the first and second wing thirds are only slightly developed. The shaded bands are tolerably parallel to the outer margin which cross the wing somewhat about midway between the outer margin and the outer dentate line, and stand out quite clearly from the lighter outer margin. The whole forewing is powdered completely with fine, black-brown atoms, least thick at the bases and on the outer margin. Fringes, head and thorax, the last not so smooth-haired, as in other *Agrotidae*, but also not so strongly woolly as in *Ag. culminicola*, are unicolorous light brown-yellow, without any dark admixture.

The hind-wings are grey brown with transparent darker end of the middle cell and yellow-brown fringes. The abdomen is grey-brown on the upperside, but darker on the underside.

The underside of all the wings is deep grey with a streak of yellowish and a darker end of the middle cell. There is a mixture of abundant yellow grey scales towards the costal and outer margins. The fringes are yellow-grey. The palpi are black-brown. The hairs of the thorax below the wings grey, grey-yellow towards the legs. The legs are dusky grey yellow, to deep brown yellow on the tarsi, and at the end of each joint looks lighter.”

Stdgr. in his *Cat.* treated this as a good species.

*Agrotis (Euxoa) cinerea*, Schiff. ab. *tephrina*, Stdgr. *Cat. Lep. Pal.* III. 148 (1901).

“Minor, al. ant. angustioribus, distinctius signatis, al. post. in ♂ albidioribus.”

Hampson. *Cat. Lep. Ph.* IV. 175 (1903). “Small, the fore-wing narrower, the markings usually very distinct; hind wings whiter; ♀ sometimes with the ground colour black.”

ab. *eximia*, Culot, *Noct. et G.* I (1), 69 (1910).

FIG.—*l.c.* plt. XI. fig. 4.

ORIG. DESCRIP.—“With a lilac grey ground.” England.

ab. *albescens*, Zerny, “Lep. of Albarracin,” *Eos*, III. 363 (1927).

ORIG. DESCRIP.—“Specimen with white grey, very slightly marked fore-wings, similar head and thorax and light grey hind-wings.” Albarracin, Spain.

ab. *variegata*, Schawda. *Int. Ent. Zt.* XXVIII. 416 (1934).

FIG.—Seitz. *Pal. Noct.* III. plt. 7a (1901).

ORIG. DESCRIP.—“Draudt figures on plt. 7a in Seitz a ♂ ab. which is well marked and in which a broad dark shading lies in the middle of the fore-wing. He says that he possesses numerous similar specimens from Vienna, Italy, Bulgaria and from the old Austrian coast-land, which again differ between one another. I have in my collection a similar ♂ taken in Waldruch (S. Tyrol) by Arno Wagner on 11th April at light, with the written name *variegata*. I now enter this name in literature. The ground colour is pure grey on the fore-wings with strongly developed dark transverse bands and broad dark central shade.”

ssp. or ab. *aragonensis*, Schawd. *Int. Ent. Zts.* XXVIII. 417 (1934).

ORIG. DESCRIP.—“A small narrow winged ♂, which Predota obtained in the Sierra Alta in Arragon. Fore-wing very dark, but more grey-brown than brown. The marking still visible. Hind-wings as in the typical form.”

*Agrotis*, Ochs. (1816-25) most authors [*Rhyacia*, Hb. (1822) Warr. Corti: *Epipsilia*, Hb. (1822) Hamp. South: *Lycophotia*, Hb. (1822) Hamp.: *Spaelotis*, Bdv. (1846) for *valesiaca*, Bdv.], *ashworthii*, Dblđy. (1855)=? *candelarum*, Stdgr. 1871 (*candelisequa*, Hb. 1808).

There was another species in *Agrotis* named *candelisequa* and thus it was necessary to rename this species, which Stdgr. did in 1871, *candelarum*. Pierce, *Genit. Noct.* 51 (1909), says of *candelarum*, “I cannot distinguish between this and *ashworthii*.”

Should the conflicting evidences be reconciled and it be decided that there be only one species, the name of that species must be *ashworthii*, Stain. (1855), as the prior name *candelisequa* is used for another *Agrotis* species. If, on the other hand, it be proved that there be two species, the name *candelarum*, Stdgr. (1871) will be that of the continental species.

Tutt, *Brit. Noct.* II. 76 (1892): Barrett, *Lep. Brit. Is.* III. 380, plt. 136, 2 (1896): Stdgr. *Cat.* III ed. 139 (1901): Hamp. *Lep. Phal.* IV. 511 (1903): Splr. *Schm. Eur.* I. 148, plt. 33, 2 (1905): South, *M.Br.Is.* I. 216, plt. 110 (1907): Warr. Seitz. *Pal. Noct.* III. 52, plt. 11f. 11g. (1909): Cort. Stz. *Pal. Noct. Supp.* III. 72, plt. 10d. 11e. (1933).

A very difficult species. Published figures and descriptions are very confusing, as is the spelling of the names by different writers.

Hübner's figure, the type, 397, is large, dark clouded, strong transverse lines with a light edging, and a marginal light dove-coloured band. His figure 493 he gives as a ♂; it is much smaller and altogether

darker, clouded practically all over without any of the beautiful shade of the ♀, with a blackish brown central shade enclosing a lighter reniform; the basal third is also lighter (*virgata*? Tutt).

In his Text Hübner says p. 168: "Whitish grey: the upper wing slightly shiny, soft brown-grey shading, with pale central stigma and slender black waved lines; the hind-wings pale brown-grey shaded; the marginal band ashy-grey." Austria.

I have never seen a ♂ approaching fig. 493 of Hb. and Treit. (1825), *Schm. V. (6)* 219 considered it a variety of *A. aceris*. Treit. also points out that Esper had previously used the name *candelisequa* for another Noctua. He refers this species to the "Black-marked Noctuid" *candelisequa* of the *Verz.* p. 72 (1775).

Frr. *l.c.* thinks fig. 493 of Hb. is probably a badly drawn and coloured figure.

Duponchel, *Hist. Nat. VI.* pl. 77, f. 2, has a very good figure of a dark form of the ♀ with lines tending to obsolescence, and dark hind wings. He cites fig. 343 of Ernst and Engr. *Pap d' Eur.* with reserve; p. 74, Freyer's fig. 688 in Vol. VII. is slightly suffused with red scales and the markings are sparse and not emphasized black.

Freyer, *Neu. Beitr. V.* (1845), pl. 472, figs. 3, 4, gives two very good figures one with somewhat pale markings, the other with well emphasized trans. lines and a very dark narrow band from the black quadrate spots to the inner margin.

Her.-Sch. *Sys. Bearb. II.* 334, fig. 80 (1846) describes and figures *valesiaca*, which he ascribes to Boisduval, *Icones*, pl. 78, f. 3, and to Stain. *Ann.* pl. (one *l* in his Syn. List, two in the text). Fig. 80 of H.-S. is that of a light brown (ochreous) form with marking quite agreeing with that of *candalarum*; there is no quadrate black spot.

Gn. *Hist. Nat. Noct. V.* 323 (1852) says that Hb. 493 is not *candelisequa*.

Stainton's fig. *Ent. Ann.* 1855, *valesiaca*, as he says, p. 63, is not the *valesiaca* of "other authors." Tutt clears this and identifies it with the *jotunensis*, Schoyen, found in Sweden. (Tutt spelled it *vallesaica* in error). Stainton's fig. is a good one of large size with a partial narrow dark band from the reniform and quadrate spot to the inner margin. Of course Stainton's name is not valid as there is another Agrotid previously so named, *valesiaca*, Bdv. (*Spaelotis*, Bdv. =? *Agrotis*, Och.)

We have the *valesiaca*, Bdv. (1833), the *valesiaca*, Stain. (1855), the *valesiaca*, Frr. (1842), and the *valesiaca*, H.-S. (1846).

This Stdgr. clears somewhat by putting the *valesiaca*, Bdv. as a good species near *Agrotis squalorum* and referring to it the *valesiaca*, H.-S. While he places the *valesiaca*, Frr. to *squalorum*, *Cat. IIIed.* 146 (1901), he places the *valesiaca*, Stain. to *ashworthii*, *Stain. l.c.* 139.

Modern authors treat *valesiaca*, Bdv. as a true species in no way near to *ashworthii* or to *candalarum*.

Mill. *Icon.* III. 93, pl. 93, fig. 11 (1868) gives a good figure of a dark ♂ which is suffused with more than a slight ruddy colour. It was an English specimen sent him by Doubleday.

Barrett, *l.c.* pl. 136, gives 2 figures, fairly good.

Hamp., *Lep. Phal.* IV, 511, considered *ashworthii* as a good species with Stainton's *valesiaca* (nec. Bdv.) as synonymous: the *candalarum* as quite separate with *jotunensis* (darker) and *signata* (paler) as aber-

rations: on *l.c.* 568 he deals with *vallesiaca*, Bdv. (error for *valesiaca*) as a good species. The former are in his genus *Episilia* and the last in *Lycophotia*.

Spuler, *Schmett. Eur.* I. pl. 33, figs. 2, 4 (1905) has 2 very good figures, a large ♀ of the continental typical form and a well marked *ashworthii*.

South, *Moths Br. Is.*, I. 216. pl. 110, f. 1 (1907) gives a very poor figure of a very dark slaty grey, with too much of the prevailing brown of the plate.

Culot, *Noct. et G.* I(1). 43, pl. 6, figs. 17-18, and pl. 7, f. 1, has excellent figures of *candelarum*, *signata*, and *ashworthii* (British).

Warr.-Stz. *Pal. Noct.* III. 52, pl. 11f. and 11g., gives very poor figures of both *ashworthii* and of *candelarum*, which are treated as two good species in the genus *Rhyacia*. The general brown colouring of the plate has spoiled the beauty of the ground colour of these species. In the text *ashworthii* is said to be pale slate grey and *candelarum* is said to be chalk grey, with which descriptions the figures do not agree at all. But Corti-Draudt in the *Supp.* III. 72, pl. 10de. give better figures to supplant these. In spite of the statement of F. N. Pierce that he could find no detail of the structures to differentiate the two, Corti-Draudt still consider them to be two good species. They treat *calcinia*, Sohn-Rethel, and *molisana*, Dnhl. as synonyms with *lactescens*, Trti. These fresh figures are quite good, and a good figure of *signata* with one of *lactescens* are added.

