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THE
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OF

GENERAL ENTOMOLOGY.

EDITED BY RICHARD SOUTH, F.E.S.

WITH THE ASSISTANCE OF

ROBERT ADKIN, F.E.S.

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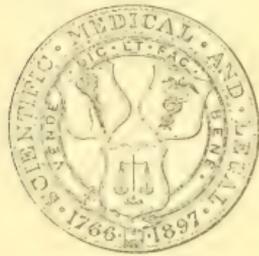


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CORRIGENDA ET ADDENDA.

- P. 17, l. 3 from bottom, for *flavilinata* read *flavilineata*.
- P. 24, l. 2 from top, for Aisne read Ain.
- P. 63, l. 14 from bottom, for Coxhame read Coxhorne.
- P. 64, l. 8 from top, for Freitschke read Treitschke.
- P. 64, l. 16 from bottom, for when and how read where and how.
- P. 79, l. 32 from top, for Cartier read Carlier.
- P. 120, l. 6 from bottom, for Nander read Van der.
- P. 212, l. 22 from top, for *asterius* read *asterias*.
- P. 224, l. 16 from bottom, for duly read duty.
- P. 226, l. 35 *et seq.* from top, for *Euphocades* read *Euphœades*.
- P. 226, l. 11 from bottom, for *ajax* (*turnus*) read *ajax*; *turnus*.
- P. 228, l. 20 *et seq.*, from bottom for *Benzoni* read *Benzoin*.
- P. 240, l. 3 from bottom, for ♂ read to.
- P. 241, l. 2 from top, add a comma after lighter.
- P. 241, l. 5 from top, after lighter add than.
- P. 241, l. 6 from top, after diminishing add much.
- P. 241, l. 18 from top, for dark brown read light brown.
- P. 252, l. 20 from top, for *auronitens* read *aurconitens*, Seitz.
- P. 267, l. 12 from top, momento read memento.

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ON THE HYBRIDS OF THE GENUS *OPORABIA*, WITH SOME NOTES ON ITS MICROGENES.

BY J. W. H. HARRISON, B.Sc.

THE genus *Oporabia* is a very old group, and one which, in spite of the fewness of the species included therein, it is very difficult to understand. This difficulty arises from the fact that, being hide-bound so to speak by the Linnean conception of a species, students of the group are unable to decide upon what constitutes a species within it. Grant the validity of the Jordanian species, and the indecision vanishes. Jordan looked upon each Linnean species as "une espèce collective," comprising within itself several "little species," or, as I call them, "microgenes." Each of these microgenes will stand the critical test of breeding true, and, in many cases, is differentiated structurally—very slightly, of course—from its neighbours. I have adopted the name "microgene" in preference to either "subspecies" or "local race," because the labours of Fruhstorfer and others have reduced the name "subspecies" to represent an entity of almost no value; on the other hand, these microgenes are not local races in any sense of the word. Well-known examples of genera, containing within their limits species with hosts of microgenes, are the plant genera *Hieracium*, *Rosa*, *Rubus* and *Mentha*; no one would dream either of calling *Rubus argentatus* a local race of *R. fruticosus*, or of recognising in *Rosa dumetorum* a local race of *R. canina*.

In my view the Linnean species *Oporabia autumnata* (Bkh.) comprises, in this district, four microgenes. These are *O. autumnata* (sens. strict.), *O. alticolaria*, *O. pinivoraria* and *O. filigrammaria*. Similarly, locally, we find *Oporabia dilutata* (Bkh.) containing three forms of the same value, viz. *O. dilutata* (sens. strict.), *O. fraxinaria* and *O. christyi*. The importance to be attached to these forms has been hopelessly obscured in the past, not only in this genus but also in other Lepidopterous

genera, by the energies of various "name-mills"—energies that have led to a large amount of cross classification, for we have included within the same aberration parallel forms of several microgenes. Details regarding the various forms are in tabular form at the end of the paper.

Let me return, for the sake of illustration, to the plant genera enumerated above, the microgenes of their several species having been so systematically worked out by Babington, Baker, Jordan, Sudre, Dumortier, and other equally well-known botanists. Possibly not one half of the named forms described in these genera have the slightest claim to be regarded as "species," but are hybrids between the various microgenes, as has been experimentally proved in certain cases. These hybrids, naturally, are in many instances intermediate to two well-defined microgenes, and transition forms crop up and provide the causes of so much apparent variation within the limits of the Linnean species. Such spurious transition forms give then, in the absence of Mendelian dominancy, what appear to be cases of continuous variation; when viewed correctly they prove the opposite.

In spite of this continual hybridising with allied forms the microgenes are not swamped, and continue true to type, proving that they are, at least, of greater value than the hosts of named "aberrations." The form which, for the sake of convenience, I have labelled *O. pinivoraria* surrounds here a colony of *O. autumnata vera* (or, to use the trinominal nomenclature now so popular, *O. autumnata autumnata*), and is overlapped by *O. filigrammaria*. Nevertheless, the three forms, year after year, remain quite distinct; so too do *O. alticolaria* and *O. filigrammaria*, which also overlap.

Turning now to the Linnean species, it becomes necessary to give my definition of what is included in the term. In my own mind I define a Linnean species as a form which, hybridised with a form of equal value, yields progeny which, when paired *inter se* or crossed with either parent, is more or less sterile; in some cases the first cross is sterile. In addition, in the Insecta, I attach great importance to the genitalia.

That *Oporabia autumnata* and *O. dilutata* are Linnean species my experiments confirm, but the proofs obtained from other considerations have been ably worked out by Prout (Ent. March, 1900; Trans. City of London Ent. and Nat. Hist. Soc. 1899). It is not necessary, therefore, to repeat what he says here. The phylogeny of the two species is very clear, and may be readily worked out in several ways. *O. autumnata** is Holarctic, whilst *O. dilutata** is practically confined to the Palæartic

* In this paragraph it will be understood that the names "*dilutata*" and "*autumnata*" are used in the Linnean (collective) sense, and also at other points where no confusion is likely to arise.

region. From this fact alone it is easy to see that, in all probability, *O. autumnata* is the older form, a statement that is confirmed by the fact that both ova and larvæ of *O. dilutata* are more specialised, and its genitalia slightly more complex, the valves possessing a strong spine.

Owing to the attraction which difficult species possess for those of an enquiring nature, attempts to hybridise these two forms by other observers were made several years ago, but proved unsuccessful. Becoming interested in these unsuccessful attempts, and having gained experience in my very successful experiments with the *Bistoninæ*, I determined to repeat the trials. For that purpose I reared a large number of imagines from local ova of *autumnata*, but my first attempt proved futile, for the microgene *pinivoraria* was chosen, and this emerges in mid-September and is quite over by the end of the month; *dilutata vera* does not emerge until mid-October. The experiments had to be postponed until the following year, when use was made of imagines of the form *alticolaria*, which emerge over a period extending from late September to late October. Retarding or forcing has little or no effect in this genus, and one must use microgenes emerging at the same time. These preparations were not in vain, as, when the first *dilutata* emerged in October, 1912, I had both sexes of *alticolaria* already in the cages. The *dilutata* males, as they emerged, were placed with *alticolaria* females, and *vice versa*. Successful pairings were secured at once; these differed, in the case of *dilutata* ♂ × *autumnata* ♀ crossing, from normal pairings of the two parent species, inasmuch as, instead of separating after a few minutes, the pairs remained *in cop.* for twenty-four hours. Eggs, however, were freely laid as a result of both cross-pairings during the second night, and very soon displayed their fertility by turning salmon-pink in the case of ova laid by *autumnata*, and dull ruby red in the reverse case. These ova remained unhatched until the following April, when practically every egg yielded a larva.

The larvæ were offered hawthorn, and this food they adopted. In habit the larva resembled, in both cases, those of *autumnata*, for they ate ravenously and stuck close to their food, displaying none of the tendency of *dilutata* larvæ to wander. Description of the larvæ is quite unnecessary, because they bore every character of *dilutata vera* larva superimposed on those of *alticolaria*. In none of my numerous experiments have I had such a perfect combination.

Pupation took place in early June, and I naturally expected the pupæ to æstivate for four months like those of their parents, but such was not to be the case with all; sixteen days after pupation a female imago emerged in the *dilutata* ♂ × *autumnata* ♀ pot. This was quickly followed by a number of others, all

females. Six weeks elapsed, and, as no other moths emerged, I dug up the remainder of the pupæ in this pot and also all of those in the other; practically every pupa was sound and healthy. They were, therefore, laid aside, packed in moss as usual, and a strict eye kept on them, but no further emergences occurred until October, *i.e.* the normal time for the parents, when the remainder of the *dilutata* ♂ × *autumnata* ♀ cross came out and proved to be all males. The imagines of the reciprocal cross emerged almost at the same time, and yielded the sexes in equal proportions. In the case of the *dilutata* ♂ × *autumnata* ♀ the sex proportions were 7 to 1 in favour of the females.

The imagines were curious-looking objects, which it is impossible in many instances to describe or figure. I shall confine myself, therefore, to the consideration of the points usually relied upon, when present, to separate the two species.

I.—OPORABIA HYBRID ROBSONI = O. DILUTATA ♂ × AUTUMNATA ♀.

The *dilutata* males used to produce this cross were of the melanic form, and the result has been that, in the case of the females, the melanism has almost obscured the markings; on the contrary the males, although possessing a rather brownish grey ground, are rather strongly and clearly marked. These facts are of some significance, for it seems as if some cross inheritance has occurred, for in the present forms, no matter how melanic the specimens, the females are generally clearly marked, whilst the males often bear confused markings.

It is absolutely certain that if the hybrid males were taken wild and no preparations made of the genitalia, they would be set down as a form of *autumnata* very little removed from the ordinary; just as certainly, except for the white V, derived from *autumnata*, at the junction of vein two with the cell, the females would be regarded as *dilutata*, although this *dilutata* appearance may be the result of the melanism present. I shall now proceed to point out the distinctive characters of hybrid *robsoni*:—

- (1) *The male antennæ.* The male antennæ are distinctly intermediate between the fine antennæ of *autumnata* and the more coarsely jointed ones of *dilutata*.
- (2) *Line bounding basal area.*
 - (a) Male. Distinct, and forms a right angle as in *autumnata*.
 - (b) Female. More rounded and nearer *dilutata*.
- (3) *Band between basal line and that bounding central area.*
 - (a) Male. Practically obsolete or forming a suffusion as in *autumnata*.
 - (b) Female. More band-like, as in *dilutata*.

(4) *Elbowed line.*

(a) Male. Almost as direct, and forming as perfect a right as in *autumnata*.

(b) Female. More or less waved, and, as it bends, almost curving to the discal spot, as in *dilutata*.

(5) *Subterminal band.*

Male. Too confused to describe, but characters intermediate.

Female. Almost a solid block; inwardly rounded, as in *dilutata*.

(6) *Discal point.*

Male. Sharp and clear; not touched elbowed line; almost as in *autumnata*.

Female. Confused; generally united to elbowed line.

(7) *Terminal band of hind wings.*

Male. A solid smoky block.

Female. Somewhat similar, but scallops of *dilutata* quite visible.

(8) Both sexes have the white V at the junction of vein two with cell well-developed. This stands out very clearly in the darker suffused female.

(9) *Genitalia.*

Male. Spine on valve developed, but small; head of labides intermediate. Cristæ on juxta eleven as in *alticolaria* (*autumnata vera* has nineteen). Shape of valve irregular. Costal ridge doubled.

Female. Upper signum* of bursa copulatrix knobbed and intermediate. Lower peg-shaped, as in *dilutata*.

(10) In other characters where the species differ, *i.e.* shape, size, &c., the male is slightly nearer *autumnata*, and the female more or less intermediate.

II.—OPORABIA HYBRID RUNGEI = O. AUTUMNATA ♂ × O. DILUTATA ♀.

In the case of this cross, moths of the same parentage as those used for the reciprocal cross were employed. The product, however, is totally different. Except that the white V so prominent in *robsoni* is absent, the two sexes would pass for suffused *autumnata* with more or less confused markings, this suffusion being somewhat weak, and the result of the melanism inherited from the female parent. In both sexes there is a general out-of-focus effect, giving the impression that we have here a blurring due to a failure in securing the exact superimposition of two images, such as one often sees in colour printing.

The genitalia in both sexes show the same tendencies as in *robsoni*, but the divergence from *autumnata* is not so great.

* Pierce ('Genitalia of the Geom.,' p. 41) is wrong in saying that the signa are discoid. In both *dilutata* and *autumnata* the upper one is knobbed, scobinate; in *autumnata* the lower is discoid, and in *dilutata* peg-shaped.

CONCLUDING REMARKS.

The outstanding features of these experiments are as follows:—

(1) The acceleration in development of the females in the *dilutata* ♂ × *autumnata* ♀ cross.