Comparing the figures of the larvae of *ashworthii* in Buckler and Millière with those of *candelarum* in Freyer and Spuler, one finds practical agreement. Ground colour blackish brown, more or less greenish, with a slight double line along the back. Each side has a row of black blotches, one on each segment, somewhat smaller in front, but more solid in the rear on the last few segments. Spiracles indicated by white dots. Lower side finely white dotted. Feet brown, head red yellow. The differences are so slight as to suggest individual.

The Names and Forms to be considered are.

*candelisequa*, Hb. (1808) *Samml. Noct.* (nec Esp.)

*valesiaca*, Bdv. *Icones*, fig. 78 (1833).

*ashworthii*, Dbldy. (1855) *Zool.* 1749.

ab. *vallesiaca*, Stain. (1855) *Ann.* 41, f. 2.

ssp. *candelarum*, Stdgr. (1871) *Cat.* IIed. 82.

ab. *signata*, Stdgr. (1871) *Cat.* IIed. 82 [Gn. *Noct.* V. 324A (1852)].

ab. *jotunensis*, Schöyen. (1888) *Norw. Lep.*

ab. *virgata*, Tutt (1892) *Brit. Lep.* II. 77.

ssp. *lactescens*, Trti. *Nat. Sicil.* IV. 68, pl. III. f. 26 (1919).

ab. *rubescens*, Schawd. *Zr. Oestr. Ver.* VI. 2 (1921).

ab. *calcinia*, Sohn-Rebel. *Iris*, XLIII. 7, pl. II. f. 11 (1929).

ab. *molisana*, Dnhl. *Mitt. Münch.* XIX. 104 (1929)

Tutt dealt with (1) Hübner's figure of the type form *candelisequa* = *candelarum*, Stdgr. (2) The English *ashworthii* of Doubleday. (3) The *vallesiaca*, Stain. without the quadrate black spot which is the same as the *jotunensis*, Schöyen of Lapland, etc. (4) The form *virgata* with a central shade. And (5) The *signata*, Stdgr. given to Guenée's var. A, pale with very emphasized black strigae.



Tutt states, *B.N.* 77-78, that var. *vallesiaca*, Stain. which has the ground "dove colour" of *ashworthii*, Dbldy. is the same as the *jotunensis*, Schoyen, which is "particularly dark," because it has not the quadrate black spot between the stigmata. These appear to be two forms and certainly not identical. *Stdgr. Cat.* III ed. 139 (1901) says of the latter, "obscurior." See Hamps.

Barrett says of the Variation—"Hardly variable, except in the depth of ground colour and general shading, but the soft bluish-slate colour fades in time and becomes of a smoky-grey, or even brownish-grey."

He reports a specimen "entirely suffused with blackish-grey, and another having a broad blackish central band."

*Rhyacia candelarum*, *Stdgr. f. lactescens*, *Trti. Nat. Sic.* (68) 1919.

FIG.—*l.c.* plt. III. f. 26.

ORIG. DESCRIP.—"In this variety the rusty colour is completely suppressed and the glaucous suffusion is replaced by a pearly colour, which renders these examples lighter than *Agrotis margaritacea*, Vill. The three costal spots from which the three sagittate lines arise, that is to say, the basal, the proximal and the distal, as also the lines themselves, stand out very clearly and finely in black. The orbicular and reniform stigmata on the other hand less distinct. Head, thorax and abdomen of a milky white. Hind-wings slightly greyish with white fringes." Sibillini Mts.

The figure is a very good one and on the plate are good figures of *signata*, *Stdgr.* and of the typical *candelarum*.

ab. *rubescens*, Schawerda, *Zt. öster. Ent. Ver.* VI. 2 (1921).

ORIG. DESCRIP.—"In this species the red-brown ground colour is always more or less covered with white-grey. From Saxony I have obtained a large number of freshly emerged specimens of this species, which are quite separable from our more white-grey Lower Austrian specimens by their clear red-brown ground and they may be differentiated from the typical form by the name ab. *rubescens*."

ab. *calcinia*, Sohn-Rethel, *Iris*, XLIII. 7 (1929).

FIG.—*l.c.* plt. II. fig. 11.

ORIG. DESCRIP.—"Still paler, like v. *signata* *Stdgr.*, silver-white, slightly marked, without any brownish powdering." Abruzzen, Majella, and Gran Sasso.

ab. *molisana*, Dnhl. *Mitt. Münch.* XIX. 104 (1929).

ORIG. DESCRIP.—"Large, broad-winged. Ground-colour milk-white, in the basal area, strongly pale blue grey toned, the middle area slightly yellowish suffused. The central shading wholly absent. The inner transverse line is very sharp but fine, the outer transverse line more feeble and delicately traced, also the row of fine dots behind this last was clearly marked. Here and there are found traces of a grey sub-marginal. Costal spots strong, stigmata pale. Hind-wings pale milk-grey, powdered grey towards the outer margin. Front wing-fringes slightly chequered and lined, in the hind-wings pure white." Abruzzen, Monte Agatone; Majella.

*Agrotis*, Ochs. (1816-25) most authors, [*Rhyacia*, Hb. (1822) Warr., Corti: *Epipsilia*, Hb. (1822) Hamp., South: *Graphiphora*, Ochs. (1816-25) Steph. *Spaelotis*, Bdv. (1833)] *lucernea*, Linn. (1758).

Tutt, *Brit. Noct.* II. 79 (1892): Barr. *Lep. Brit. Is.* III. 390, plt. 136, 3 (1896): *Stdgr. Cat.* IIIed. 143 (1901): Hamp. *Lep. Phal.* IV. 505 (1903): Splr. *Schm. Eur.* I. 154, plt. 31, 9 (1905): South, *Moths Br. Is.* I. 213, plt. 107, figs. 9-10 (1907): Warr.-Stz. *Pal. Noct.* III. 51, plt. 11d. (1909): Culot. N. et G. I. (i). 58, plt. 9f. 2 (1909: Cort.-Drdt.-Stz. *Pal. Noct. Supp.* III. 71, plt. 10b.c. (1933).

Tutt refers to the *renigera*, Humph. & West. (*Brit. Moths.* I) as a separate form on the evidence of the figures given by these authors. They quote the description of Stephens, but their figures, plt. xxv, 2-3, are absolutely different and of most inferior execution in colour, and I think can be ignored as variant forms.

Bork "Naturg." says he knows of no description and has not seen insect nor a figure.

Ochs. & Treit. omit mention of *lucernea*, but in vol. V (i), 197, Hübner's *renigera*, fig. 384 (1802-8) is dealt with as a good species.

Hübner's fig. 44 *lucernea*, *Samml. Noct.* (1802) is a very unsatisfactory figure. The hind wings are impossible with huge discoidal blotch and dark clear-cut bands on a bluish ground. Were it not for the well-marked stigmata and black outer marginal area I should have said that fig. 42 should have been named *lucernea*, a very dark form. Fig. 384 *renigera*, Hb. has nothing to do with the *renigera*, Stephens, as Stephens thought.

Dup. *Hist. Nat. Supp.* III. plt. xix (1836) is a very fair one of *cataleuca*, but with too great emphasis and clearness in the markings; the hindwing coloration is not dark enough for most examples.

Wood, *Ind. Ent.*, plt. 9, 154 (1833) has a very good figure of the dark *renigera*, Steph.

The two figures of *cataleuca* in Frr. *Neu. Beitr.* V. plt. 399, have the marking too pronounced and the ground somewhat of too light a shade.

H.-S., *Sys. Bearb.* II. 377, notes that the figure of Bdv. *Icon.*, plt. 82, is incorrect in most respects, shape, fringes, colour of transverse lines, hind-wings and under surface. His figs. 574-5 are of a very large *cataleuca* with the central shade not so emphasized in depth as the transverse lines.

Barrett, *l.c.*, plt. 136, gives 3 figures. The basal colour incorrect, too brown, some of markings too definite: 3a three dark brown transverse bands alternating with four lighter bands; 2nd line a crenulated black line; a similar one succeeds the stigmata; also a shortened basal crenulated line; 3b generally darker, black-brown with obsolescent marking.

Spuler, *Schm. Eur.* I. plt. 31, gives a good figure of a dark *cataleuca*; he adds on p. 154 that *lucernea* has been shown to be distinct from *nyctemera* by its genital structure.

South, *Moths Br. Is.* I. 213, plt. 107, 9-10 (1907) gives two good figures, one with very numerous markings, which he calls *renigera*, Steph. Scotland, but very different from all the usual Scotch specimens

I have seen, which tend to be uniformly dark with more or less suppressed marking; the other figure, a ♀, is the *cataleuca* banded form.

Warr.-Stz., *Pal. Noct.* III. plt. 11d., figures a very dark *renigera* ♂ and ♀ under the name *lucerneae*, the ♂ being an ab. *cataleuca* with the central shade. There is an ochreous tinge in these figures, which does not agree with the description on p. 51, pale grey with green flush.

Culot, *N. et G.* I(1). plt. 9, fig. 2 (1909) gives a good figure of what is considered *lucerneae* on the Continent. In his text, p. 58, he considers *renigera*, Steph. as a Scotch sub-sp.

Corti.-Drdt.-Stz., *Pal. Noct. Supp.* III. plt. 10cd. figures *cataleuca*, with weakly expressed band; *renigera*, Steph. (nec Hb.) too dark and brown; *arguta*; *insulicola*; *pescona*, a pale bluish grey form; and *osmana*, a form extremely like the figure of *cataleuca* close to it on the plate, but is slightly yellowish.

Of the Variation Barrett writes:—"Variation in this species appears to be mainly local or climatal, and exists principally in the intensity of the colour. On the south coast of England, and especially at Portland, the general tint is pale smoky-grey, much darker toward the hind-margin, and with the markings moderately distinct; inland mountainous districts, especially in North Wales, produce a still paler form; coast districts in the West and North a decidedly darker; and in the far West, as in Kerry, some specimens are actually slate-black, without more than the faintest trace of markings. The Isle of Wight produces deep slate-coloured specimens, darker than those from the Isle of Man, which are brown-grey. Shetland specimens are large and dark, even to glossy blue-black.