(2) Only these females showed melanism in this cross.

(3) Apparently *autumnata* is more potent in affecting the products. That the hybrid origin of a form has the effect of hastening its development in the pupal stage, in some cases in one sex only, in others in both, has been known for a long time. One of the first points to which the earlier experimenters with *Smerinthus hybridus* drew attention was this very fact, and the same observation was made by Standfuss in the case of his *Drepana* and *Clostera* hybrids, and by myself with the *Biston*—*Ithysia* crosses.

No satisfactory suggestions as to the cause of this displacement have ever been made. That we have to look to the disorganisation of metabolism due to hybrid origin is perfectly clear, but how this is brought about is certainly not obvious.

Cytological observations have shown that, in the case of hybrids between species in which the number of homologous chromosomes is small, gametogenesis occurs without reduction division, so that in the gametes of the hybrid insects we have nearly the somatic number of chromosomes present. This mode of formation of gametes may be accomplished at a much greater speed than in the case of a pure species, a feature that may be accompanied by a correspondingly earlier somatic development; hence an earlier emergence of the insect than is usually the case may be expected.

A point, too, that possibly has some bearing on the case is that, when some species are rapidly forced, a rapid appearance of the imago is accompanied by immaturity of the sexual products.* Possibly, then, the degenerate nature of the germ cells, especially visible in some hybrid females, may react on the somatoplasm and induce a precocious development of the soma. The ova of the accelerated females of *robsoni* are defective, as dissection and subsequent microscopic examination prove.

(To be concluded.)

SOME NEW MELANIC *EUPITHECIA* ABERRATIONS.

By LOUIS B. PROUT, F.E.S.

MR. G. B. OLIVER, of Wolverhampton, has sent for my inspection some very interesting melanic *Eupithecia*, representing in part species in which—so far as my knowledge goes—extreme

* As in the case of *Deilephila elpenor* in my own experiments.

melanism has never yet been described, although there are one or two general remarks in our literature to the effect that the phenomenon seems widely spread in the genus, and one or another of the forms described below may be already known to individual entomologists.

Eupithecia nanata ab. *oliveri*, n. ab.

Fore wing black with a tinge of brown, especially in the areas which in pale *nanata* usually show brownish clouding, namely, near the apex, and more particularly between the third radial and second median veins; cell-mark deeper black; a few whitish scales, indicating the position of the pale postmedian band; an extremely slender, inconspicuous, interrupted, subterminal whitish line, ending in a very slender V-shaped mark near the tornus. Hind wing equally black at inner margin, slightly less so anteriorly; whitish subterminal line weakly indicated. Under surface nearly uniform smoky-blackish, glossy. Thorax and abdomen black. Warwickshire—the type (♀) bred from larva, June 27th, 1914, by Mr. Oliver, who tells me he believes Mr. L. W. Newman also bred one two years ago from pupæ with which he supplied him.

Eupithecia lariciata ab. *nigra*, n. ab.

Uniform sooty-black with deeper black cell-mark and veins, the hind wing not quite so deep in tone, the veins consequently showing up more sharply; basal dark markings of fore wing extremely faintly indicated. Under surface unicolorous dark grey, the veins scarcely differentiated. Thorax and abdomen black, without the characteristic white spot. Warwickshire—the type captured June 12th, 1914, by Mr. Oliver's son. A second example was met with last spring, but was too worn to set. Except for the slight differences of wing-shape, this form would be virtually indistinguishable from *E. tripunctaria* (*albipunctata*) ab. *angelicata*, &c.

Eupithecia innotata ab. *unicolor*, n. ab.

A small second-brood form of an almost absolutely unicolorous dark grey, the fore wing with deep black discal mark, the costa of the fore wing and inner margin of hind wing with very faint indications of darker spotting; on the fore wing, in addition, the position of the angulated postmedian line is just discernible through a slight darkening of veins SC⁴, R¹, and R², just proximally to it, and an entire interruption of the darkening distally thereto (where the first outer pale line would cross the said veins), and there is a faint row of pale lunules indicating the subterminal. The type (♂), bred in August, 1914, from a Durham strain provided by Mr. J. W. H. Harrison. The second-brood specimens (known on the Continent as ab. *fraxinata*) are commonly darker and more weakly marked than the first brood, but this extreme development is new to me.

In addition, Mr. Oliver has obtained in his district *E. castigata* ab. *obscurissima*, Prout (Seitz, *Macrolep.* iv. p. 287), though not of quite such a deep black as my types, and a rather dark brownish form of *Gymnoscelis pumilata*.

SOME INTERESTING RHYNCHOTA FROM BRITISH INDIA.

BY W. L. DISTANT.

In the second volume of the 'Rhynchotal Fauna of British India' (p. 206) I described a new genus and species of Reduviidæ (*Eugubinus araneus*) found living in the nest of a spider (*Theridium* sp.) near Bombay. This was an immature form of the species, as might be gathered from the descriptive word "apterous." I have since received two other species from the Calcutta Museum, both of which are found in webs of spiders (*Cyrtophora cicatrosa*, Stolickzka). These are new but closely allied species, as shown by the following comparative key:—

1. Anterior lobe of pronotum a little shorter than posterior lobe.
 - A. Anterior femora moderately slender, finely spinose.
 - B. Rostrum with the first and second joints strongly incrassated.
 - a. Apices of posterior femora black.
 - b. Head and pronotum fuscous with central pale longitudinal lines *E. reticolus*.
2. Anterior lobe of pronotum about as long as posterior lobe.
 - AA. Anterior femora moderately robust, strongly spinose.
 - BB. Rostrum with the first and second joints moderately incrassated.
 - aa. Apices of the posterior femora greyish-white.
 - bb. Head and pronotum black *E. intrudans*.

Eugubinus reticolus, sp. n.

Head and pronotum fuscous-brown, head in front of eyes blackish; a central pale greyish longitudinal line traversing post-ocular area of head and pronotum, the latter with its posterior lateral margins also greyish; antennæ black, annulated with greyish-white; hemelytra pale fuscous brown, the basal costal margin greyish; abdomen blackish, its apex and segmental spots pale ochraceous or greyish white; legs blackish, strongly annulated with greyish-white, apices of the posterior femora black; head with the antecular area shorter than the postocular, head distinctly constricted at base, eyes greyish-white, large and prominent; rostrum reaching the anterior coxæ, first and second joints strongly incrassated and almost subequal in length; antennæ slender, first joint about as long as head and thorax together; pronotum with its anterior lobe a little shorter than posterior, broadest and truncate anteriorly, attenuated posteriorly; anterior coxæ scarcely more than half the length of anterior femora, which are armed beneath with short greyish spines; hemelytra not extending to abdominal apex. Long. 13 millim.

Hab. Calcutta; salt lakes below Chingrighatta.
From webs of *Cyrtophora cicatrosa*, Stolickzka.

Eugubinus intrudans, sp. n.

Head and pronotum black; antennæ black, annulated with greyish-white; hemelytra piceous; abdomen black, its apex and

segmental spots greyish-white or pale ochraceous; legs blackish, strongly annulated with greyish-white, apices of the posterior femora greyish-white; head with the antecular area shorter than the postocular, and distinctly constricted at base; eyes dull greyish, large and prominent; rostrum reaching the anterior coxæ, first and second joints moderately incrassated; antennæ slender, first joint about as long as head and thorax together; pronotum with its anterior lobe about as long as posterior lobe, broadest and truncate anteriorly, gradually attenuated posteriorly; anterior coxæ distinctly more than half the length of anterior femora, which are more robust than in the preceding species (*E. reticolus*), and more strongly darkly spinose; hemelytra not extending to abdominal apex. Long. 13 millim.

Hab. S. India, Cochin State, Ermakulam.

From webs of *Cyrtophora cicatrosa*, Stolickzka, at dusk.

NOTES ON THE LARVAL AND PUPAL STAGES IN SOME OF THE SESIIDÆ.

BY COLONEL R. H. RATTRAY.

In 'Entomologist,' vol. xlv., pages 94 and 95, appeared an article by Lieut.-Col. Nurse on "The Duration of the Larval Stage in some of the Sesiidæ," expressing a hope that some other naturalists would give the results of their experiences. During the early part of the present year I gave up my whole time to these most fascinating insects. I therefore give my notes for what they are worth.

Sesia cynipiformis and *culiciformis* are quite common, and *Trochilium crabroniformis*, *S. andrenæformis*, *tipuliformis*, and *myopiformis* fairly so, but owing to nature of food-plant difficult to obtain.

As regards *T. crabroniformis*, I am of opinion that the larval stage extends beyond one year, but not more than two years. I have seen a large number of larvæ both full-fed and half-grown, but never any quite small ones, such as there would be if the stage lasted three years. Numerous woods were cleared during the winter of 1913-14. I searched them carefully, and interested the woodmen in the matter, with the result that I obtained some fifty larvæ. I found that all full-fed larvæ had cut exit holes and spun up ready to pupate before December. I kept all larvæ found in their original sections of saw in moist sand. All that had spun up turned to pupæ, with two exceptions, about the end of May, and all but five emerged safely during the last ten days of June. Two died without turning to pupæ, and five failed to emerge. All larvæ—many appeared quite as large as those that had spun up—that were feeding continued to feed, but owing to wood drying eventually died.

None of the larvæ that died were small when found, and were very active, moving freely up and down their burrows. Of the seventeen that had already spun up not one showed any inclination to move about, but in one or two instances, when the lower portion of cocoon was damaged, the damage was at once repaired. It therefore seems that *T. crabroniformis*, here at any rate, spins up ready to pupate either in autumn or beginning of winter, and not in spring as stated by other writers. It seems, therefore, that those larvæ that do not spin up before December of one year continue to feed during the following summer, and have a two-year cycle at least from egg to perfect insect.

S. cynipiformis is the commonest of the Sesiidæ in this area of Kent. Numerous woods were cut down during the winter 1912-13, leaving stumps of old oak trees in the ground. These trees were all sawn off close to the ground, leaving some six to nine inches exposed and covered with bark. I inspected a large number of these stumps during March and April of this year, and again during June and late July. During March and April I took out some 120 larvæ of all stages, some quite small—less than a quarter of an inch—others apparently full-fed. All, large and small, had spun themselves into a cocoon at the end of burrow with frass round it. I put them into a zinc box with holes in it for drainage; filled box with some oak sawdust and large pieces of bark. This box I put into a tin, covering with a bell-glass. I put the whole on the hot-water tank of the house and left them there, constantly moistening the sawdust. I looked at them daily and found they had all tunnelled into the oak bark, and continued to feed, eventually pupated and emerged. I bred out on an average seventy-five per cent. of larvæ, large and small. At the end of April all larvæ in stumps had grown considerably. I repeated the operation with similar results, but with a larger percentage of moths successfully reared. During June I only found full-fed larvæ and pupæ. Towards end of July I only found empty pupa cases—not a single full one and no larvæ. From this we can be sure that Col. Nurse's deductions are correct—that the larval stage does not last over one year.

S. culiciformis is almost as common here in larval stage as the last. I overlooked numerous woods where birch trees had been cut down during the winter 1912-13, through the spring of 1914. From the beginning of February to the end of March I went out, stripped the bark of the stumps about once a week, and obtained over one hundred larvæ. All had spun up and were resting through the winter in their cocoons. I forced these in the same manner as I did larvæ of other Sesiids, and about seventy per cent. emerged within a month. When I searched for them during third week in April I found they were turning to pupæ, about fifty per cent. having already changed. I again

searched birch stumps during last two weeks of July, and failed to find a single larva or pupa. I also stripped numerous birch stumps during March that had been cut during the winter of 1911-12. I saw plenty of old burrows, but failed to find a single larva or pupa in them. From this I conclude *S. culiciformis*, like *S. cynipiformis*, has only a one-year cycle from egg to insect.

S. myopiformis, though not rare, is more difficult to obtain. I searched old apple trees and found ten larvæ that looked like being full-fed. This was in April. These I also forced, putting them in apple sawdust and bark; they pupated at once, and in due course emerged, eight nice specimens. At the same time I found on other apple trees some seven or eight smaller larvæ, obviously not full-fed. I endeavoured to rear these, but all died. Of these seven or eight larvæ some were about a quarter of an inch long when found, others up to half an inch, but I never found small, and what I considered to be full-fed, larvæ on the same branch or on the same tree. I again searched the trees on which I had found full-fed larvæ during the last week in June, but only found empty pupa cases. From this I conclude that the larval stage of *S. myopiformis* lasts longer than one year, and probably two years in all.

Not far from here I obtained thirty-five larvæ of *S. andreæformis* during April, 1914. I split open about half the sticks to examine the larvæ, closing them up again carefully. I kept the sticks in moist sand, and in due course bred out twenty-one imagines and three ichneumon. The remaining eleven larvæ fed for some time, but when the wood dried they came out of their burrows and crawled about cage till they died. These were almost as large as those that were full-fed. I also, in other sticks that I split without cutting from bush, saw some quite small larvæ less than a quarter of an inch long. I tied up twigs and left them. When first found the full-fed larvæ were fat, dead-white in colour, and resting head towards exit hole, but with no signs of cocoon. I did not see when they spun up, but one or two I looked at shortly before they emerged were in pupal stage. From the fact of finding larvæ in three stages, full-fed, large, and small, I think we may safely assume that the larval stage lasts at least two, and probably three, years.

Owing to feeding in stems of currant bushes, *S. tipuliformis*, though common, is hard to obtain. In the small extent of currant bushes to which I have access I found ten larvæ in April. Four died in larval or pupal stage and six emerged. All were found in bushes that had been heavily pruned the previous year, so the eggs could not have been laid or larvæ present earlier than 1913. No small larvæ were found anywhere in the garden; all were apparently same age. I do not think there can be any doubt that the life-cycle does not extend beyond one year.

During June I was searching some aspen trees for other larvæ. I noticed some lumps, or knobs, near end of twigs with suspicious holes and frass at exit. I opened two and found undoubted Sesiid larvæ between quarter and half an inch long. They were not larvæ of any Sesiid that I am acquainted with. Could they have been *S. tabaniformis*? They both died. I left other swellings, and if I am able to do so will again search next May or June. The twigs were not thicker above and below the swellings than an ordinary lead pencil; it is therefore unlikely to have been young *T. apiformis*, nor is *T. apiformis*, to my knowledge, found here.

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NEW SPECIES OF HETEROCERA FROM FORMOSA.

By A. E. WILEMAN, F.E.S.

NOCTUIDÆ.

Nyctipao albicincta obscura, ab. nov.

♂. Differs from the typical form in having dark brown fringes to all wings on both surfaces; the transverse lines on upper side are suffused with dark brown, especially those of fore wings.

Expanse, 116 millim.

Collection number, 1828.

A male specimen from Horisha, May, 1908.

Except in the characters referred to this specimen does not differ from *Nyctipao albicincta*, Kollar (Hügel's Kaschmir, iv., p. 474, pl. 22).

Bleptina bisectalis, sp. n.

♂. Head brown; thorax blackish, mixed with grey, front brown; abdomen brownish grey, blackish tinged on posterior edge of each segment. Fore wings blackish, streaked and powdered with brown on costal area up to postmedial line; median nervure, and branches up to postmedial line, white; antemedial and postmedial lines white, inwardly oblique, the postmedial slightly indented before the dorsum; discoidal lunule white; subterminal line pale, wavy; fringes blackish, marked with white, preceded by black triangular marks between the veins. Hind wings dark grey, paler on costal area; two pale slightly curved lines beyond the middle, the outer one serrate; black triangular marks on termen; fringes dark grey. Under side of fore wings whitish strongly suffused with fuscous, costal area tinged with ochreous brown; discoidal mark and serrate postmedial line blackish, subterminal line pale ochreous but only distinct towards costa: hind wings whitish speckled and clouded with brown, discoidal lunule black preceded by a black spot in the cell; two blackish serrate lines beyond the middle, each line outwardly edged with whitish.

Expanse, 40 millim.

Collection number, 1497.

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A male specimen from Arizan (7300 ft.), August 15th, 1905. There is a male, also from Arizan (Wileman), in the British Museum.

Allied to *B. ambigua*, Leech.

Bleptina centralis, sp. n.

♂. Head and thorax brown, grey mixed; abdomen whitish brown, darker on the posterior edges of segments. Fore wings brown with faint purplish tinge on the basal and terminal areas, medial area whitish sprinkled and clouded with brown; antemedial line black, slender, inwardly edged with white, almost straight; post-medial line black, outwardly edged with white, bluntly angled opposite the black discoidal lunule; subterminal line paler, wavy; terminal lunules black, fringes whitish brown marked with darker. Hind wings pale fuscous with traces of whitish transverse bands on the dorsal area. Under side whitish: fore wings suffused with fuscous brown; postmedial line black, excurved beyond the cell; discoidal dot black; subterminal line pale ochreous, only distinct on the costa where it is inwardly clouded with blackish: hind wings sprinkled with brown, chiefly on the costal area; discoidal lunule black, preceded by a black dot in the cell; postmedial line blackish, wavy, followed by a blackish interrupted band.

Expanse, 30 millim.

Collection number, 527.

One male specimen from Kaushirei, April 15th, 1908.

Near *B. descripta* Leech.

Bleptina persimilis, sp. n.

♂. Head and thorax brown, abdomen grey brown; antennæ fasciculate. Fore wings ochreous brown, basal area purplish brown; antemedial line purplish brown, nearly straight; medial line purplish brown, sinuous, outwardly shaded with brown; postmedial line (double) and subterminal line purplish brown, sinuous, the area between these lines shaded with brown; costal area between apex and subterminal line purplish brown; a black dot in the cell, two black dots at end of the cell with a third just beyond the lower, and a black spot in the first sinus of the postmedial line; terminal dots black. Hind wings pale fuscous brown, suffused with darker, a dusky discoidal mark and transverse line beyond; subterminal line whitish, broad and well-defined towards dorsum, faint towards costa. Fringes of all wings pale brown, marked with darker. Under side of fore wings pale brown suffused with darker; discoidal dot and line beyond darker: of hind wings pale brown sprinkled with darker; discoidal spot and curved line beyond blackish; subterminal line pale bordered with dusky.

Expanse, 34 millim.

Collection number, 1745.

Allied to *B. mimica*, Hampson.

A male specimen from Rantaizan, May 8th, 1909.

There is an example of each sex from Formosa (Wileman) in the British Museum.

Bleptina incisa, sp. n.

♂. Head and thorax grey mixed with brown, abdomen pale brown inclining to whitish. Fore wings creamy white, clouded with brown on middle of discal area; basal and terminal area black, the terminal deeply invaded by the ground colour about middle; discoidal mark black, lunular, some brown scales around it; terminal dots black, fringes pale grey darker towards apex of the wing. Hind wings fuscous grey with two paler bands. Under side whitish flecked with brown; fore wing with darker terminal area and black discoidal mark; hind wing with black discoidal lunule and black dot in the cell, ternal area barred with black.

♀. Similar but costal portion of black terminal area of the fore wings broader.

Expanse, 36 millim. ♂; 38 millim. ♀.

Collection number, 1466.

One example of each sex from Arizan (7300 ft.), August, 1908. Near *B. figurata*, Hampson.

Bleptina contigua, sp. n.

♀. Head and thorax white, brown tinged; abdomen whitish brown. Fore wings white, faintly striated with brown, basal fourth freckled with brown except on dorsum; postmedial line dark brown, subterminal line whitish, space between these lines densely, and beyond the subterminal sparsely, powdered with brown; black marks on termen, fringes grey marked with darker. Hind wings white, dusky on basal half; postmedial band dusky, terminal line black, fringes grey. Under side of fore wings fuscous brown, mottled with darker; hind wings whitish sprinkled with brown chiefly on costal area, a black discoidal dot and two dusky transverse lines beyond.

Expanse, 28 millim.

Collection number, 1466 A.

A female specimen from Rantaizan, May 4th, 1909.

Allied to *B. propugnata*, Leech.

Bleptina bidentata, sp. n.

♂. Antennæ ciliate with paired bristles at each joint. Fore wings blackish on basal and terminal areas, whitish clouded with black-brown on medial area; antemedial line black, interrupted, outwardly edged with whitish, turned inwards towards dorsum; post-medial line black, wavy, bidentate about middle, incurved below middle, inwardly edged with white; discoidal lunule black; sub-terminal line pale, sinuous; terminal dots black, fringes whitish marked with blackish. Hind wings light fuscous; discoidal spot blackish, two dark transverse bands beyond, both outwardly edged with whitish. Under side of fore wings dark fuscous, a quadrate pale patch at apex: of hind wings whitish flecked with fuscous;

antemedial and postmedial lines blackish, wavy, a blackish band beyond the postmedial line; discoidal spot black, set on the antemedial line, a black dot in the cell.

Expanse, 34 millim.

Collection number, 527 A.

One example of each sex from Arizan (7300 ft.) August, 1908. Near *B. propugnata*, Leech.

Bleptina terminalis, sp. n.

♀. Fore wings dull purplish brown at the base and area beyond the postmedial line; medial area pale ochreous brown, traversed by a dark brown shade; antemedial line brown inwardly edged with whitish, oblique, limiting the basal area; postmedial line whitish edged with dark brown, turned inwards below the cell to vein 2, thence oblique to dorsum; subterminal line dark brown, sinuous, marked with white on the costa; space between the postmedial and subterminal lines dull purplish brown, and beyond the subterminal lines rather paler brown; discoidal lunule black, the extremities only distinct. Hind wings fuscous brown, medial and postmedial lines dusky, whitish edged. Under side fuscous brown, paler on hind wings, in the cell and at apex of fore wings; the hind wings have a black discoidal mark, and blackish medial and postmedial lines, the postmedial is outwardly edged with whitish towards dorsum.

Expanse, 34 millim.

Collection number, 1008.

A female specimen from Arizan (7500 ft.), September, 1906. Allied to *B. curvilinea*, Leech.

Bleptina quadripuncta, sp. n.

Head, thorax and abdomen brown-grey, dappled with darker brown. Fore wings greyish, sprinkled and clouded with brown; antemedial line whitish, straight, outwardly bordered with dark brown; postmedial line whitish narrowly edged with dark brown, almost parallel with the antemedial; a black spot divided by a whitish X-like mark; the basal portion of the costa suffused with dark brown, two dark brown clouds on terminal area, dots on termen black. Hind wings pale fuscous, postmedial line whitish, terminal dots black. Under side pale brown sprinkled with darker, all wings have a black discoidal spot and a pale postmedial line, area beyond the postmedial darker except on the termen.

Expanse, 38 millim.

Collection number, 1484.

One example of each sex from Kanshirei, June 4th, 1908. Near *B. parallela*, Leech.

LASIOCAMPIDÆ.

Metanastria brunnea, sp. n.

♂. Head brown with greyish hairs; palpi dark brown, antennæ paler brown; thorax dark brown, collar darker; abdomen brown,

tail blackish. Fore wings brown, inclining to reddish, brown hair on the basal half; postmedial line double, blackish, wavy; subterminal line composed of eight greyish white spots, the 5th and 8th set further in than others of the series, all edged with dark grey, the 7th and 8th centred with dark grey. Hind wings paler brown faintly tinged with reddish on basal area; traces of a blackish medial band. Under side pale brown clouded and suffused with darker; all the wings traversed by a dusky band.

Expanse, 68 millim.

Collection number, 1829.

A male specimen from Rantaizan (7500 ft.), February 20th, 1909.

Allied to *M. purpurascens*, Moore.

Gastropacha taiwana, sp. n.

♂. Head, thorax and abdomen brown. Fore wings brown with a faint greyish tinge, darker on basal area; discoidal spot black, and traces of a diffuse dusky subterminal line. Hind wings dark brown, paler on dorsal area; fringes brown, tips whitish between veins. Under side of fore wings reddish brown, paler towards termen: of hind wings brown, clothed with whitish hairs thickly covering the dorsal area.

Expanse, 56 millim.

Allied to *G. khasiana*, Swinhoe.

The type, a male specimen from Rantaizan (Wileman), is in the British Museum.

GEOMETRIDÆ.

Pseudomiza aurata, sp. n.

♂. Head, thorax and abdomen yellow. Fore wings yellow, freckled with brownish; antemedial line brownish, curved and indented; costa from base to antemedial line orange, suffused with brownish; postmedial line blackish, oblique from apex to dorsum just before middle, shaded with purplish brown; apical area purplish brown with greyish suffusion, enclosing four subhyaline spots, the third spot small and the fourth large; discoidal spot blackish. Hind wings yellow freckled with brownish; medial band brownish, not extending to costa. Under side as above, but the costa of forewings without orange colour towards base.

Expanse, 50 millim.

Collection number, 1823.

One male specimen from Rantaizan, May, 1909.

Allied to *P. flavescens*, Swinhoe.

Pseudomiza aurata limbata, ab. nov.

♂. Head and thorax yellow, orange mixed, abdomen yellow. Fore wings yellow, slightly freckled with brownish; basal and terminal areas orange freckled and clouded with brownish, the outer limit of the basal area irregular and edged with brown at costa, the inner

limit of terminal area oblique to apex where are four subhyaline spots set on the outer edge of a grey suffused purplish brown patch; discoidal dot blackish. Hind wings yellow freckled with brownish; medial band brownish outwardly edged with orange, not extending to costa. Under side yellow with traces of the brownish markings of upper side, the subhyaline marks of fore wings rather larger.