Names and Forms to be considered:—

*lucerneae*, Linn. *Sys. Nat.* Xed. 510 (1758).

ssp. *renigera*, Steph. *Ill.* II. 129 (1829)

ssp. *cataleuca*, Bdv. *Ann. Soc. Ent. Fr.* 377, plt. 14. f. 2 (1833).

ssp. *dalmata*, Stdgr. *Cat.* IIIed. 143 [fig. *Iris.* XXXVI. (1901)].

f. *dubia*, Vorb. & M.D. *Schm. Schw.* I. 265 (1911).

ssp. *insulicola*, Trti. *Nat. Sicil.* nos. 7-12 (1919), p. 70 of sep.

ssp. *osmana*, Corti & Wagner. *Mitt. Münch.* XIX. 69 (1929).

ssp. *illyrica*, Reb. & Zrny. *Denk. Acad. Wiss. Wien.* 90, plt. fig. 20 (1932).

ssp. *buresschi*, Trti. *Mitt. Bulg. Ent. Gesell.* VII. 114. fig. (1932).

ab. *pallida*, Schaw. *Zt. Oestr. Ent. Ver.* XVIII. 70 (1933).

ab. *melanophila*, Schaw. *l.c.*

f. *arguti*, Corti-Drdt.-Seitz. *Pal. Noct. Supp.* III. 71, plt. 10c. (1933).

f. *pescona*, Corti-Drdt.-Seitz. *l.c.*

Tutt deals with (1) the *lucerneae*, Linn. "almost unicolorous whitish-grey form," with no stigmata, and three pale transverse strigae. (2) f. *cataleuca* with a well-developed, dark, central, transverse shade between the positions of the stigmata. (3) ssp. *renigera*, the dark blackish-grey form, varied with obsolescent darker markings, of Scotland and the North. He refers to, but does not name, the much paler form from the I. of Wight and S. of England.

v. *dalmata*, Stdgr. *Cat.* IIIed. 143 (1901).

FIG.—*Iris*, XXXVI (1901).

ORIG. DESCRIP.—“ Multo pallidior, al. ant. flavescenti-cinereis, al. post. subt. plerumque extus non late obscuro-fasciatis; trans. ad sp. sequ. esse videtur; an sp. propria?” Dalmatia.

f. *dubia*, Vorb. & M.D. *Schm. Schw.* I. 265 (1911).

“ A particularly large grey-white form, with obsolescent marginal band on the hind wing, occurs in Wallis with the typical *lucernea*, L. It was originally confused by Favre & Wullschlegel with *nictymera*, Bdv. and frequently labelled as such. But it is never so strongly clay-yellow as that species and clearly differs, as in *lucernea*, by the very shapely toothed inner and outer wavy lines. I think that this form has been confused most of all with *nictymera*, B.” Glacier de Trient.

f. *insulicola*, Trti. *Nat. Siciliana*. nos. 7-12 (1919), p. 70 of sep.

FIG.—*l.c.* pl. III. f. 33, and Seitz. *l.c.* pl. 10c.

ORIG. DESCRIP.—“ This forms a transition between *nictymera* and the form *dalmata*, Stdgr. of *lucernea*, of a size intermediate. The difference of the ochreous coloration is appreciated more easily when comparison is made with series of *nictymera*, *lucernea*, *dalmata* and *renigera*. It has the colour of the upper side somewhat like the ochraceous colour of *nictymera*; the markings and lines are analagous; but the wavy line is sparsely shaded, while on the underside of all four wings there lies a large black fascia, which distinguishes *lucernea*.” Sardinia, Ajaccio.

To this Corti-Draudt add, Seitz. *Pal. Noct. Supp.* III. 71. “ Forewings are much darker.” “ Much wider central shade.” “ Much darker margin ” than *simulatrix* = (*nictymera*).

f. *osmana*, Corti-Wagner. *Mitt. Münch.* XIX. 69 (1929).

ORIG. DESCRIP.—“ It is of generally more yellow colouration, and yellow transverse lines as in normal *lucernea*. The hind-wing underside is particularly characteristic, where the deep, almost black darkening of the outer area is not present, but is clay yellow as in *nyctemera* without the black outer band of *lucernea* and with only a curved line on the fore-wing underside. A characteristic marking of *lucernea*, that in the examples, which are not dusted with black on the margin, almost always occurs, (that) is the black trace along vein C<sub>2</sub> (according to Berge-Rebel) from the outer margin, is in these examples clearly present; in Pfeiffer's examples not always. Fringes white as in *lucernea*.” Anatolia.

ssp. *illyrica*, Reb.- Zerny. *Denk. Acad. Wiss. Wien.* (1932), 90.

FIG.—Plt. fig. 20.

ORIG. DESCRIP.—“ Differs from the alpine *lucernea* by much smoother scaling, more uniform coloration, throughout lighter upper side of the forewings, which want the interspersed scattered yellowish white scales. The outer transverse line is more sharply and distinctly toothed, hindwings towards the base somewhat lighter. Underside of the forewings and the marginal band of the hindwings less dark, the latter therefore also not so strongly in contrast with the pale wing surface as in typical *lucernea*.

“ The single ♀ lying before me has the upper side of the forewings very light yellow-grey with distinct transverse lines and hindwings towards the base strongly paled. Underside of all the wings

whitish, the forewings with outer transverse line obsolescent towards the inner margin. The hind-wing marking less up to a very slight discal point." May be ssp. of *simulatrix*.

ssp. *bureschi*, Tuleschkow, *Mitt. Bulg. Ent. Gesell.* VII. 114 (1932).

FIGS.—*l.c.* p. 114, very poor woodcuts.

ORIG. DESCRIP.—"Upperside dark grey with slight grey suffusion. Fringes of the same colour as the wings, somewhat paler on the hind-wings. The whole marginal area of all the wings up to the outer transverse line almost unicolorous black-grey. Central shade wide, dark-grey, with hardly visible traces of the reniform stigma; orbicular stigma as slightly marked.

"Underside equally very dark ashy grey, grey-black in the marginal area, paler towards the base, into dusky white. The central shade line wide and on all the wings well emphasized; as is the discal point on the hind-wings." S.W. Bulgaria.

ab. *pallida*, Schaw. *Zeit. Oestr. Ent. Ver.* XVIII. 70 (1933).

ORIG. DESCRIP.—"Two ♂♂ wholly pale, yellowish-grey colour. Only the praemarginal narrow band and the central band are somewhat darker grey, so that the fore-wings are actually pale. The hind-wings are also much lighter. Both specimens are quite fresh, undamaged, fringes perfect." Corsica. Elevations.

ab. *melanophila*, Schaw. *Zeit. Oestr. Ent. Ver.* XVIII. 70 (1933).

ORIG. DESCRIP.—"The fore-wings are in ground colour grey and not ochre-yellow, wholly darkened, with a wide, blackish outer area. Of the same black colour are the central transverse band and the reniform stigma. Hind-wings blackish darkened. Fringes whitish." Elevated parts of Corsica.

f. *arguti*, Corti-Draudt-Seitz. *Pal. Noct. Supp.* III. 71 (1933).

FIG.—*l.c.* pl. 10c.

ORIG. DESCRIP.—"Resembles *dubia* by the more diffuse markings, but is darker; subterminal line is scarcely discernible." Pyrenees. The figure is uniformly dark with sparsely emphasized marking, scarcely above the ground depth of colour.

f. *pescona*, Drdt.-Seitz. *Pal. Noct. Supp.* III. 71 (1933).

FIG.—*l.c.* pl. 10c.

ORIG. DESCRIP.—"Is a very pale bluish grey; a very clearly marked form with unusually dentate subterminal line; central shade very apparent but narrow; marginal band of hind-wings exceptionally wide and deep black." Abruzzi.

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*Agrotis*, Ochs. & Treit. (1816-25) most authors [*Epipsilia*, Hb. (1822) Hamp. (*Episilia* in error): *Rhyacia*, Hb. (1822) Warr., Corti: *Graphiphora*, Ochs. & Treit. (1816-25) Meyr.: *Spaelotis*, Bdv. (1840), Dup.: *Pachnobia*, Gn. (1852) South.] *simulans*, Hufn. (1766).

In his consideration of *pyrophila*, Tutt took Hübner's fig. 43 as the type. But Hübner himself says in his text (Noctuae), "Synon. Noct. *pyrophila* d. Ther." i.e. of Schiffermüller.

ORIG. DESCRIP.—“Larva with waved lines; larva with a few curved hairs and moth of a dull grey: The dark grey marked owl-moth.”

This was recognized by contemporary authors, Göze, de Villers, Borkhausen & Fabricius. This last in the *Mantissa*, II. 170 (1787), and in the *Ent. Sys.* III. 98 (1793) gave a fuller recognizable description. and in 1801 Illiger in his *Sys. Verz.* I. 204 confirms the name with the later description.

Villers, *Ent. Linn.* IV. 487 calls *simulans* “L’ardoisée,” thus noting its slaty surface appearance.

Ernst & Engr., *Pap. d’Eur.* VI. 104, fig. 342, gives 5 figures, very clearly giving both the grey and the yellow forms, but although good, have too much emphasis in the marking and in the yellow form of colour. The latter is said to be the ♂, the grey form the ♀. One figure is described as having white hind wings: an aberration.

Tutt, *Brit. Noct.* II. 80 (1892): Barr. *Lep. Brit. Is.* III. 377, plt. 135, 2 (1896): Stgdr. *Cat.* IIIed. 143 (1901): Hamps. *Lep. Phal.* IV. 510 (1903): Splr. *Schm. Eur.* I. 153, plt. 34, 11-12 (1905): South, *Moths Brit. Is.* I. 214, plt. 107, f. 7-8 (1907): Warr.-Seitz. *Pal. Noct.* III. 52, plt. 11f. (1909): Culot, *N. et G.* I (1). 57, plt. 9, f. 1 (1910): Corti-Drdt.-Seitz. *Pal. Noct. Sup.* III. 70, plt. 10a. (1933).

Esp., *Abbild.* IV. 1-2 (1786) depict a yellowish ♂ and a grey brown ♀ very poorly; fig. 3 is about the size of *pecta* and all three are named *radicea*. They badly represent this species. Gn. distinctly says (V.301) that fig. 3 cannot be *pyrophila*.

Göze, *Ent. Beitr.*, places them as separate species. III(3). 211 and 195 (1781).

Bork., “*Eur. Schm.*” IV. 207 and 211 does the same (1792).

Hübner’s fig. 43 (1802) is rather too yellow-grey to be the Portland form as I have it. The examples of the latter I have before me have possibly lost the “deep ochreous colour tending to brown” which Tutt (II. 80) speaks of.

Treit., *Schm.* V(1). 202 (1825) unites *simulans*, Hufn., *pyrophila*, Schiff., *tristis*, Fb., and *radicea*, Esp. under the name *pyrophila*, and thus does not use the prior name.

Steph., *Ill.* II. 130 (1826) considered his dark insect as the continental *latens*, Hb., which it certainly cannot be. See Hüb. *Samml.*, figs. 419, 806-7, which cannot be confused with the very dark *latens*, Steph., found in Scotland. Gn. *Hist. Nat. Noct.* V. 305 places *latens* to *lucernea*, which Tutt points out cannot be correct on account of the marking.

Dup., *Hist. Nat.* VI. 35, plt. 74, 2 (1826) gives a good figure of the yellow tinged *pyrophila*.

Wood, *Ind.*, plt. 9, f. 155 (1834) gives a figure of *latens* (Stephens’ collection) a very dark form with suppressed marking and f. 156 shows *pyrophila*, the slightly yellowish form, probably a southern one of Stephens’ collection.

H.S., *Sys. Bearb.* II. 334, considers Hb. fig. good, but too yellow and too broad fore-wings, the orbicular too dark, and the reniform too uniformly filled in dark.

Gn., *Hist. Nat. Noct.*, V. 301, quotes *simulans*, Hufn., but does not adopt it as the prior name.

South, *Moths Br. Is.*, I., pl. 107, figs. 7 and 8, represent ♂ and ♀, the latter of an unusual pale brown instead of the usual grey-brown.

Barrett, *l.c.*, pl. 135, 2 figs. 2a. darker and more uniform with distinctly lighter stigmata; specific basic colour not apparent in these figures.

Comparing the *simulans* and the *lucerneae* lying before me I note that the former has the fore-wings of a slaty grey generally, the Portland specimens with a slight tinge of ochreous, the hind-wings neither black nor ruddy, the fore-wings have a faint submarginal row of sagittate marks, while the latter have a silky texture of fore-wing surface, the hind-wings are dark fuscous with a ruddy suffusion. The form *latens*, Steph., was formerly attributed to *lucerneae*, but comparison of series of the two species shows that it belongs to *simulans*.

Warr.-Stz., *Pal. Noct.*, III. 52, pl. 11f. (1909), treat *tristis* and *radicea* as synonyms of the typical form, and *latens*, Steph., as "a unicolorous black form, with still more intense markings" and not as the *latens*, Hb., which Stephens considered it was when he described it in 1829 (*Ill.* II. 129). They figure *simulans* much too brown. A curious error arises regarding the fig. 11f. of *latens*, which does service for both *latens*, Hb., and *simulans* form *latens*, Steph. The fig. cannot refer to the latter which should be "unicolorous black" (see above).

Culot, *N. et G.*, I(1), pl. 9, 1 (1910), has a good figure of the continental form and lays stress on the fact that the ochreous tinge never approaches that of *nyctemera*.

Corti-Drdt.-Stz., *Pal. Noct. Supp.* III. 70 (1933), consider *auguroides*, Roth. from N. Africa as a race of *simulans*. "It is more brownish with irrorations and indistinct stigmata." They give a revised figure, *l.c.*, 10a, as the figure in the main volume is too brown; it should be much greyer.

The Forms and Names to be discussed are:—  
*simulans*, Hufn. (1766), *Berlin Mag.*, III. 396.  
*tristis*, Fab. (1775), *Sys. Ent.*, 617.  
*pyrophila*, Schiff. (1775), *Verz.*, 71.  
*radicea*, Esp. (1786), *Abbild.*, IV. 454, pl. 143, 1-2.  
 ab. *latens*, Steph. (1826), *Ill.*, II. 130.  
 ssp. *sibirica*, Stdgr. (1892), *Iris*, V. 356.  
 ab. *suffusa*, Tutt (1892), *Brit. Noct.*, II. 80.  
 ab. *obscurata*, Stdgr. (1901), *Cat.*, III ed. 143.  
 ab. *auguroides*, Corti (1933), Drdt.-Seitz., *Pal. Noct.*, III. Sup. 70.

Tutt dealt with (1) the *simulans*, Hufn. (2) the slightly yellow tinged large *pyrophila*, Schiff. (3) the melanic form *latens*, Steph. (4) and the suffused grey slaty form *suffusa*.

Barrett says of the Variation:—

"Hardly variable in any one locality but subject to regular gradations of colouring in accordance with latitude. On the south coast its colour is brownish-grey, or even pale brown; as it occurs further north the colour becomes darker, till in the north of Scotland, the insect is of a unicolorous grey-black."

ab. *tristis*, Fab., *Sys. Ent.*, 617 (1775).

This name is nothing more than an alternative name for *simulans*. Hampson, however, says "Darker, fore-wings blackish grey."

ab. *radicea*, Esp., *Abbild.*, IV. 454 (1786).

FIG.—*l.c.*, plt. 143, f. 1-3.

ORIG. DESCRIP.—“This rare variety has shorter, smaller wings, and a more conspicuous red-brown ground colour of fore-wings, the stigmata are larger and more distinct, also the band on the outer margin is stronger, and with a paler margin. The upper side of the hind-wings has two blackish transverse lines. On the underside of both wings is a brown reddish colour, and the body is more blackish coloured.”

This figure 3 is a very small and unrecognizable form of *simulans*. Figures 1 and 2 on the same plate may represent *simulans*, but I doubt it.

ssp. *sibirica*, Stdgr., *Iris*, V. 356 (1892).

ORIG. DESCRIP.—“A whole row of ♀ specimens, doubtfully attributed to *sibirica*, Bdv., are most probably only a dark form of *simulans* such as I possess among a somewhat varied series of specimens from Jutland and Finland. The 34 mm. sized ♀ from Kentei is smaller, has a somewhat different general appearance, and probably belongs to another species.”

ab. *obscurata*, Stdgr., *Cat. Lep.*, ed. III. 143 (1901).

ORIG. DESCRIP.—“Obscurior; al. ant. nigricanti-griseis.”

ab. *auguroides*, (Corti) Drdt.-Seitz., *Pal. Noct. Supp.*, III. 70 (1933).

FIG.—*l.c.*, plt. 10a.

ORIG. DESCRIP.—“It is more brownish with irregular irrorations and indistinct stigmata.” A N. African race; Guelt-es-stel.

*Agrotis*, Ochs. & Tr. (1816-25) most authors. [*Graphiphora*, Ochs. & Tr. (1816-25) Steph. Meyr.: *Rhyacia*, Hb. (1822) Warr., Corti: *Orgygia*, Hb. (1822) Sth.] *ravida*, Schiff. (1775) = *obscura*, Brahm (1791).

Tutt, *B. Noct.*, II. 81 (1892), used the name *obscura*, Brahm and Bork., for the type description. He states in a footnote “Brahm has only described the earlier stages. I have therefore taken Borkhausen’s as the type description.” In this statement Tutt was incorrect. The facts are these. Brahm in 1791 described the earlier stages, and in 1792 he described the insect he bred from his larva he had named *obscura*, *Ins.-kal.* II, p. 412. Borkhausen in the same year, 1792, also described the same insect and in doing so quoted the description of Brahm and used the same name for it, *obscura*. Curiously Tutt subsequently took three earlier descriptions of Esper, 1786, as those of aberrant forms of *obscura*, the form described in 1792 by Brahm.

Borkhausen’s description is almost word for word taken from Brahm, and was quoted by Tutt, *Br. Noct.*, II. 81.

Tutt overlooked the earlier references to Schiff. for *ravida*, although a number of early writers acknowledged the reference, from Illiger (1801) onward.

Tutt, *Brit. Noct.*, II. 81 (1892): Smith, *Rev. of Agrotis*, p. 94 (1893): Barr., *Lep. Br. Is.*, III. 386, plt. 136 (1896): Stdgr., *Cat.*, III ed., 136 (1901): Hamps., *Lep. Phal.*, IV. 455 (1903): Splr., *Schm. Eur.*,



I. 145, plt. 32, 18 (1905): South, *M.B.I.*, I. 215, plt. 107 (1907): Warr.-Seitz., *Pal. Noct.*, III. 49, plt. 10k (1909): Culot, *N. et. G.*, I(1). 36, plt. 5, f. 8-9 (1910): Corti-Drdt.-Seitz., *Pal. Noct. Supp.*, III. 70, plt. 9k (1933).

Three of Esper's figures have been identified with this species. *Abbild.*, IV., plt. 142, fig. 5. *austera* is a fairly good figure, reddish with a dark space between the two stigmata. Fig. 4 is to me an impossible one for a form of this species; it is named *obducta*, general shape and marking are quite different and the colour is not uniformly grey but variegated. Tutt says that Newman's figure is of this type; it may be, but still one can call his (Newman's) figure an "*obscura*." Esper's, *l.c.*, plt. 150, fig. 2, *bigramma*, is another fairly good figure of a grey-brown form with the dark space between the stigmata.

Ernst & Engr., *Pap. d'Eur.*, fig. 342d (1788), probably represents this species with a slight reddish tinge.

Hübner's figure, *Samml.*, 126 (1802), has a bright red costa, not faint as Brahm and Borkhausen both say, as also does Illiger in his *Verz.* (1801). Hübner, *l.c.*, 600, is a much better figure, ashy-grey very slightly tinged with red, costa paler, to which Tutt has given the aberrational name *rufa*, *l.c.*, 83. I have never seen a specimen like Hüb., 126. H.S., *Sys. Bearb.*, II. 339 (1845), also unfavourably criticizes Hübner's figs.

Godt., *Hist. Nat.*, V. 234, plt. LXVI, f. 6 (1824), has a very fair figure, with slightly reddish costa.

Freyer, *Neu. Beitr.*, III. 25, plt. 208 (1839), gives a good figure of *ravida*, and in the text says that the species has been described under *obducta*, *austera* and *bigramma* by Esper, and as *obelisca* and *obscura* by Borkhausen. He discards the prior names and used *ravida*, Hb.

Guenée, *Hist. Nat. Noct.*, V. 300, says, "Specimens from N. America are a little darker, especially on the lower wings, and often more uniform in colour, but this is not sufficiently marked to merit a varietal name." Tutt refers to two American varieties represented in the British Museum collection. (1) *clandestina*, Harr., which has subsequently been determined as a good species; and (2) *unicolor*, Walk., a Canadian form.