Expanse 50 millim.

Collection number, 1823A.

One male specimen from Arizan, May, 1908.

Loxotephria taiwana, sp. n.

♀. Head and thorax brown, the latter yellowish mixed; abdomen brown, darker at base, paler below. Fore wings yellowish, finely dusted with purplish brown; antemedial and postmedial lines purplish brown, inwardly oblique, both apparently angled below costa, but costal extremity of the antemedial not distinct; angle of postmedial brown shaded; subterminal line pale, angled below costa, outwardly shaded with brown; terminal line and fringes purplish brown, the latter paler at base. Hind wings yellowish, dusted with purplish brown; two purplish brown lines, the outer expanding on the costa; terminal line and fringes as on the fore wings. Under side yellowish, slightly freckled with purplish brown; on the fore wings the dorsum is whitish and the terminal area purplish brown except at apex; tranverse lines of upper side indicated on all wings.

Expanse 30 millim.

Collection number, 1255.

A female specimen from Kanshirei, May 2nd, 1908.

Allied to *L. padanga*, Swinhoe.

Leucoctenorrhoe undulata, sp. n.

♂. Fore wings white, costal and basal areas clouded with ochreous brown; subbasal line indicated by black marks on the veins; discoidal spot black; postmedial line black, slightly wavy, bent outwards below costa and inwards below vein 5, followed by ochreous brown and greyish clouds towards costa and by a black mark about middle; terminal dots black. Hind wings white; antemedial and postmedial lines dusky, only distinct on the dorsal area; subterminal line dusky, double; three black dots on termen. Under side white; postmedial line black, thicker than on the upper side, costal area beyond clouded with ochreous brown and streaked with blackish.

Expanse, 26 millim.

The type, which is in the British Museum, from Kanshirei, April 16th, 1908 (A. E. Wileman).

Docirava flavilinata, sp. n.

♂. Head and thorax grey; abdomen whitish brown, pinkish below. Fore wings pale grey slightly tinged with pink, powdered with

darker grey, costa edged with pink; antemedial line ochreous outwardly edged with purplish brown, not reaching the costa; post-medial line ochreous, inwardly edged with purplish brown, incurved towards dorsum; discoidal dot purplish brown, faintly yellow margined; fringes pinkish, especially towards tips. Hind wings whitish brown, basal half fuscous tinged. Under side grey, suffused with pink on hind wings and on the apical area and the costa of fore wings.

Expanse, 32 millim.

Collection number, 937.

One male specimen from Tozan (8500 ft.), September 14th, 1906.

Allied to *D. æquilineata*, Walk.

ARBELIDÆ.

Arbela discipuncta, sp. n.

♂. Head and thorax pale brown mixed with darker; abdomen brownish grey, large tuft dark brown. Fore wings whitish, slightly tinged with brownish on basal area; a blackish mark below median nervure towards base and a smaller black mark above; a brownish grey spot at outer end of the cell; dorsum marked with brownish grey, as also is the terminal area except on costa; subterminal line whitish, irregular; fringes of the ground-colour marked with brown. Hind wings fuscous, brown tinged towards the base; fringes whitish marked with brown. Under side somewhat as above.

Expanse, 37 millim.

Collection number, 1246.

One rather worn male specimen from Kanshirei, April 27th, 1908.

Comes near *A. phaga*, Swinhoe.

LIMACODIDÆ.

Narosa obscura, sp. n.

♀. Head and thorax brown mixed with grey, abdomen rather paler. Fore wings pale brown, densely powdered with dark brown; two blackish marks on the disc, one in the cell and one below the cell, the latter oblique; fringes dark brown. Hind wings and under side whitish brown, fuscous tinged.

Expanse, 22 millim.

Collection numbers, 1353 and 1272.

Two female specimens from Kanshirei; the one described taken on April 30th, 1908; the other on September 8th, 1907.

Fore wings of the September example are paler than those of the type described. It appears to be somewhat worn, probably due to the absence of dark brown powdering.

Allied to *N. holoxanthia*, Hampson.

Altha subrosea, sp. n.

♀. Head, thorax, and abdomen yellowish buff, transversely marked with reddish. Fore wings yellowish buff, costa suffused with white especially towards apex; two double whitish lines on the dorsal area, not continued across the wing; three pale edged reddish brown spots at base of the wings, one at outer end of the cell, and an oblique series of five beyond the cell; fringes of the ground-colour, preceded by pale edged reddish brown lunules. Hind wings red, costa yellowish. Under side yellowish buff, all wings suffused with red on the disc.

Expanse, 28 millim.

Collection number, 1261.

Two female specimens from Kanshirei, June 5th, 1907, and July 10th, 1908.

Thosea rufa, sp. n.

♂. Head, thorax, and abdomen reddish brown. Fore wings reddish brown; postmedial line oblique, whitish, inwardly edged with dark purplish brown, slightly broadened on dorsum; subterminal line dusky, outwardly oblique from costal end of postmedial line to the termen just above the tornus; apical part of terminal area, limited by the oblique subterminal line, slightly greyish tinged. Hind wings, and under side of all the wings, fuscous brown.

Expanse, 24-30 millim.

Collection number, 1260.

Two male specimens. One from Suisha, July 21st, 1909, the other from Kanshirei, April 10th, 1908.

DREPANIDÆ.

Macrocilix misticata flavotincta, ab. nov.

♀. Head white, thorax orange brown, collar and patagia yellow. Fore wings, upper part of band somewhat narrower than in typical *misticata*, and its dorsal extremity is orange brown shaded on each side with yellow. On the hind wings the tornal area is suffused with grey, obliterating the typical black marking.

Expanse, 48 millim.

Collection number, 1831.

A female specimen from Arizan, August, 1908.

NOTES AND OBSERVATIONS.

FORMALDEHYDE USEFUL IN SETTING INSECTS.—I am interested to see Mr. St. John's notes on the use of formaldehyde in setting insects (Entom. xlvii. p. 325), as I have occasionally used it myself for some years past, being led to try it by the extreme rigidity of insects killed by its fumes. My method was to remove an insect from the setting board after 'initial set' had occurred, and lightly to touch the bases of the wings, where they join the body, with a camel-hair brush dipped in a 10 per cent. solution of formaldehyde, when the

insect was replaced on the board for two or three days longer. I wonder whether Mr. St. John has tried injection of a minute quantity of formaldehyde into the bodies of such species as *sparganii* and *ochracea*? I should imagine it would have the effect of preventing any flow of fatty or greasy matter, since I believe formaldehyde or formalin—(are these of precisely similar composition chemically?)—are used in testing butter, on glass slips, the hardening effect it produces being very striking. It may be possible to combine formalin with ether or some light spirit, as a vehicle, so that an injection would permeate the whole insect, and evaporate quickly, leaving behind the essential germicide, thus obviating the necessity of removing, cleaning, and replacing the bodies of certain species. Probably Professor Meldola could settle all these points offhand.—G. BERTRAM KERSHAW; 9, Victoria Street, Westminster, S.W.

ACRONYCTA STRIGOSA AND HADENA ATRIPPLICIS IN HUNTINGDONSHIRE.—Several localities in Cambridgeshire have been mentioned where *A. strigosa* has been taken, but I see no mention of Huntingdonshire. When I began collecting I paid many visits to Somersham, in Huntingdonshire, and in 1874, 1875, and 1876, at sugar, I took both *A. strigosa* and *H. atriplicis*, the former generally three or four each evening, while *H. atriplicis* was one of the commonest insects at the sugar patches, often four or five on a tree trunk, and on looking at my diary I find I took thirty-eight one evening. I have not been to this spot since 1877, and so far as I know it has not been visited by any entomologist. I see no reason why they should not both be still taken there if worked for. Somersham is about six miles from Chatteris, a well-known locality.—JAMES KENWARD; 1, Norfolk Gardens, Lower Addiscombe Road, Croydon.

ACRONYCTA STRIGOSA, HADENA ATRIPPLICIS, &C.—Mr. Thurnall's notes (Entom. xlvii. p. 313) on *A. strigosa* are of interest. With regard to the plantation mentioned, this has been cited to me as a former locality for both *Hadena atriplicis* and *Acronycta strigosa* at sugar. I have never myself been able to determine the position of this plantation. There is one rather north-east of the village, if I recollect aright, but I believe this is all small holdings now. With regard to recent captures of *atriplicis*, there was a ridiculous lawsuit some years ago, arising from the visit of entomologists to Holme Fen, and I seem to remember that two or three *atriplicis* were taken on that occasion. Newman (Edward), I think, records the fact that years ago pupæ of *atriplicis* were so common that they used to be collected by boys and sold for feeding fowls. Concerning *Lælia canosa*, the late Mr. Bailey, of Wicken, told me that he was in the Fen when Mr. Porritt took the last *canosa*, and I think he said that Mr. Porritt exchanged it with him for some *Nascia ciliaris*, then very scarce. I should say that in some notes of mine on *strigosa*, appearing in the 'Entomologist' a short time ago, Mr. Bailey was accidentally referred to as the 'Rev.' Mr. Thurnall is no doubt aware that a Houghton and a Bailey still carry on the traditions of their respective families as entomologists at Wicken.—G. BERTRAM KERSHAW, M.Inst.C.E., F.E.S.; 9, Victoria Street, Westminster, S.W., December 7th, 1914.

AN AFTERNOON IN SOUTH EASTERN FRANCE.—At the end of July I started with a friend for a short walking tour in the Eastern Pyrenees; but the sudden outbreak of the war compelled us to return abruptly, after we had had no more than one afternoon's walk (on Saturday, August 1st), from Narbonne to Sigean. As we were on the high road nearly all the time we did little collecting, except during a brief halt for an hour in a clover field, where we took the following insects: *Pieris manni*, *Pontia daplidice* (worn), *Colias edusa*, *Pyrameis cardui*, *Melitæa cinxia*, *M. phæbe* (small), *Melanargia lachesis* (worn), *Satyrus circe* (worn), *S. fidia*, *Epinephele jurtina* (worn), *E. ida*, *Polyommatus thersites*, and two other "blues" which are too worn to identify with certainty, but are probably *P. medon* and *P. escheri*. We had an exciting week of it on our return, especially at Cette (where I was arrested as a suspected German spy, and, having no passport or papers of any kind, I had great difficulty in convincing the police of my bona fides), Lyons, Paris, and Le Havre. The insects I took will always have for me an interest far in advance of their real value: but my object in writing this note is to record the capture of these species, some of which, as I am told by Mr. Rowland-Brown, who kindly looked them over for me, are not common in South-eastern France.—F. A. OLDAKER, M.A.; F.E.S.; The Red House, Haslemere, November 28th, 1914.

EUROIS OCCULTA IN ESSEX.—In reference to Mr. Stiff's note on the occurrence of *Eurois occulta* in Essex (Entom. xlvii. p. 323), it may interest him to know that the four specimens he mentions as having been captured near Leigh-on-Sea are by no means the first recorded Essex specimens. As long ago as 1869, Mr. Meldola ('Entomologist,' vol. iv. p. 325) says, "I took two fine specimens of this moth at sugar in Epping Forest on August 26th." Again, Henry Doubleday, in vol. v. p. 420, in sending a list of insects captured in his garden at Epping, says, "I also took *Calocampa vetusta*, and a very fine *Aplecta occulta*. It must be about twenty-five years since I took two specimens of this moth" [presumably at the same place]. On July 29th, 1883, I took a single specimen at rest on the trunk of an oak near Brentwood, and I was told some two or three years afterwards that it was not very scarce at sugar there, but I never had an opportunity of testing the truth of the statement. I may add that this specimen was of the pale southern type, whereas those recorded by Mr. Stiff, and taken not very many miles away, are all of the dark variety.—A. THURNALL; Wanstead, December 8th, 1914.

EUROIS OCCULTA IN ESSEX.—In the 'Journal of Proceedings' of the Essex Field Club (vol. i. p. xxii.) occurs the following passage in the report of the meeting of the club held on June 26th, 1880:—"Mr. Meldola exhibited *Aplecta occulta* (dark aberration), *Aplecta tinctoria* and *Noctua glaucosa*, all captured in the woods near Woodford, some years ago. Mr. English remarked that *glaucosa* occurred occasionally in some parts of the Forest, but that *A. occulta* was a great rarity. Mr. Doubleday had once bred a batch of thirty or forty specimens, but all of the grey tint common in southern specimens, whereas Mr. Meldola's example was similar to the dark

northern form of the moth." I myself took a dark specimen in fair condition on treacle in Lark's Wood here about fifteen years ago, but I cannot lay my hand at present on my note of the capture, so I cannot give exact date. I have the specimen still, however.—C. NICHOLSON; Hale End, Chingford.

NOTES FROM THE HASLEMERE DISTRICT FOR 1914.—The season this year has been in many ways an unusual one, so that the following brief note may be of interest. In the first place, I have to record *Agrotis vestigialis* (July 4th), *Eupithecia sobrinata* (July 17th), and *Pachys betularia* ab. *doubledayaria* (June 13th), as new to our local list; while *Chloroclystis coronata*, taken for the first time here last year, occurred again at the lamps on July 14th this year. Several interesting varieties have been taken or bred—a very dark specimen of the *capucina* variety of *Miselia oxyacanthæ* was taken at ivy blossom on October 16th: a pale yellow variety of *Amathes macilenta* on October 12th: a heavily banded form of *Xanthia lutea* on October 6th: a very varied lot of *Oporabia dilutata* were bred between October 21st and 26th, culminating in a fine ab. *latifasciata*: specimens of most of the forms of *Cidaria truncata* were taken on the lamps at the end of May, and a second brood was bred, but this latter showed little variation and the specimens were all of smaller size than the spring brood: many larvæ of *Bormia repandata* were collected in the spring, in the hope of breeding varieties, and in addition to a nice lot of minor variations a magnificent ab. *conversaria* emerged on June 21st. Many insects which are usually uncommon occurred in greater numbers this year, notably *Drymonia chaonia* (April 20th–May 22nd), and *Polyploca ridens* (April 13th–29th). The former of these is usually far less common than *D. trimacula* = *dodonæa*, but this year we took only one of the last-named. The following species were also specially abundant: *Geometra papilionaria* (July 3rd–20th), *Euchloris pustulata* (June 20th–29th), *Eucosmia undulata* (June 29th–July 16th), *Metrocampa margaritana* (June 20th–July 11th) (which was also unusually large) and *Boarmia roboraria* (May 29th–June 30th). All these were taken at the lamps, and *Agrotis ypsilon* (October 12th–November 5th) was common, both at the lamps and on the ivy blossom. Among the less common insects which were taken either singly or sparingly were: *Notodonta trepida* (April 28th–May 19th–June 15th), *Habrosyne derasa* (June 29th–30th), *Palimpsestis fluctuosa* (July 21st), *Polyploca flavicornis* (March 31st), *Pæcilocampa populi* (November 6th), *Drepana binaria* (June 5th), *D. cultraria* (May 27th), *Sarrothripa revayana* (April 19th), *Mitochondria miniata* (July 20th–21st), *Cybosia mesomella* (July 11th), *Demas coryli* (April 21st–May 29th), *Tæniocampa gracilis* (April 15th), *Ochria aurago* (October 18th), *Lithophane socia* (October 10th), *Plusia moneta* (July 14th), *P. pulchra* (June 19th), *Chesias rufata* (June 4th), *Euphyia picata* (July 20th), *Perizoma flavofasciata* (June 30th–July 11th), *Numeria pulveraria* (May 20th), *Ellopia prosapiaria* (June 21st), *Hygrochroa syringaria* (June 8th), *Gnophos obscurata* (July 11th), *Scodionia fagaria* (May 23rd).

On April 11th *Cucullia verbasci* emerged from a 1912 pupa; the larvæ of *Fimbria* were specially abundant in the spring, and larvæ of

Vinula were common in late June and early July. The larvæ of *Vanessa io* were in countless numbers about the middle of June, but they were very badly stung. I had a curious experience with four full-fed larvæ of *Pheosia dictæoides*: I beat them late in the afternoon of September 19th, and being hurried on my return home, put them for the night on a birch twig within a glass cylinder which rested on a wooden platform. When I came to look at them next morning, I found that the larvæ had lifted up the cylinder and crawled away. After the most careful search I found one attacked by a large spider in a corner under a fringe of carpet, but the others are still somewhere in my study successfully hidden. It is also perhaps worth noting that *Euchloë cardamines* and *Lycæna icarus* were distinctly scarce here this year, while there were not so many larvæ of *Vanessa urticae* as usual.—F. A. OLDAKER, M.A., F.E.S.; The Red House, Haslemere, December 1st, 1914.

THE REV. T. A. MARSHALL'S LOCALITIES.—Ever since the publication of tome neuvième of André's 'Species des Hyménoptères d'Europe and d'Algérie,' which treats of the first part of the Proctotrypidæ, in 1904, I have been intending to publish the meaning of the localities indicated beneath the cards upon which Marshall invariably mounted his Hymenoptera (and other insects). These indications invariably take the form of abbreviations, and the difficulty Mr. Lyle met in discovering the meaning of "St. A." (Entom. 1914, p. 261—of *separata*, a very mistaken method of pagination, p. 5) has occurred in a good many instances both at home and abroad: notably in M. l'Abbé J.-J. Kieffer's Proctotrypidæ, above-mentioned, where the actual abbreviations are reproduced seriatim in a good many instances, for what they are worth, because their meaning was unknown to the author! Hence it were well, surely, to place on record a list of these, which was kindly furnished to me by Mr. Marshall when presenting me with a collection of Palearctic Ichneumonidæ. It is dated "Ucciani, Corse, April, 1899":—

"Bfm. or Bfmg.—Botusfleming (Cornwall).

Nantes—France.

Rannoch—Scotland.

B. T.—Bishops' Teignton (Devon).

Govilon—on the Usk, near Abergavenny, South Wales.

N.—Nunton, near Salisbury (Wilts).

Bugbr.—Bugbrooke, near Northampton.

Cwthy.—Cornworthy, near Totnes (Devon).

C.—Cheltenham.

Groveley Wood—near Salisbury. [I have never heard of other entomologists collecting here. I myself visited the locality in June, 1911, and was charmed with it.]

L.—Leicester.

B.—Barnstaple (N. Devon).

M.—Milford Haven, in Pembroke.

I. of Wight—Hants.

Niton—Isle of Wight.

St. A.—St. Albans, Herts.

Bolt Hd.—Bolt Head in Devon.

B. Tn.—Bishops' Teignton (Devon).
 Nantua—France (Aisne), Jura mountains.
 Last—Lastingham (Yorkshire moors)."

These explanations will be especially useful in working through Marshall's collection of Braconidæ, in the British Museum, for every card bears one of the abbreviations; and I regret not furnishing the above information (which was equally at hand then as now) when remarking upon that collection at *Entom.* 1909, pp. 61 and 96.—
 CLAUDE MORLEY; Monks' Soham House, Suffolk, November 30th, 1914.

OBITUARY.

WILLIAM WARREN, M.A., F.E.S.

Born at Cambridge in 1839. Died at Tring on October 18th, 1914.
 Aged 75 years.

Mr. Warren's interest in British Lepidoptera, evident even in early boyhood, continued active throughout his life. As he was a strenuous field-worker and keen observer, his acquired information concerning our Lepidoptera was extensive and thorough. Especially was this the case as regards the so-called "Micros"—the Tortricina and Tineina, in particular. His knowledge of the species in the families named was indeed great, not only of the imagines but of their early stages also.

Unfortunately, Mr. Warren did not often publish the results of his observation and research, but most of those that he did record will be found in the 'Entomologist Monthly Magazine' for 1878–1889. His earliest communication (1878) deals with the economy of the larva of *Ephippiphora nigricostana*. The occurrence of *Laspeyresia (Stigmonota) pallifrontana* in England was noted by him in 1887, and in August of the same year he found larvæ of the species feeding in pods of *Astragalus glycyphyllos*. In 1887 also he published a note on the occurrence of both *Steganoptycha pymæana*, Hb. and *S. abiegana*, Dup., in England. The latter he identified as identical with Haworth's *Tortrix subsequana*.

When the late Mr. J. H. Leech acquired the 'Entomologist' in 1890, Mr. Warren was invited to act on the Reference Committee. This he consented to do, and from that year until 1900 he took an active interest in the journal, and contributed to its pages.

Although he never lost touch with his special groups of British Lepidoptera, Mr. Warren had for years past devoted much time to the study of the Geometridæ of the world. More than a quarter of a century ago he undertook and carried out the arrangement of this family, and also the Pyralidæ, in the British Museum. Subsequently his sphere of activity was transferred to the Tring Museum, and here during the greater part of some twenty years he encompassed a great amount of work on the lepidopterous fauna of New Guinea, South America, Africa, &c., the results being published in 'Novitates Zoologicæ.' More recently his work was pretty much confined to the Palæarctic Noctuidæ, which formed the subject-matter of the third volume of Seitz's 'Macro-Lepidoptera of the World.'

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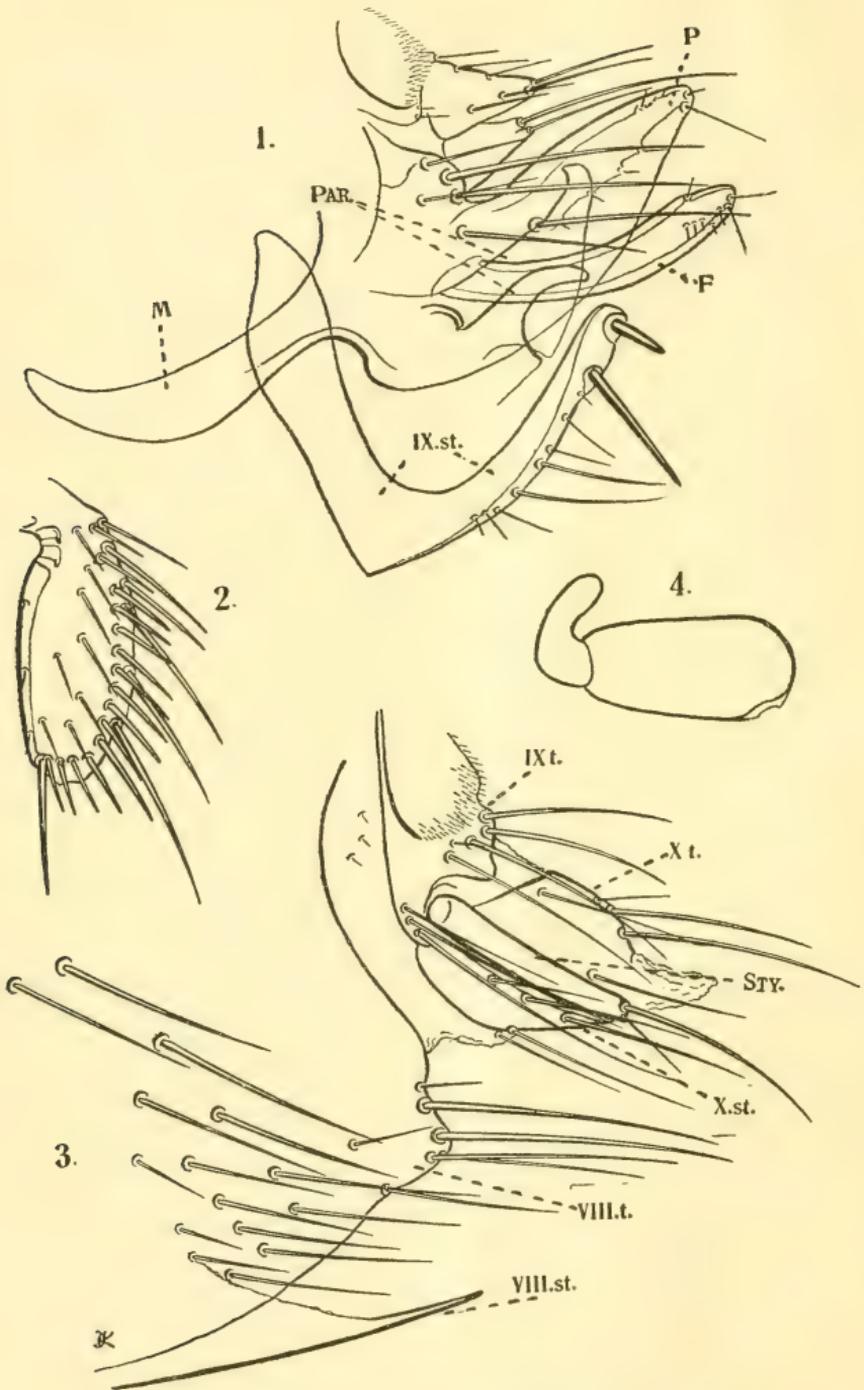
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STEPHANOCIRCUS PECTINIPES, SP. NOV.

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STEPHANOCIRCUS PECTINIPES, SP. NOV.

BY THE HON. N. CHARLES ROTHSCHILD, M.A.

(PLATE II.)

♂ ♀. Similar to *S. simsoni*, but at once recognised by the outer bristles of the dorsal and apical edges of the tibiae forming a comb.