Hamp., *Lep. Phal.*, IV. 455 (1903), took *ravida*, Schiff., as type name and considered *obducta*, *austera* and *bigramma*, of Esper, *valida*, Walker, *stabulorum*, Bien., *nipona*, Feld., *caliginosa*, B.Hr., and *glis*, Christ., as forms of the species.

Splr., *Schm. Eur.*, plt. 32, 18 (1905), has a very good figure, with no differentiation of costa.

South, *M.B.I.*, I, plt. 107, figs. 5, 6 (1907), has two very good figures of the true surface tint and no features too pronounced.

Warr.-Seitz, *Pal. Noct.*, III. 49 (1909), considers *crassa*, Haw., as the same as *austera*, Esp., and the *nipona*, Fldr., and *caliginosa*, Btlr., to be the *valida*, Wlkr. On plt. 10k are figured the grey brown *ravida*, the larger more well-marked Eastern form *valida*, Wlkr., and *stabulorum*, Bien., which is considered to be a true species by its dull rufous-green tint and very obscure lines (not obscure in the figure).

Culot, *N. et. G.*, I (1), plt. V, f. 8-9 (1910), gives 2 excellent figures; 9 with the merest shade of red on the costa.

Barrett speaks of the Variation as follows:—"There is some Variation in the ground colour, the red costal colouring in some specimens suffusing the greater portion of the fore-wings, or in others becoming hardly perceptible, leaving the whole surface dark brown, or grey-brown, or even blackish-brown. In some specimens in each shade of colouring there is a darkening of the space between the orbicular and reniform stigmata. There is nothing clearly defined in these variations; all melt imperceptibly into each other."

He reports a curious aberration "remarkably resembling one of the forms of *A. nigricans* and hardly larger than that species."

The two figures on plt. 136 are both poorly coloured.

Hampson, *Cat. Lep. Phal.*, IV, 456 (1903), records specimens from the Punjab with hind-wings wholly brown.

List of Names and Forms to be considered:—

*ravida*, Schiff. (1775), *Verz.*, 80.

f. *obducta*, Esp. (1786), *Abbild.*, IV, 452, plt. 142.

f. *austera*, Esp., *l.c.*

f. *bigramma*, Esp., *l.c.*, 490, plt. 150.

*obscura*, Brahm (1791-2), *Ins. Kal.*, I, 191 (1790); II, 412 (1792).

*obscura*, Bork. (1792), *Naturg.*, IV, 538.

*crassa*, Haw. (1809), *Lep. Brit.*, 220.

ssp. or f. *unicolor*, Walk. (1856), *Lep. Het.*, IX, 233.

ssp. or f. *clandestina*, Harris (1862), *Injur. Ins.*, 448.

*valida*, Walk. (1865), *Lep. Het.*, XXXIII, 711.

ssp. *stabulorum*, Bien. (1870), *Disc.*, 34.

ssp. *nipona*, Fldr. (1872), *Reis. Nov.*, plt. 110, 20.

ssp. *caliginea*, Btlr. (1878), *Ann. and Mag. N.H.*, (5), I, 165.

ssp. *glis*, Christ. (1887), *Rom. Mem.*, II, plt. 12, 5; III, 64, plt., III, 10.

ab. *rufa*, Tutt (1892), *Brit. Noct.*, II, 82.

ab. *suffusa*, Tutt (1892), *l.c.*

f. *salva*, Corti-Drdt.-Seitz. (1933), *Pal. Noct. Sup.*, III, 70, 9k.

Tutt dealt with (1) the *ravida*, Hb., with red costa; (2) *obscura*, ashy-grey with silky shimmer; (3) *obducta*, Esp., grey-brown; (4) *bigramma*, Esp., grey-brown with dark area between the stigmata; (5) *rufa*, Hubner's fig. 600; (6) *austera*, Esp., reddish with dark area between the stigmata; (7) *suffusa*, greyish-black, unicolorous; (8) *clandestina*, obscure markings, grey costa, not red; (9) *unicolor*, Wlkr., a Canadian form almost typical, with only the slightest red tinge on costa.

*crassa*, Haw., *Lep. Br.*, 220 (1809).

ORIG. DESCRIP.—"Alis fuscis nitidis atq̄ subnebulosis, corpore praegrosso."

"Antennae omnino setaceae. Thorax perfuscus antice rufescens. Alae basi, lineolâ nigrâ, vel atrâ, aliisque irregularibus inter et circa stigmata ordinaria obsoleta. Stigma tertium imperfectum vel interdum omnino oblitteratum. Saepe strigae obsoletissimae pallidiores ordinariae plurimarum Noctuarum, fusco plus minus adnatae, viz., una basi, altera ante, tertia pone stigmata, quartaque juxta marginem posticum pallida absque fusco. Alae posticae albae venis fimbriaque fuliginosis. Exemplaria perpauca solum vidi." Norfolk.

This description is taken as that of *ravida*, but Haworth called it the *crassa*, Hb., 152, in error. He admits having seen very few examples.

*valida*, Walker, *Cat. Lep. Ins. B.M.*, XXXIII, p. 711 (1865).

ORIG. DESCRIP.—Foem: "Obscure fusca, crassa; palpi oblique ascendentes, articulo 3 conico; alae anticae lineis quatuor cinereis angulosis nigricante marginatis, 3 postmedia flexa, 4 submarginali, orbiculari et reniformi magnis nigro submarginatis, illa strigam nigram interrumpente; posticae albido-cinereae, linea marginali fusca."

Female: "Dark brown, thick. Palpi stout, obliquely ascending, not rising so high as the vertex; third joint conical, not more than one-fourth of the length of the second. Abdomen brownish, extending rather beyond the hind-wings. Wings cinereous and shining beneath. Fore-wings with four cinereous zigzag blackish-bordered lines; first line very near the base; second emitting a black streak to the reniform mark; this streak is interrupted by the orbicular mark; third line bent; fourth submarginal; orbicular and reniform marks large, incompletely bordered with black. Hind-wings whitish cinereous; marginal line brown. Length of the body 10 lines; of the wings 22 lines."

a. Shanghai. From the Entomological Society's collection.

ssp. *stabulorum*, Bien., *Lep. Ergebnisse. Reise, Persien*, 34 (1871).

ORIG. DESCRIP.—"Alis anticis obtusis rufescentibus, strigis duabus obsoletis, linea undulata serrata, macula reniformi et orbiculari griseo-scente obscurior cincta, posticis fuscentibus, omnibus subtus ad marginem exteriorem rufo conspersis."

"In shape and size like that of *A. ravida*. It differs from that species by its dusky red-green coloration, the very obscure often not recognizable transverse lines and obsolescent waved line and the absence of the black basal streak. The reniform and orbicular are paler, grey, spots somewhat darker enveloped; in many examples the two stigmata do not show as paler spots. The fringes are a little paler than the ground colour." Steppe bei Schahrud.

Hamp., *Cat. Lep. Ph.*, IV, 456 (1903). Paler; fore-wing without the basal black streak, the stigmata not defined.

ssp. *nipona*, Feld., *Reis. Nov.*, pl. 110, f. 20 (1872).

There is no text to this work of Felder. Rogenhofer edited the volumes of plates. The figure is an *obscura*, with no differentiation of costa but the area of the hind-wing inside the dark marginal area is slightly tinted pale yellow.

ssp. *caliginea*, Btlr., *A.M.N.H.*, (5), I, 165 (1878).

ORIG. DESCRIP.—"Allied to *Graphiphora sigma*, but with narrower and longer wings, the primaries sepia-brown, with the costal area slightly greyer or redder, but not sharply defined as in *G. sigma*, the discoidal markings less strongly defined, the angular discal stripe less lunated in its divisions and more uniform in width; secondaries sordid shining white instead of brown; the thorax scarcely darker than the abdomen, the head and collar whitish instead of reddish; under surface shining whitish; the primaries with a discal transverse line, twice as far from the margin as in *G. sigma*, secondaries with the discocellular

spot barely indicated, and the discal line only visible on the costal area." Japan.

This was also figured and described, *Ill. Het.*, III, pl. 44, 10 (1878), by Butler.

ssp. *glis*, Christ., *Rom. Mem.*, III, 64 (1887).

FIG.—*l.c.*, pl. III, fig. 10.

ORIG. DESCRIP.—“*Alis ant. obtusis, rufobrunneis, strigis ambabus lutescentibus, antica denticulata, postica angulosa, linea subundulata antimarginali, stigmatibusque concoloribus vel griseis, fusco-circumscriptis; posticis lutescente griseis, ad limbum infuscatis.*” 17-21 mm. N. Persia.

“Next to *A. senna*, H.G., near *A. erythrina*, Rmbr., *glis* has no row of white dots like the latter. The cross lines of *erythrina* are nearer to one another on the inner margin than in *glis*, which also differs from *senna* by the wavy line before the border being more distinct and pretty regularly toothed. The fore-wings are wider than in *senna* and not dark red brown. The front wavy cross line is of a more yellow colour on the costa and margined on both sides by a black brown spot, here and there darker on both sides. The basal cross-line lies almost as in *senna* but is not dentate. At its origin on the costa is also a black-brown spot. The border line, also yellowish, has a few insignificant teeth, while in *senna* the teeth are deep and regular. It is dark margined on the inner side. The stigmata are distinct; they are filled in with the wing colour or grey without dark margining.”

*f. salva*, Corti (Draudt) Seitz., *Pal. Noct. Supp.*, III, 70 (1933).

FIG.—*l.c.*, pl. 9k.

ORIG. DESCRIP.—“This looks like a small narrow-winged very pale *ravida* with heavy irrorations and the delicate markings are only indistinctly visible in the patchy ground colour. The subterminal line with slightly paler edge towards the darker post-median area. Hind-wings very pale, whitish.” Juldus. In spite of Corti's indication Draudt considers it a species.

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*Agrotis*, Ochs. & Tr. (1816-25), Hump., Stdgr. Sth. Splr. Cul. [*Rhyacia*, Hb. (1822), Warr. Corti: *Epipsilia*, Hb. (1822), Sth. Corti (subgen.): *Triphaena*, Hb. (1822), Meyr.: *Pachnobia*, Gn. (1852), Mill. Stdgr. Newm. Weir. Barr.] *alpicola*, Zett. = *hyperborea*, Zett.

Tutt notes that *alpicola*, Zett., is the prior name, but that because *hyperborea* “is in such general use,” he retains it.

Zett., *Ins. Lapp.*, 938, quotes “Dalm. in lit.,” “*Hadena*, Bdv. (*Ind. Lepid.*, p. 71),” “Mus. Reg. Acad. Holm., etiam Schonherre, e quo specimina typica heic descripta mihi benigne communicata.” From which we understand that Zett. made the description in 1840 of *hyperborea* on p. 938 from specimens kindly lent him by Schonherr and that the species was already named by Dalman from whom Bdv. had obtained knowledge as early as 1829 since he included the name in his *Europ. Lep. Index Meth.* in the genus *Hadena*, p. 71, eleven years before, quoting Dalm. as the authority. We are unable to trace the

name *egregia*, Led., which has been mentioned by some writers as a synonym., e.g. Hering (1846).

Tutt, *Brit. Noct.*, II, 85 (1892): Barrett, *Lep. Brit. Is.*, V, 231, plt. 215, 1 (1899): Stdgr., *Cat.*, III ed., 137-8 (1901): Hamp., *Lep. Phal.*, IV, 468 (1903): Splr., *Schm. Eur.*, I, 147, plt. 32, 23 (1905): Sth., *Moths Br. Is.*, I, 215, plt. 108, 1-4 (1907): Warr.-Seitz., *Pal. Noct.*, III, 36, plt. 7k (1909): Culot, *N. et G.*, I (1), 37, plt. 5, 15-18 (1910): Corti-Draudt-Seitz, *Pal. Noct. Supp.*, III, 73, plt. 10k-11b (1933).

Herr.-Schaff. (*Sys. Bearb.*, II, 198) (1846) describes continental forms as *glacialis*, figs. 421, 423, 424. Fig. 424 with a bluish outer marginal area to the fore-wings is that which is similar to our British bred form Tutt has called *caerulescens*. 423 with the cuneiform submarginal spots is the form called *carnica* by Hering, while 421 is *glacialis* I take it. They are all three good well-coloured figures. H.-S. was apparently not acquainted with the work of Zetterstedt, nor with that of Humph. & Westw.

Humph. & Westw., *Brit. Moths*, I, 118, plt. 23, 13 (1843), describe and figure as *alpina* the example from the Scottish mountains, 3000 ft., taken by J. W. Douglas in Perthshire in 1839. The figure is poorly executed, but sufficiently passable to designate the form as distinct from the continental northern countries type. The figure in Newman, "British Moths," was taken from the original specimen taken by Foxcroft in 1854.

Millière in his *Icon.* of the Linn. Soc. of Lyons, pt. XIII, p. 79, plt. 60, redescribes *hyperborea*, and figures the ♂ and ♀ in his collection excellently, remarking that it had never been figured before.

Both Guenée and Doubleday err in quoting the author of *carnica* as Heer. Hering is the correct spelling.

Newman, *Brit. Moths*, 355 (1869), gives a good b. and w. figure of the 2nd British example, taken by J. Foxcroft also in Scotland and describes it under the name *Pachnobia carnica*, presumably compared with and identified as the *carnica* of Hering (1846), probably following Gn.

Weir, *Ent.*, 290 (1880), plt. IV, figs. 14, 15, states that the Shetland forms are not so variable as those on the Scottish mainland. He gives two fair figures of the extreme forms found in the islands, 14 a pinkish form with sparse blackish markings, and 15 a predominantly black form with a few grey markings.

Hamp., *Lep. Phal.*, IV, 801, places it in his genus *Episilia*, which he ascribes to Hübner, but misspells it. It should be *Epipsilia*, Hb.

Splr., *Schm. Eur.*, I, 147, plt. 32, fig. 23, gives a fairly good figure of a form predominantly pale slaty in colour and no black markings, the rest of the wing being of dull brown shades, not red at all.

South, *M.B.I.*, I, 215, plt. 108, gives 4 very good figures, two of Shetland and two of Rannoch specimens, average forms and in no way extreme, or of remarkable aberration.

Meyrick places it in his conception of the genus *Triphaena*, which contains two species of "yellow underwings."

Warr.-Seitz., *Pal. Noct.*, III, 36, plt. 7k (1909), puts *iveni*, Huber, as a synonym, and *glacialis*, H.-S., as the *carnica*, Hering, and treats the name *hyperborea* as that of a form, adopting *alpicola*, Zett., as the

Corti-Draudt-Seitz., *Pal. Noct. Supp.*, III, 73, pls. 10k and 11b (1933), acknowledge the unsatisfactory figure in the main volume and give a better figure, 11b, more comparable with the slaty form in Spuler's fig. (ante) but not so much of that tint on the outer half of the fore-wing. Three other figures on plate 10k show the *riffelensis* form, the *iveni* form, and the more familiar form to us, viz., *alpina*, which is stated to come from both Scotland and Ireland. Corti returns to the name *hyperborea* in place of *alpicola*.

Culot, *N. et G.*, I (1), 37, plt. V, figs. 15-18, gives four excellent figures, 15 a slaty grey form, *hyperborea*; 16, 17 two *alpina* forms, the latter with scattered dark markings; 18 a much darker *riffelensis* form; but none comparable with our north British forms.

Of the Variation Barrett writes:—"Variation in this beautiful species is universal, hardly two specimens are quite alike; it shows itself in the tone and intensity of the warm velvety-brown of the ground colour, and in its extent; in the degree and extent of ashy-grey cloudings—which occasionally occupies the whole surface of the fore-wings except a central red-brown band—and especially in the longitudinal black striping. This is sometimes remarkable, and is most seen in specimens from the Shetland Isles; the black basal streak is extended into a deep black broad bar, right through the wing to the subterminal line, and is sometimes supplemented by a similar but narrower broken stripe above it, or by long black dashes from the reniform stigma to the same line, while in other instances the centre of the wing is occupied by a black cloud, or all the spaces between the nervures in this portion are filled in with black, or, on the other hand, there is a total absence of black markings. In examples from the Scottish mountains many have large blotches of almost bluish or purplish bloom at the base and on the costal or dorsal margin or both, and very often along the hind margin, while some are devoid of such shading altogether or lean toward rich dark purple-brown with the markings obscured."

"Abroad the range of variation does not seem to be so great; those from the Swiss mountains are rosy-brown; from Lapland red-brown or rosy-grey; from Labrador dull inconspicuous brown; and from Finland ashy-grey."

The Names and Forms to be considered are:—

*alpicola*, Zett., *Ins. Lap.*, 938 (1840).

*hyperborea*, Zett., *l.c.*, 938 (1840).

*aquilonaris*, Zett., *l.c.*, 940 (1840).

f. *alpina*, Hump. & Wstw., *Brit. Moths*, I, 118, plt. 23 (1843).

f. *carnica*, Hering, *Stett. ent. Zeit.*, 236 (1846).

f. *glacialis*, H.-S., *Sys. Bearb.*, II, 198, figs. 421-5 (1849).

f. *iveni*, Huber, *Hor. Ross.*, VI, 135, plt. 3 (1869).

ab. *caerulescens*, Tutt, *Brit. Noct.*, II, 85 (1892).

ssp. *norvegica*, Strnd., *Nyt. Mag. Naturv.*, XLII, 134 (1904).

ab. *ryffelensis*, Obthr. & Culot, *Lép. comp.*, I, 60, plt. I, 11 (1904).

Tutt dealt with the 3 ashy forms (1) *hyperborea*, with more distinct markings. (2) *alpicola*, with central area reddish-brown. (3) *aquilonaris*, markings obsolete, clouded with reddish; and with 3 red forms (4) *caerulescens*, with slaty lines (beautiful bred forms from Scotland) = *glacialis*,

a somewhat similar continental form figured by H.-S. (fig. 424). (5) *carnica*, with cuneiform spots, and (6) without cuneiform spots = *glacialis*; and finally (7) buff-grey, with cuneiform spots, *alpina*.

Again one meets with a case of great variation, a variation which makes it almost impossible to analyse and classify the forms or even to identify the forms which have already been described.

*iveni*, Huber, *Hor. Ross.*, VI, 135 (1869).

FIG.—*l.c.*, plt. 3.

ORIG. DESCRIP.—Grisea, brunneo mixta, lineis nigris, stigmatibus brunneis, ciliis linea dividente obscuriore, alis posterioribus griseis.

“Fore-wings grey at the base; from the costa to the middle of the wing close to the thorax lies a black streak interrupted in the middle, to which the arrow streak running from the base of the wing puts a stop; then follows a unicolorous grey area with a black dot. This area is margined by a wavy line formed of half-moon shaped streaks curved inwardly, which crosses the whole width of the wing. In the following area are found the inner pale grey reniform stigma, and further, separated by a dark intermediate space, the outer stigma, beyond which up to the outer margin of the wing lies a light brown band. Then follows a strong wavy line which is formed of half-moon shaped streaks curved towards the outside. The band now following running almost parallel with the outer margin of the wings contains two light brown, strongly marked dart-like streaks and numerous brown streaks. The fringes are on a wavy black line running along the outer margin of the wing. The lower wings are dark grey and have only a very dull impression of a discal mark. Thorax and abdomen grey as the upper wings,” etc.

var. *ryffelensis*, Obthr., *Lép. comp.*, I, 60.

FIG.—plt. I, 11 (1904).

ORIG. DESCRIP.—“The form from the Ryffelalp differs from the Lapland form. It is of a duller slaty grey and seems generally larger.”

“In the north of Britain the form of *hyperborea* (*alpina*) has the markings reddish, while in Lapland and in Switzerland, a violet grey or slaty grey replaces this reddish colour.”

race *norvegica*, Strnd., *Nyct. Mag. Naturvid.*, XLII, 134 (1904).

ORIG. DESCRIP.—“Of the northern examples of *A. hyperborea*, which have similarity to *carnica*, only those I have knowledge of are mentioned—Schöyen, Tengström and Reuter [and his own].”