Head.—The helmet is nearly the same as in *S. simsoni* (cf. Ent. Mo. Mag. (2) xvi. pl. 1, fig. 3), but the comb contains on each side from seventeen to twenty spines; the bristles behind this comb also as in the figure cited. The genal comb consists of six or seven blunt spines and a long pointed spine placed behind the vestigial eye. The occiput is twice as long as the helmet (inclusive of the comb) is wide at the fifth spine. The second segment of the maxillary palpus is as long as the first and about one-third longer than the third segment. The apical segment of the proboscis is very short, being twice as broad as it is long. The bristles of the second segment of the antenna are longer than in *S. simsoni*, nearly all reaching to or beyond the apex of the club.

Thorax.—The pronotum bears three rows of bristles, and the meso- and metanotum each four rows, the mesonotum having additional bristles in front. The meso-pleura have fifteen to twenty-five bristles, the episternum of the metathorax five or six, and the metepimerum six to ten bristles in the first row, and five or six (usually five) in the second.

Abdomen.—The tergites bear two rows of bristles and (particularly in the female) some additional bristles representing a third row; the eighth tergite has bristles above the stigma in both sexes. The basal sternite bears two or three ventral bristles placed one behind the other, and further back two or three lateral ones; sternites III. to VII. of the male bear a row of four or five bristles on each side and several additional bristles in front of the row, VIII. has a row of four, and four to eight additional bristles; in the female the bristles on the sternites are more numerous, sternite VII. bearing a row of eight or nine bristles and before this row another of seven to nine, on each side.

Legs.—The fore femur has on the outer surface about four lateral bristles, besides the subventral ones which are placed near the apex. The outer dorsal and apical bristles are nearly of equal length and

form a continuous comb which is not interrupted at the apex (fig. 2). The bristles on the outer surface of the hind tibia are almost evenly distributed between the ventral and dorsal edges.

Modified Segments.—♂. The manubrium (M) of the clasper (fig. 1) is widest in the centre. The clasper bears two large and two smaller bristles at the proximal dorsal angle, and two long bristles further down; the process (P) of the clasper as well as the movable process (F) are slenderer than in *S. simsoni*. The horizontal arm of the ninth sternite (ix. st.) is narrower than in *simsoni*; its stout apical bristle is half as long as the subapical one, the latter being longer than in *simsoni*. The anal tergite bears a dorsal median row of three or four bristles and a lateral row of two or three, the last bristle of each row being placed at the apex of the segment.—♂. The eighth tergite (viii. t.) has a row of four to six bristles above the stigma, the row being continued down to the ventral margin of the tergite, and accompanied by another row, there being additional bristles near the ventral and at the apical edges, the segment having thirty to thirty-four bristles altogether on each side. The apex of the segment is less pointed than in *simsoni*. The ninth tergite (ix. t.) has two or three bristles close to the base of the stylet (Sty.), which is long, cylindrical and slightly curved, and an apical row of four on each side. The anal tergite (x. t.) bears two long dorsal bristles accompanied as a rule by one or two small bristles, and has one lateral bristle; the sternite (x. st.) bears on each side a row of three bristles at the dorsal margin, and one or two bristles ventrally. The head of the receptaculum seminis (fig. 4) is twice as long as it is broad, being also much longer than the tail.

A series of both sexes from Emerald, Victoria, obtained on *Epimys assimilis* by Mr. Ed. Jarvis.

EXPLANATION OF PLATE.—Fig. 1. Male organs of *Stephanocircus pectinipes*; M. = manubrium; P = non-movable process of clasper; F = movable process of clasper; IX. st. = ninth sternite; Par. = parameres of penis. Fig. 2. Fore tibia (of male). Fig. 3. Last three abdominal segments of female; t. = tergite; st. = sternite; sty. = stylet. Fig. 4. Receptaculum seminis.

THE BUTTERFLIES OF THE BUCKS. CHILTERNs.

By H. ROWLAND-BROWN, M.A., F.E.S.

PRIOR to the extension of the Metropolitan Railway to Aylesbury, the greater part of the country with which these observations are concerned was, entomologically speaking, *terra incognita*. The Chiltern Hills bisect the county of Buckinghamshire at its narrowest east and west borders; that is to say, from the point where Hertfordshire is driven wedge-like north-west of Tring as far as Wingrave, to the eastward face of Bledlow Ridge looking towards Princes Risborough, and round to the Wycombes. Though to-day something of suburban London has followed the line even as far away as this, there still remains, and is likely to

remain, an unspoilt land of chalk down and beech forest, dividing the Vale of Aylesbury from the gravel and clay lands of the southern division—hardly less beautiful in their way than the Chilterns themselves. I first made acquaintance of it when the “safety” cycle gave access to “fresh woods and pastures new,” that is to say, about 1896; and since then no year has passed that I have not spent one or two days in spring, in summer, and in autumn with the Chiltern butterflies and other day-flying Lepidoptera. Latterly, I understand, collectors from the north have camped among them under canvas, and I venture to hope, therefore, that the publication of these remarks will induce a supplement to my records; for, despite the exquisite nature of the uplands and forest of the locality under review, I can find in the magazines and reports of our Natural History Societies but scanty notices even of the butterfly fauna.

In the mid-Victorian period, the Rev. Joseph Greene, author of the entertaining ‘Insect Hunter’s Companion,’ worked Halton. He is quoted by Stainton in his ‘Manual of British Butterflies and Moths’ (1857), by whom also several species are reported from Wavendon, near Newport Pagnell, beyond the scope of my immediate investigations. At the same period, and later, the Rev. H. Harpur Crewe, the well-remembered authority on the Eupithecias, and a frequent contributor to the ‘Entomologist,’ interested himself with the Lepidoptera of Drayton-Beauchamp and Aston-Clinton, at the extreme eastern edge of the Bucks. Chilterns. His observations are recorded in Newman’s ‘British Butterflies,’ which bears no date on the title cover, but was published, I believe, in 1871. Between this and the coming of Tutt’s monumental ‘British Lepidoptera,’ no systematic attempt appears to have been made in an entomological work to collate the Chiltern butterflies, though there are occasional notices of the neighbourhood to be found in this and other entomological magazines to which I may draw attention,* as well as Mr. Barrett’s list in the ‘Victoria History of Buckinghamshire.’

It is not my intention to particularise localities explored. As long as a commercial value attaches to specimens, the evil of too intimate directions is obvious. I will say this much, however, that my personal knowledge, such as it is, is confined to the section of the Chilterns which unites Wendover with the Wycombes, and the gradual sloping country southward as far as the Chalfonts.

A more diversified landscape it is difficult to imagine. The one feature lacking is water, and in dry seasons, such as those of 1893, 1911, and 1914, the pastures and downs suffer

* *E.g.* “Contribution to the List of Macro-Lepidoptera of Bucks.,” E. W. Carlier, M.D., B.Sc., ‘Entomologists’ Record,’ vol. xxi., pp. 285-6. “List of August Diurni” (*id.* vol. xxii., pp. 44-45). Mr. Kenneth Raynor does not deal with that part of the county described by me here.

grievously. But there are a certain number of springs, on the north face, and, as a rule, an abundant chalk-flora outside and in the clearings of the beech woods, which still cover a considerable area towards the west. I see it stated that Buckinghamshire gets its name from the Anglo-Saxon "boe," or beech woods. There are secluded spots in the foothills which retain apparently their primitive aspect in every detail. In such places the space between forest fringe and meadow, or more usually arable land, is sprinkled with dwarf juniper and ancient thorns; the steep flinty roads are banked with helianthemum, scabious, and occasional hedges of viburnum. Here and there the side wastes have been enclosed with barbed wire to contain the sheep in places where the grass affords pasture, mingled with *hippocrepis*, burnet-saxifrage, and aromatic wild thyme. In the occasional open spaces, or by the cart-tracks used for wood cutters, there is an abundance of wild strawberries; and, while in July tall thistles are certain lure for the larger Fritillaries, a month later clumps of hemp agrimony invite the commoner Vanessids to their familiar banquet.

On the south side, dropping from Great Hampden, or along the Wendover road to Great Missenden, the woods give way to ploughed fields, sometimes a glory of scarlet poppies, at other seasons gay with the delicate pink spires of sainfoin, or dusker lucerne. At other spots the gentle slopes are a blaze of mustard splashed with the "dragon's blood" of luscious Dutch clover. The lesser copses are fringed with holly, and where the main road from Aylesbury reaches to Missenden the cherry orchards begin, thence in April an unbroken line of snowy blossom to the limit of the lighter soils; as beautiful as the stretches of blackthorn later laden with large and bloomy sloes. Motors and motor dust have done much to spoil the amenities of the great highways; still, Saturdays excepted, the Chiltern by-roads are as peaceful and as pleasant as those of the Alps. Also, much likely-looking ground is enclosed and private; but from east to west there are country lanes unrivalled in mid-England for luxuriance of wild flowers and fruits; open downs and wood land, where it seems you may wander at will undisturbed by "trespass" boards, and the ever unwelcome keeper. We entomologists, however, owe not a little to the game preserver, and I quite agree with my correspondent Mr. A. J. Spiller, who has given me so much valuable help in compiling this Buckinghamshire list, that the real reason why certain once common species tend hereabouts to become "small by degrees and beautifully less" is directly traceable to the grazing of the hills by sheep in places formerly reserved for sporting purposes. And, as proof of this, otherwise rare insects are still locally plentiful where the various grasses and chalk-loving flora are left to flourish at their own sweet will.

HEsPERIDÆ.

1. *Hesperia malvæ*, L. This butterfly is hardly common at the outskirts of the beech woods. The under sides vary considerably in colour from sage green to deep crimson, suggestive of *Pyrgus sao*. I have never come across a true example of ab. *taras*, Brgstr., but the *intermedia*, Schilde, form is not unusual, and I have several ab. *scabellata*,* Reverdin, in which the spots on the inner margin of the fore wing are united near the margin with a white streak. Is fond of sitting on last year's dead beech leaves in sunny spots.

Earliest date of appearance, May 17th, 1912; latest observed, June 21st, 1902.

2. *Nisoniades tages*, L. In some seasons extremely common, affecting the warm banks in the chalk lanes, and again the lush green grass on waste places. I am surprised to find I have no record in my diaries of an autumn emergence, but I am sure in very hot summers I have come across individuals of a second brood. Mr. Spiller reports a second brood in 1914.

Earliest date, May 11th, 1912; latest (first brood) observed, June 22nd, 1908.

3. *Agriades sylvanus*, Esp. Common on both sides of, and throughout the range, but more so on the south slopes.

Earliest date, June 9th, 1900; latest observed, August 1st, 1906.

4. *A. comma*, L. Another Hesperiid which varies largely in relative abundance. Some years I meet with only a few scattered specimens. (I have generally been abroad at the normal time of appearance in July.) Occasionally it swarms, as in August, 1906. Mr. B. C. S. Warren tells me that he caught "very fine" ab. *catæna*, Stgr., between August 9th-15th, 1911. The Hon. N. C. Rothschild reports it from Drayton-Beauchamp, in the eastern extremity of the region; Mr. Spiller, and Mr. Peachell have informed me that it extends well westward in the High Wycombe direction, and to the Oxford Chilterns.

Earliest date observed, July 8th, 1899; latest, September 3rd, 1898. Mr. South records an example at Wendover as early as July 6th, 1893 (Entom. xxvi. p. 252).

[*Adopæa lineola*, Ochs. Neither I nor my several correspondents have yet turned up this species in Bucks. Mr. Warren writes: "I have no *lineola*, probably because I did not take much trouble hunting for them." I have no doubt that a careful

* Ab. *scabellata*, Reverdin. As this aberration has not been described or figured to my knowledge in an English work, I venture to supply the following translation from the original description (Bull. Soc. Lépid. Genève, vol. ii. p. 153):—The white spot nearest the inner margin of the median band of the fore wings united by a white dash to the corresponding white spot of the basal series (as in *H. alveus* ab. *lineolata*, Rev., *ibid.* p. 152). The whole arrangement may be compared in shape to a footstool (*escabeau*) turned upside down with its feet in the air.

search at the right season would be rewarded. It occurs in the neighbouring counties of Northants. and Beds.]

5. *A. flava*, Brunn. (*thaumas*, Hufn.; *linea*, F.). This Skipper is at its best from the middle to end of July, when I have seldom visited the ground where it occurs, as a rule rather sparsely compared with *A. comma*. It seems, however, to be generally distributed from the Wycombes to Drayton-Beauchamp. Mr. Warren reports it common, July 18th, 1908.

Earliest date observed, July 15th, 1899; latest, August 21st, 1909.

LYCENIDÆ.

6. *Chrysophanus phlæas*, L. Rather irregular in relative abundance. In some years an undoubted third brood. I take the ab. *cæruleopunctata*, Stgr., not infrequently.

(a) *gen. vern.* Earliest seen, May 9th, 1912.