“Schöyen describes a specimen from Vesteráalen; Tengström and Reuter a Finnish example. These descriptions sufficiently show that the captured examples belong to the same form as my Erfjörd examples. From the description of Tengström I note only the absence of the distinct row of black wedge-shaped spots in the marginal area, but which in my examples, if not also wholly wanting, are so extremely indistinct that they cannot serve as a characteristic of this variation, in fact these spots are often also wanting in quite typical examples of *hyperborea*. The example from Vesteráalen, which I had the opportunity to examine, as well as the description of Schöyen, agrees with my examples. The small difference present may be described as follows. While the dark brown colour of the Erfjörd form in the disc and on the costa (which is only slightly pallid) is extended right up to the base, so that only the

inner marginal area retains the greyish ground colour, the basal area of the Vesteráalen example is grey only darkened in the middle, and on the costal margin it retains the grey ground colour right up to the reniform stigma. And the grey colour, which predominates in the Vesteráalen example, is only a little darker in the marginal area, than in the basal area, and the cuneiform spots are large and distinct, not blackish but deeper brown, or yellowish brown. In my examples the brown colour is present over the whole marginal area, in which the markings do not show; the rest of the outer half of the wing is strongly reddish and suffused. In both the inner portion of the wing area with the inner portion of the large orbicular stigma is of the grey-white colour sharply separated from the dark area at the darkest part. The remaining portion of the Vesteráalen example is more suffused than in mine, so that its paler colour is more expressed; it may be not the same sex."

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*Agrotis*, Ochs. & Treit. (1816-25). Most authors. [*Rhyacia*, Hb. (1822) Warr.-Seitz.: Corti-Seitz.: *Lycophotia*, Hb. (1822) Hamp.: *Scotophila*, Steph. (1829)] *strigula*, Thunbg. (1788) = *birivia*, Schiff. (1775).

Tutt, *Brit. Noct.*, II, 89 (1892): Barr., *Lep. Brit. Is.*, III, 364, pl. 134, 1 (1896): Stdgr., *Cat.*, III ed., 135 (1901): Hamp., *Lep. Phal.*, IV, 524 (1903): Splr., *Schmett. Eur.*, I, 142, pl. 32, 2 (1905): South, *Moths Brit. Is.*, I, 210, pl. 107, 1 (1907): Warr.-Seitz., *Pal. Noct.*, III, 41, pl. 9a (1909): Culot, *N. et G.*, I (1), 27, pl. 3, 4-6 (1909): Corti-Drdt.-Seitz., *Pal. Noct. Supp.*, III, 73 (1933).

Tutt did not trace the name *porphyrea* as it was originally used in the *Verz.* of Schiff., and apparently did not search for records earlier than Hübner's use of it, nor did he consult the text of Hübner, and thus missed the first description of this species.

*birivia*, Schiff., *Verz.*, 71 (1775).

ORIG. DESCRIP.—“These Noctuae have deflexed wings, mostly dust coloured, always having the transverse waved line obsolete, glossy.” “The white marked Noctua.” The *porphyrea*, Schiff. “The purple-brown, dark sprinkled noctua,” p. 83, is not this species.

Esper's fig. 1 on pl. 152, *Abbild.*, IV, is recognisable as this species and is named *concinna*.

Ernst and Engram., *Pap. d'Eur.*, VI, fig. 340 (1788), give two fairly good figures of this species, which they call the *birivia*, Schiff.

Bork., *Naturg. Schmett.*, fully describes the *birivia*, Schiff. “The white-marked owl-moth,” and identified the *concinna*, Esp., as a form of it. He refers to the *varia*, de Vill., as this species.

Illiger, *Neu Ausg. Verz.*, I, 203 (1801), recognises the *concinna*, Esp., as a *birivia*.

Hübner gives 2 figures labelled *birivia*, *Samml.*, 42 (1802), and 631 (1818), neither of which is the *birivia* of Schiff. which Illiger, who had access to the collection of Schiffermueller indicated in the purplish winged moth with “whitish” markings, *concinna*, Esp., only half the size of wing of Hübner's fig. 42, which he, in his text, *Noct.*, p. 169,



attributes to Schiff., and which Ernst and Engram. pictured in fig. 340. Hübner's fig. 631 is quite another species and cannot be confused with the *birivia*, Schiff., nor with his own *birivia*, fig. 42. Whereas Hübner's figs. 93 and 473, labelled *porphyrea*, are undoubtedly the *birivia*, Schiff. under the name *porphyrea*, Hübner gives two excellent figures of the *birivia*, Schiff., figs. 93 and 473.

Dup., *Hist. Nat.*, VI, 400, pl. 100, 4 (1825), gives an excellent figure. He confuses his early references.

Steph., *Ill.*, III, 19, considers this species sufficiently distinct to be placed in a separate genus, which he describes under the name *Scotophilila*.

Ochs. and Treit., *Schmet. d. Eur.*, V (1), 191, *birivia*, "the white-marked owl-moth," and V (2), 73, *porphyrea*, "the purple-brown, dark sprinkled owl-moth," seemed to have confused the references and the two species, which are abundantly different in size, colour, and marking. Possibly they were influenced by the *Text* of Hübner, which refers the figures 93 and 473 to the *porphyrea*, Schiff., and to the *birivia* described by Borkhausen, "the red-brown white-marked owl-moth." No doubt a confusion. In fact Borkhausen describes the *birivia*, Schiff., very fully and emphasises it by references to figures in Ernst and Engr., *Pap. d'Eur.*

Wood, *Ind. Ent.*, 56, pl. 13, f. 286 (1834), gives a very sparsely marked fig.

Freyer, *Beitr.*, I, 109, pl. 34 (1828), gives a good figure, with the larva on heath.

Of Hübner's figures H.-S. notes, *Sys. Bearb.*, II, 347 (1846), that there is often a much brighter suffusion of rosy red. He refers the *lepida*, Esp., IV, pl. 73, 2, cited to this species by Treit., to be *perplexa*. He names the species *porphyrea*, Schiff., in error, but correctly cites *birivia* of Bork. In his *Syn. List of Noctuae*, p. 46, he cites the *amica*, Fab., 323, and also the *artemisiae*, Cram., and Donovan's, pl. 360, 1, a very good figure. He followed Cram. in quoting *artemisiae*, Cram., 396, a Surinam species; but Gn. considered it not in any way proved.

Hamp., *Lep. Phal.*, IV, 524 (1903), calls it the *porphyrea*, Schiff., in error, and he puts *concinna*, Esp., *ericae*, Haw., *suffusa*, Tutt, *picta*, Fb., *strigula*, Thun., and *marmorea*, Gras., as synonyms, which action proves that *porphyrea*, Schiff., the "purple-brown, dark-sprinkled owl-moth" is not the insect intended. He places it in the genus *Lycophotia*, Hb. He probably assumed that *porphyrea*, Hb., was the same as the *porphyrea*, Schiff., and made a double error in placing it in *Lycophotia*.

Meyr., *Hand.*, 95 (1895/6), uses *strigula*, Thun., with synonym *porphyrea*, Hb., in the genus *Agrotis*, and does the same in the *Revised Hand.*, 99 (1928).

South's figure, pl. 107, 1, *Moths Br. Is.*, I, is a fairly good one of a not very clear typical form.

Culot, *N. et G.*, I (1), 27 (1909), places *strigula*, Thun., at the head of the genus *Agrotis*, and on pl. III, 4-6, gives excellent figures of *strigula*, typical, of *marmorea* with decrease in the emphasis and amount of light markings, and of the *suffusa*, Tutt, with much fewer light markings.

Warr.-Seitz., *Pal. Noct.*, III, 41, gives the name *porphyrea*, Schiff., which it cannot be from the subsequent description, and states that the

*birivia*, Bork., is not the *birivia*, Schiff., which is contrary to all the evidence of early figures, the full and clear description made by Borkhausen and his references to Schiff., Esper, de Vill., and Ernst and Engr. The ♂ and ♀ figures of Seitz. are poor for typical with all the usual white markings dulled without any suggestion of the red-ground of the description in the text.

Of the Variation Barrett remarks:—"Slightly variable in the depth of the purple ground colour, in the amount of white upon the nervures, and in the distinctness of the white markings, most of which in some individuals become obscured, or more rarely obliterated, except that the orbicular stigma is constant and conspicuously white. There is, however, a strong tendency to climatic alteration in colour, which in the south of Scotland becomes a darker purple, and in the mountain districts dark purple-brown or purple-grey with a smoky hue. Those from the Shetland Isles are often much suffused with dark colouring and their markings obscured. Similar dark forms are found in mountain districts in Germany."

The Forms and Names to be considered are:—

- birivia*, Schiff. (1775), *Verz.*, 71.  
*porphyrea*, Schiff., *Verz.*, 83.  
 ab. *concinna*, Esp. (1786), *Abbild.*, IV, 500, plt. 152, 1.  
*strigula*, Thunb. (1788), *Mus. Nat.*, 72, fig.  
 ab. *varia*, Vill. (1789), *Linn. S.N.*, II, 276.  
*birivia*, Bork. (1792), *Naturg.*, IV, 206.  
*picta*, Fb. (1794), *Ent. Sys. Emend.*, III (2), 91.  
*?arnicae*, Fb. (1794), *l.c.*, 107.  
*porphyrea*, Hb. (1802-8), *Saml. Noct.*, 93, 473.  
*ericæ*, Haw. (1809), *Lep. Brit.*, 224.  
 f. *marmorea*, Gras. (1863), *Ann. Soc. ent. Fr.*, 312, plt. 8, f. 9.  
 ab. *suffusa*, Tutt (1892), *Brit. Noct.*, II, 89.  
 v. *astur*, Obthr.-Culot (1909), *N. et G.*, I (1), 27, plt. 3, figs. 4-6.  
 v. *nitescens*, Dnhl. (1925), *Ent. Zts.*, XXXIX, 120.

Tutt dealt with (1) the "bright red form with white markings," *strigula*, Thunb.; (2) the similar form, *porphyrea*, Hb.; (3) the pale red with paler markings, *marmorea*, Gras.; (4) the small dark purplish red, with a slaty tinge, *varia*, de Vill.; (5) the same form *concinna*, Esper; (6) ab. *suffusa*, large basal part reddish black, outer dark red, pale lines partly suppressed.

*birivia*, Bork., *Naturg. Schm.*, IV, 206 (1792).

ORIG. DESCRIP.—"Ground colour is a pale red-brown, which in some examples turns to purple colour. It is crossed by two white streaks of which the first is somewhat zig-zag, but the other is strongly bowed outwardly and has small teeth. Both are margined dark brown on their sides turned towards one another. Between these two are the usual stigmata, of which the first is very small, almost a point only, round, white and encircled by a brown line, but the other is reniform, white with a brownish centre, and only on the costal portion margined with brown. Below the first lies a long, narrow, white, brown edged clavi-form, which arises from the first transverse line. Parallel with the hind margin near this runs a white line. The fringes are brown and white

chequered. Between the two transverse lines and the apex of the wing, the costal margin is white dotted. The hind-wings are unicolorous ashy coloured."