(b) *gen. æst.* Earliest seen, July 8th, 1899.

(c) *gen. auctumn.* First seen, September 27th; last seen, October 9th, 1913: but no doubt in this year it was flying much later, as I saw it in Middlesex into November.

7. *Cupido minimus*, Fssl. For some years I did not find the limited locality where this butterfly occurs in the part of the Chilterns then known to me. Here the food-plant, *Anthyllis vulneraria*, grows in some abundance, and I usually come across a fair number of examples. *Minimus* is distributed locally from one end of the region to the other, and Mr. A. J. Spiller reports a partial second emergence in the west, in 1914. This I have never noticed in Bucks., but I had no opportunity to visit the ground in the hottest of all recent summers, 1911.

Earliest date observed (a single male), May 22nd, 1914; latest, July 2nd, 1908. (To be continued.)

Note.—I shall be much obliged if collectors who are acquainted with the butterflies of this region will communicate with me.

ON THE HYBRIDS OF THE GENUS *OPORABIA*, WITH SOME NOTES ON ITS MICROGENES.

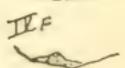
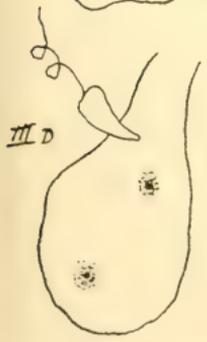
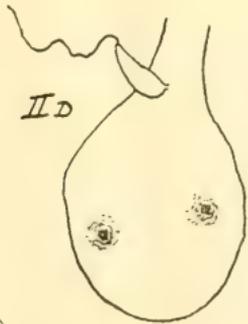
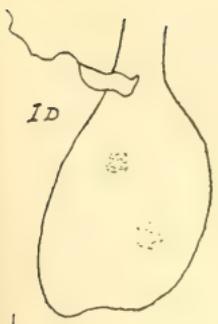
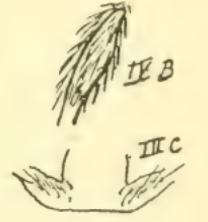
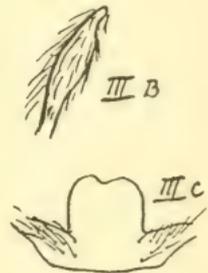
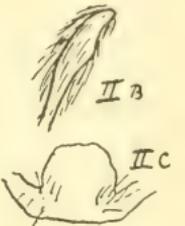
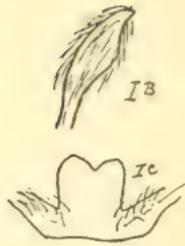
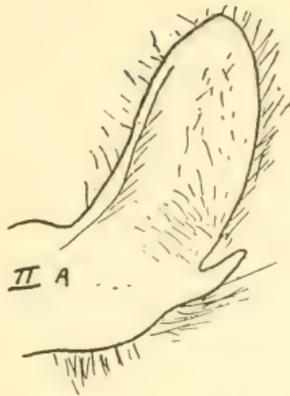
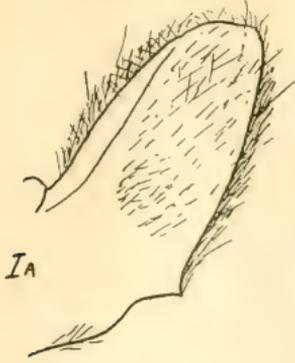
By J. W. H. HARRISON, B.Sc.

(PLATE I.)

(Continued from p. 6.)

THIS acceleration of development is not always found to result in degenerate germ cells,* and therefore the above suggestions are not a complete explanation. In this case the observation is not without its value in suggesting the possible

* Such as I have found in rearing *Drepana rebeli* = *D. falcula* × *D. curvatula*.



DETAILS OF GENITALIA OF *OPORABIA AUTUMNATA* AND *O. DILUTATA* AND THEIR HYBRIDS.
(Explanation at end of paper.)

origin of some species. Suppose a mutation of a species to arise through some disturbance in the normal behaviour of the chromosomes; let this mutation cross with the parent form; imagine the difference in rate of metabolic change to result in precocious development of the resulting imagines. There would then result a number of insects emerging some time before the parent, and not necessarily sterile. They would, however, be effectually separated from the original form by a certain space of time. They would thus be saved from being swamped, and differing, as was granted, in the chromosomes, they must in the process of time be regarded as a "new species." If such be the origin of some species, we ought to be able to find pairs of closely allied species separated from each other by the time of emergence. Such pairs we see in *Biston strataria* and *Amphidasis betularia*, and *Tephrosia (Ectropis) bistortata* and *T. crepuscularia*.

Let me now take up point two.

That the accelerated form resembles a melanic *dilutata* may be a consequence of that acceleration. It may be possible that, in *dilutata*, when once the imago commences to develop, it forms at a much more rapid rate than in *autumnata*, although the periods of the commencement of development may not coincide, for, as a matter of fact, *autumnata* commences to develop first. The acceleration produced otherwise in the females may cause the *dilutata*-ness of the hybrid to overpower to some extent its *autumnata*-ness. However, it is not, I think, to this we have to look for our explanation, but to the constitution of the parent gametes.

Experiment has shown that, as regards sex, in the Lepidoptera one of the two sexes is heterozygous.* The bulk of the evidence shows that it is the female that is heterozygous and the male homozygous. In *Saturnia*, however, I have definite evidence that it is the male that is heterozygous, whilst, in the *Bistoninae*, the weight of the evidence is in favour of the view that the female is heterozygous.

Suppose in the genus *Oporabia* that the male is heterozygous and has the composition ♂ ♀, † whilst the female is homozygous and is represented as ♀ ♀. Imagine, too, that the form of *dilutata* used is melanic, and therefore carries a factor for melanism. Let us further suppose that, in the gametogenesis, there is a kind of false allelomorphism between maleness and the melanic factor, and that they repel each other. Spermatozoa would thus be formed of two kinds, one carrying femaleness and melanism (♀ M), ‡ and the other maleness and no melanic factor (♂ N). † The females, on the other hand, would give ova

* Castle (Bull. Mus. Comp. Zool. Harvard, 1903, vol. xl. No. 4) says that possibly both sexes are heterozygous in some forms in this respect.

† Maleness being regarded as dominant.

‡ M is used to represent the presence of a factor for melanism: N denotes its absence.

all of the same type represented as ♀ M. On fertilization we should have two types of zygotes formed, one of the composition ♀ ♀ M M, and therefore a melanic female, and the other ♂ ♀ M N, and therefore male, and possibly showing diluted melanism. Introduce now a female not bearing the melanic factor. Its gametes would be ♀ N and ♀ N. Fertilization with a melanic male, yielding gametes ♂ N and ♀ M, would give zygotes of the composition ♂ ♀ N N, which are non-melanic males; and zygotes, represented as ♀ ♀ M N, which would be females melanic or diluted according to the greater or less dominance of the melanic factor. Such a procedure was adopted in the cross *dilutata* ♂ × *autumnata* ♀. The female hybrid bore melanism, and the male was without it; results just as one would predict from the above scheme.

In the reverse cross we have *autumnata* males of the form ♂ ♀ N N, and *dilutata* females represented as ♀ ♀ M M taking part; these would yield in the former case the gametes ♂ N and ♀ N, and in the latter gametes all ♀ M. Fertilization then would give zygotes of the form ♂ ♀ M N and ♀ ♀ M N, i.e. both zygotes are heterozygous, as far as melanism is concerned. This heterozygousness is probably shown by the suffused and blurred out-of-focus effect in both sexes of hybrid *rungei*, and again the actual results agree with the predicted ones.

Concisely, the results can be shown as follows:—

| | | |
|----------------|--|---|
| (I) | <i>dilutata</i> ♂ × <i>autumnata</i> ♀ | |
| | Composition ♂ ♀ M N × ♀ ♀ N N | |
| | gametes { ♂ N | Both ♀ N |
| | { ♀ M | |
| F ₁ | Non-melanic males ♂ ♀ N N | More or less melanic females ♀ ♀ M N |
| (II) | <i>autumnata</i> ♂ × <i>dilutata</i> ♀ | |
| | Composition ♂ ♀ N N × ♀ ♀ M M | |
| | gametes { ♂ N | All ♀ M |
| | { ♀ N | |
| F ₁ | More or less melanic males ♂ ♀ M N | More or less melanic females ♀ ♀ M N |

I have undertaken experiments, within the limits of the same species, to confirm the above views; these are not yet complete, but I can say that the results obtained are not inconsistent with the views here propounded.

Lastly, it is easy to see in the greater potency of *autumnata* the usual experience one has in similar experiments, that the phylogenetically older species has the greater effect on the hybrid produced, and that *autumnata* is the older form I have already shown.

TABLE I.—MICROGENES OF OPORABIA AUTUMNATA.

| | <i>O. autumnata autumnata.</i> | <i>O. autumnata filigrammaria.</i> | <i>O. autumnata alticolaria.</i> | <i>O. autumnata pinivoraria.</i> | |
|-----------------|--------------------------------|---|--|---|--|
| OVA. | Description | Salmon pink; pitted ridges marked but pits shallow | Much the same; * colour duller | More purple; longer and narrower; depression large, pits smaller, and more numerous | Smaller and not so pink |
| | Hatches † | Date varies | Hatches much earlier | Hatches about ten days earlier | Hatches about a fortnight earlier |
| LARVÆ. | Description | Green, dull, with faint suggestion of grey | Darker green, sometimes mottled; head smoky, smaller | Very bright green; newly hatched larva a little longer | Green, but may be marked with rusty markings to mimic pine buds; not purple like <i>dilatata</i> |
| | Food . . . | Birch and alder | <i>Calluna, Erica, Vaccinium</i> | Alder and birch | Pine and larch |
| | Pupates ‡ | Last | First | Third | Second |
| IMAGINES. | Emerges § | Oct. 8th–Nov. 10th | Aug. 20th–Sept. 20th | Sept. 23rd–Oct. 23rd | Sept. 16th–Sept. 30th |
| | Markings and size | Ground, often white, varies to grey; when melanic black-brown with subterminal line paler; markings generally distinct; female fairly large | Colour the same; markings heavier and clearer, especially on hind wings; ground rarely suffused; glossier; smaller; wings narrower; female smaller in proportion | Ground brown, but grey mixed; markings more delicate, but still firm; central area very broad, duller; larger, and females in proportion larger still | Males always suffused and feebly marked; females very small, generally well marked; when melanic, blue-black |
| MALE GENITALIA. | Octavals | Not large, widely apart; depression between shallow | Nearer; depression deeper | Larger; nearer depression shallow | Much the same |
| | Costæ ¶ | About 19 | About 7 | About 14 | About 19 |
| | Labides ** | Head wide, with thin hairs | Head narrow, with thin hairs | Head narrow, with thin hairs | Head wide; very densely clothed with hairs |
| FEM. GEN. | Signa †† of Bursa copulatrix | Small and scobinate | Larger | Larger | About the same |

* Wherever comparisons are made they are with *O. autumnata autumnata*.

† Ova out of doors but not in nature.

‡ Wild larvæ.

§ Wild imagines.

|| Chitinous projections on 8th sternite.

¶ Patch of stiff hairs on juxta.

** Pair of rods, with a head bearing fur in these species, rising from the chitinous bar extending from costæ of valves.

†† Chitinous armature of bursa.

TABLE II.—MICROGENES OF *OPORABIA DILUTATA*.

| | <i>O. dilutata dilutata.</i> | <i>O. dilutata christyi.</i> | <i>O. dilutata fraxinaria.</i> | |
|-----------------|------------------------------|---|---|---|
| OVA. | Description .. | Glossy, ruby in colour, pitting feeble | A little smaller, * glossier | Slightly smaller |
| | Hatches | Varies | The same | Earlier |
| LARVÆ. | Description .. | Green, often purple-marked | The same | Always green |
| | Food | Oak, &c. | Birch, &c. | Nearly always ash |
| IMAGINES. | Emerges | Middle of October & onward | The same | Sept. 30th—Oct. 20th |
| | Markings, size, &c. | Ground very variable. Discal point large; angle of elbowed line rounded; sweeps near discal point | Ground whitish generally. Discal point small; angle of elbowed line almost as near a right-angle as in <i>autumnata</i> | Much smaller, ground bluish-grey, glossier. Practically no markings; parallel to <i>O. autumnata pinivovaria</i> . Is not, however, melanic |
| MALE GENITALIA. | Octavals | Far apart | Very near | As in <i>christyi</i> |
| | Labides | Head narrow | Head wide | Intermediate |
| | Valves | Spined externally | Shorter; spine more hooked | Much as in <i>dilutata dilutata</i> , but smaller |

EXPLANATION OF PLATE OF GENITALIA.—I. *autumnata*; II. *dilutata*; III. hybrid *robsoni*; IV. hybrid *rungci*. A. Valve; B. Head of labides; C. Juxta and Cristæ; D. Bursa copulatrix with signa and Ductus seminalis; E. Upper signum; F. Lower signum.