The figure references are to Ernst and Engr., *Pap. d'Eur.*, fig. 340, and to Esper's *concinna*, *Abbild.*, pl. 152 (73), 1, and to the *Verz.* of Schiff., 71 (1775).

*picta*, Fab., *Ent. Sys. Emend.*, III (2), 91 (1794).

ORIG. DESCRIP.—“*N. cristata* alis deflexis purpureis; strigis punctisque albis; quibusdam nigro marginatis.”

“Corpus griseum abdomine purpureo segmento penultimo flavo. Alae anticae purpureae maculis punctisque plurimis, albis, nigro marginatis. Macula ordinaria reniformis pone medium lunula purpurea et pone hanc strigae tres albae, posticis duabus macularibus, nigro punctatis. Posticae fuscae. Subtus cinereae, purpureo mixtae.”

Undoubtedly the description of this species.

*arnicae*, Fab., *Sys. Ent. Emend.*, III (2), 107 (1794) [quoted as *amicae* in error by H.-S.].

ORIG. DESCRIP.—“Alae anticae cinereo fuscae lineola baseos nigra, tunc striga undata, albida, in medio puncta duo alba, quorum alterum orbiculatum, simplex, alterum acuminatum, nigro marginatum, pone hoc macula reniformis,” etc. May be (*porphyrea*, *strigula*) *birivia*.

*ericae*, Haw., *Lep. Brit.*, 224 (1809).

ORIG. DESCRIP.—“ (The lover's knot) . . . Alae anticae cinereo-rufescentes, nigro nebulosae, costa nigro alboque punctata. Striga torta, sive lineolae albae nexae basi; tunc stigma rotundo-oblongum album, et reniforme cinereum albo-cinctum, atque teliforme cinereum; subtus haec lineola longa alba: tunc striga arcuata et dentata alba, strigaeque alia lineolarum albarum juxta marginem posticum; ordine punctorum nigrorum in ipso margine, ciliis rufescentibus,” etc. “Habitat in Ericetis.” This is no doubt the species we have known as *porphyrea*, *strigula*, etc.

ab. *astur*, Culot, *Noct. et G.*, I (1), 28 (1909).

ORIG. DESCRIP.—“It has the markings suppressed like *suffusa*, but the ground colour is a mixture of yellowish and reddish suffusion.” Asturias.

v. *nitescens*, Danhl., *Ent. Zt.*, XXXIX, 120 (1925).

ORIG. DESCRIP.—“In the upper Bavarian moorland among various forms of the South Tyrolean alpine race there were numerous dark grey *strigula*, tolerably uniform in character, in which the white markings were curtailed and covered up, the black brown element being also restricted, but in which the claviform stigma had completely disappeared. On the otherwise dark ground colour the white, but sometimes small, orbicular stands out bright.”

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*Agrotis*, Ochs.-Treit. (1816-25). Most writers. [*Rhyacia*, Hb. (1822) Warr.: *Lycophotia*, Hb. (1822) Hamp.: *Hapalia*, Hb. (1822) South: *Actebia*, Steph. (1829)] *praecoex*, L. (1758).

In the short orig. descrip. of Linn., *Sys. Nat.*, X ed., 517 (1758) no mention is made of the typical colour (green) and there was long a doubt

whether this species was the *praecox* of Linn. But in the reference Linn. gives to Rösels, *Abbild.*, I, Class II, pl. 51 (1746), an excellent figure of this species is convincing. See Illig., *Neu Verz.*, I, 275 (1801), who states that the description in Rösels says "ashy-grey" although it is like the Linn. description in other respects. Schiff., *Verz.*, 82 (1775), gave the name *praeceps* to a "pale green, brown margined owl moth," but as Illig. says, "they are without doubt variant forms of the same species."

Bork., *Naturg.*, IV, 434 (1792), says that *praeceps* may be a species, but probably is only a form of *praecox*. He describes the *praecox* (430) with ground colour "ashy-grey" and all the markings are described in detail but no mention is made of a green ground colour. The references he gives, to de Vill., Fabricius (3), Maders, etc., all name it "the red-bordered." Bork., *l.c.*, 433, then describes *praeceps* having exactly the same markings, but with the ground colour green.

Tutt, *Brit. Noct.*, II, 90 (1892): Barrett, *Lep. Brit. Is.*, III, 365, pl. 134 (1896); Stdgr., *Cat.*, III ed., 153 (1901): Hamp., *Lep. Phal.*, IV, 578 (1903): Splr., *Schm. Eur.*, I, 164, pl. 35 (1905: South, *M.B.I.*, I, 211, pl. 107 (1907): Warr.-Seitz., *Pal. Noct.*, III, 56, pl. 13g (1909): Culot, *N. et G.*, I (1), 92, pl. 15, 14 (1909): Corti-Drdt.-Seitz., *Pal. Noct. Supp.*, III, 82, pl. 12e (1933).

Hübner's figure, *Samml. Noct.*, 70 (1802), is named *praeceps* and is of a "blue-green" colour. He gives no text. Most of the standard authors give very good or excellent figures. Rösels, *Abbild.*, Class II, pl. 51; Panzer, *Fn. Ins.*, XIV, 104; Esper, *Schm. Ab.*, IV, pl. 168; Ernst and Engr., *Pap. d'Eur.*, VII, 466; Hübner, *Samml.*, 70; Godart, *Hist. Nat.*, V, pl. 73; Freyer, *Neu. Beitr.*, VII, pl. 614; Barrett, *Lep. Br. I.*, III, pl. 134; Spuler, *Schm. Eur.*, I, pl. 35; South, *M.B.I.*, I, pl. 107, 4; Seitz., *Pal. Noct.*, III, pl. 13g; Culot, *N. et G.*, I (1), pl. 15.

Of the Variation Barrett writes:—"Extremely constant in colour and marking, but I have seen a specimen from the N. of Ireland in which the subcostal, median and sub-dorsal nervures of the fore-wings are darkly coloured, so that three very straight, nearly equal lines extend almost the whole length of the wings. Mr F. N. Pierce has an exquisitely lovely variety taken near Liverpool, pale green throughout, with but faint traces of the usual markings."

Warr.-Seitz., *Pal. Noct.*, III, 56, treats *praeceps*, Schiff., as a synonym of *praecox*, L.

The Names and Forms to be considered are:—

*praecox*, L. (1758), *Sys. Nat.*, Xed., 517.

ab. *praeceps*, Hb. (1802), *Samml. Noct.*, 70.

ab. *flavomaculata*, Graes. (1888), *Berl. Ent. Zeits.*, 323.

ab. **signata-deleta**, nov. ab. [Barr., *Lep. Br. Is.*, III, pl. 134, f. 2b.]

Tutt deals with (1) the *praecox* form of Linn., (2) the bluish green *praeceps* of Hb.

ab. *flavomaculata*, Graes., *Berl. Ent. Zt.* (1888) 323.

ORIG. DESCRIP.—"The ground colour of the fore-wings is not so pale a green as in *praecox*, but running more bluish and darker; the stigmata which have, in the specimens of the typical form before me, a

particularly pale green coloration, are in this local form unicolorous and an intensive ochre yellow colour and stand out much sharper from the bluish ground colour. The hind-wings, which in *praecoæ* have a quite pale grey coloration, are here much darker, unicolorous black grey, and the underside is much darker ashy-grey than in the European examples." Amur. ♂ and ♀.

ab. **signata-deleta**, ab. n. (Barret, *l.c.*).

Barrett refers to a form in which the usual markings are practically absent so that the ground colour is of a nearly uniform green. Perhaps such may be named *signata-deleta*.

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*Triphaena*, Ochs. & Treit. (1816-25), Hb. (1822). Most authors. [*Agrotis*, Ochs. & Treit. (1816-25), Stdgr., Splr., Culot] *interjecta*, Hb. (1808-18).

Hübner used Ochs. generic name.

Tutt, *Brit. Noct.*, II, 91 (1892): Barr., *Lep. Br. Is.*, IV, 13, plt. 138, 2 (1897): Stdgr., *Cat.*, III ed., 135 (1901): Spl., *Schm. Eur.*, I, 144, plt. 32, 9 (1903): Hamp., *Lep. Ph.*, IV, 628, fig. 114 (1903): South, *Moths Br. Is.*, I, 234, plt. 116, 3 (1907): Warr.-Seitz., *Pal. Noct.*, III, 63, plt. 15a (1909): Culot, *N. et. G.*, I (1), 31, plt. III, 17 (1909): Corti-Drdt.-Seitz., *Pal. Noct. Supp.*, Noct. III, 90 (1933).

Tutt says, *Brit. Noct.*, II, 91, that Hb., fig. 107, is "of a very dull reddish-brown colour (almost grey)." In my copy of Hübner the colour is, as Newman, *Brit. Moths*, 340, says, "rusty brown (sometimes) inclining to brick-dust red." In looking through a large number of British examples I find "grey" suffused ones are the exception and rare. This seems to show again that the figures in copies of Hübner's works do not agree with one another; possibly they were executed by Hübner's pupils in some copies, as no doubt the plates were issued and reissued as demands increased. Hampson's description, *Lep. Phal.*, IV, 628, "yellow-brown or reddish-brown" is perhaps the more accurate.

Warr.-Seitz., *Pal. Noct.*, III, 63, says of the typical form "greyish rufous," which our British examples are rarely coloured.

Warr.-Stz., plt. 15a, and Splr., plt. 32, 9, are dull intermediate between the greyish and reddish forms. A specimen I have from the Alps, although somewhat worn, is of the reddish, not greyish, colour of forewing. Godart's fig. 1, plt. 59, *Hist. Nat.*, is a very good one, overlooking the accidental colour of the hind-wings of all the *Triphaena* figures on the same plate, they being pink instead of yellow. South's fig., *M.B.I.*, plt. 116, 4, is of the "dull reddish brown" and not typical of the usual British form. Freyer's figure, *Neu. Beitr.*, IV, plt. 292, is too large, very incorrect in the narrow black band of the hind-wings, such as never occurs in typical *interjecta*, and as the text and figure indicate red brown, it might possibly have been drawn from a southern specimen.

Of the Variation in this species Barrett says:—"Hardly variable, except in the depth of colour of the dark brown transverse shades, which sometimes are scarcely perceptible; and a little in intensity of the black







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