NEW SPECIES OF HETEROCERA FROM FORMOSA.

By A. E. WILEMAN, F.E.S.

NOCTUIDÆ.

Micreremites bidentata, sp. n.

♂. Fore wings whitish, with a faint ochreous tinge; antemedial line black, sinuous, a black line from it to base of the costa; postmedial line black, sinuous, the sinus enclosing black discoidal spot bidentate; subterminal line pale, sinuous, inwardly bordered with black, area beyond the line suffused with blackish; terminal line black, lunulate; fringes grey, white at base. Hind wings whitish, fuscous

* Comparisons with *O. dilutata dilutata*.

tinged; discoidal lunule and two transverse lines beyond blackish, the first line bent inwards below cell, the second line from costa near apex to termen above tornus; terminal line blackish, lunulate; fringes white marked with grey towards the costa, greyer towards tornus. Under side whitish, suffused and clouded with fuscous, chiefly on the fore wings; discoidal spot black, placed on a blackish undulated line on fore wings; the hind wings have a black discoidal spot, a blackish line beyond, and a diffuse blackish band between the line and the termen.

Expanse 20 millim.

Collection number, 1031.

Two male specimens from Arizan (7500 ft.). One taken September 27th, 1906, the other August 8th, 1908.

Comes near *M. rasalis*, Warren.

Bertula albipunctata, sp. n.

♀. Head and thorax brown, abdomen brown mixed with greyish. Fore wings grey-brown, faintly reddish tinged; antemedial line blackish, slightly excurved; postmedial line blackish, outwardly oblique from costa to vein 6, thence wavy and inwardly oblique; a white dot in the cell, and a white lunule followed by three white dots at outer end of the cell; subterminal line whitish, most distinct on costal area, where it is incurved and edged with black; a short oblique black streak from apex. Hind wings pale brown, sprinkled with darker; a diffuse blackish band before the middle, terminal area clouded with blackish; subterminal line indicated by blackish edged-white points. Under side fuscous; all wings have a blackish discoidal spot and dusky line beyond.

Expanse, 30 millim.

Collection number, 1405.

A female specimen from Kanshirei, April 29th, 1908.

There is a male from Kanshirei (Wileman) in the British Museum. Except that the antennæ are fasciculated, this specimen agrees with the female now described. It was captured in November, 1908.

Adrapsa mediana, sp. n.

♂. Fore wings brown clouded with fuscous; discoidal lunule white, slender, preceded by a blackish transverse shade; postmedial line white, wavy, bent inwards at costal extremity, the outer border broadly dusted with white; subterminal line pale, sinuous, marked with white at costa and above the middle, area beyond dusted with white; terminal line black, lunular; fringes brown marked with white. Hind wings brown clouded with fuscous; medial line white, almost straight, followed by a band of white dusting; subterminal line white, wavy, indistinct; terminal line black, lunular, preceded by some white dusting; fringes as on fore wings. Under side of fore wings pale grey brown, finely sprinkled with darker; discoidal lunule whitish, preceded by a dark cloud and followed by an almost straight, dusky postmedial line; terminal area black-brown, with a patch of the ground colour below apex: of hind wings pale grey

brown, antemedial and medial lines black brown, interrupted; discoidal lunule whitish, edged with black-brown; subterminal line pale, wavy, broadly bordered inwardly with black-brown and followed by a dusky transverse line.

♀. Similar but rather darker, and there is less white powdering on the termen of the fore wings.

Expanse, 30 millim. ♂; 28 millim. ♀.

Collection number, 1431 ♂ and 1006 ♀.

One male specimen and two females from Kanshirei. One female was taken on June 16th, 1906, the male on April 9th, 1907, and the second female on September 1st, 1908.

Allied to *A. abluialis*, Walk., the type of the genus *Adrapsa*.

Nodaria terminalis, sp. n.

♂. Head and thorax pale brown, mixed with grey, abdomen paler; antennæ ciliated with paired bristles. Fore wings pale brown with greyish suffusion; terminal fourth dark brown; antemedial line dark brown, wavy, indented below costa; postmedial line dark brown, outwardly oblique from costa to vein 6, thence wavy and sinuous, preceded by a dark shade; subterminal line pale brown, dotted with black, almost straight; dots on termen black, fringes brown-grey mixed. Hind wings pale fuscous, suffused with darker, especially on basal area; discoidal spot and medial line blackish, the latter limiting the darker basal area; subterminal line blackish outwardly edged with whitish, sharply angled before the tornus; terminal line black, fringes brown paler at the base. Under side of fore wings fuscous brown; discoidal dot, postmedial and subterminal lines black, the subterminal rather indistinct: of hind wings pale brown sprinkled with black; discoidal mark and two lines beyond black, the inner line wavy and the outer line indented before tornus.

Expanse, 30 millim. ♂; 32 millim. ♀.

Collection number, 1435.

One example of each sex. The male from Punkio (4000 ft.), August 4th, 1908, and the female from Karapin (3000 ft.), August 1st, 1908.

Allied to *N. centralis*, Zuch.

Nodaria (?) *apicimacula*, sp. n.

♀. Head, thorax, and abdomen pale brown mixed with darker. Fore wings pale brown dusted with darker, chiefly on the basal and terminal areas; a black dot on the cell and two dots at end of the cell, the latter placed on a dusky transverse shade; antemedial line black, slender, deeply indented below costa, inwardly oblique towards dorsum; postmedial line black, slender and wavy; subterminal line pale, indistinct; towards costa interrupting a broad oblique black dash from apex, preceded by black marks which increase in size towards dorsum; terminal line black, lunular; fringes grey brown, paler at base and tips. Hind wings pale brown dusted with darker, chiefly on basal and terminal areas; two black discoidal dots set in a dusky transverse shade; postmedial line black, thicker than that

on the fore wings; subterminal line pale, inwardly marked with black; terminal line and fringes as on fore wings. Under side pale brown, with most of the black markings of upper side reproduced, but these only faintly on the fore wings.

Expanse, 28 millim.

Collection number, 1022.

Two female specimens from Kanshirei, one taken May 2nd, 1907, and the other April 29th, 1908.

There is a rather rubbed male from Formosa (Wileman) in the British Museum. In this specimen the markings of the fore wings are only faintly traceable.

Nodaria unipuncta, sp. n.

♂. Head and thorax pale ochreous brown, abdomen paler. Fore wings pale ochreous brown, a black spot at end of the cell: antemedial and postmedial lines dark brown, the former wavy and the latter slightly excurved, both indistinct; traces of a dusky subterminal line and minute black dots on the termen. Hind wings whity-brown, suffused with darker brown. Under side whity-brown, fore wings suffused with darker; all the wings have a dusky discoidal dot and a transverse line beyond.

Expanse, 35-38 millim.

Collection number, 1426.

Two male specimens from Kanshirei, April 29th, 1908.

There is a female of this species from Kanshirei (Wileman) in the British Museum. It is of a deeper ground colour, and the subterminal line is dark brown outwardly edged with paler, and nearly straight. This specimen was taken in June, 1908.

Nodaria interrupta, sp. n.

♀. Fore wings pale ochreous brown, clouded and suffused with darker brown, except on the basal and three-fourths of the costal areas; antemedial line black, sinuous, bisecting two white spots; postmedial line black, outwardly oblique from costa to a white mark at end of the cell, thence inwardly oblique and wavy to the dorsum; discoidal lunule black, placed on the inner edge of the white mark; subterminal line white, sinuous and interrupted, outwardly edged with black towards the costa; terminal dots black; fringes grey-brown marked with paler. Hind wings whitish with blackish discoidal lunule and two transverse brownish bands beyond, neither band extending to the costa, the outer one edged outwardly with white and angled above dorsum; subterminal line dark brown, fringes whitish fairly marked with grey brown. Under side of fore wings pale ochreous brown sprinkled with darker brown, and suffused with fuscous on the disc; discoidal lunule and postmedial line black, the latter only distinct on the costal area; white markings on costal half as on upper side: hind wings white finely freckled with brown, discoidal lunule black; medial and postmedial lines blackish, serrate,

commencing in black spots on the costa, and marked with black opposite the cell.

Expanse, 25 millim.

Collection number, 1019e.

A female specimen from Arizan (7500 ft.), September 10th, 1906.

Near *N. duplicinota*, Hampson.

Nodaria rivulosa, sp. n.

♀. Fore wings pale brown, heavily powdered with darker brown; antemedial line black, wavy; postmedial line black, the upper part outwardly oblique, united with the black discoidal mark, lower part wavy and inwardly oblique; subterminal line whitish, highly sinuous, shaded inwardly with black; terminal line black-brown, fringes whitish marked with grey-brown. Hind wings pale fuscous, suffused with darker; traces of two dusky transverse lines, the outer line angled towards tornus and outwardly edged with white; terminal line black-brown, fringes whitish, marked with grey-brown. Under side of fore wings dark fuscous; postmedial line black, excurved; an almost round blackish spot, followed by some whitish marks, below costa indicate the subterminal line: hind wings whitish sparingly sprinkled with brown; discoidal spot black, two brownish transverse lines beyond.

Expanse, 22 millim.

Collection number, 1019c.

A female specimen from Arizan (7500 ft.), August 23rd, 1908. Allied to *N. simplex*, Hampson.

Bomolocha taiwana, sp. n.

♂. Head and thorax dark brown, paler mixed; abdomen pale brown. Fore wings pale brown, clouded with darker on dorsal and terminal areas; postmedial line white, oblique, sinuous; a white oblique line from the base near costa to dorsal extremity of the postmedial line; space enclosed by the white lines dark chocolate brown; subterminal line represented by dark dots outwardly edged with white; terminal line black, fringes dark brown, almost black. Hind wings dark fuscous. Under side pale brown freckled with darker; a dusky postmedial line on all the wings, and a black discoidal dot on the hind wings.

Expanse, 36 millim.

Collection number, 1458.

A male specimen from Kanshirei, April 27th, 1908. Allied to *B. mandarina*, Zuch.

Orthozona curvilineata, sp. n.

♂. Head and thorax dark grey brown, abdomen paler; antennæ serrate-ciliate; palpi recurved, densely scaled, third joint half-length of second. Fore wings dark grey brown; antemedial dark brown; postmedial line dark brown, preceded by a slender, very wavy, brown line; postmedial and antemedial lines are parallel, broad, slightly

curved, the former from apex of the wing; reniform stigma pale, indistinct, a dusky dot at lower end; a black point in the cell, and some black lunules on the termen. Hind wings grey-brown, paler on basal two-thirds; antemedial line blackish, not extended to costa; postmedial line dark brown, outwardly edged with whitish, not extended to costa. Under side greyish, freckled with brown and clouded with darker on the outer area of fore wings; a fringe of long pale hairs from vein 12; black discoidal dot on hind wings and traces of a pale-edged dusky postmedial line on all the wings.

♀. Palpi porrect, third joint upturned, about one-third length of second, which is rather hairy above. Similar in colour and marking to the male, but with a slender, wavy, brown subbasal line on the fore wings.

Expanse, 30 millim. ♂; 40 millim. ♀.

Collection number, 1762.

One example of each sex from Rantaizan, the male taken May 10th, 1909, and the female May 9th, 1909. The palpi of the sexes differ in structure, but as regards this character the female agrees exactly with female *O. quadrilineata*, Moore, upon which the genus *Orthozona*, Hampson, was founded (Fauna Brit. Ind. Moths, vol. iii. p. 94).

Orthozona bilineata, sp. n.

♂. Fore wings pale greyish brown, antemedial and postmedial lines rusty brown, oblique, the postmedial broad commencing on the costa just before apex; reniform stigma pale ochreous, two brown dots in it; a black dot in cell; terminal line brown, interrupted at ends of the veins. Hind wings pale greyish brown with two rusty brown lines, apparently continuations of those on the fore wings; terminal line dark brown. Under side pale greyish, fore wings suffused with dusky on the disc, hind wings with a dusky discoidal dot and traces of two wavy transverse lines.

Expanse, 33 millim.

Collection number, 1761.

A male specimen from Rantaizan, May 11th, 1909.

Very similar to *O. curvilineata* but the lines of fore wings are oblique, the postmedial is from before apex instead of from the apex itself, and there are no hairs from vein 12 on under side. Antennæ and palpi as in *O. curvilineata* male.

Anepa contigua, sp. n.

♂. Head and thorax pale brown, crest on thorax rather darker; abdomen paler brown with minute black crests; antennæ fasciculated. Fore wings pale brown, freckled with darker; antemedial line dusky, indistinct, a white dot on it in the cell; postmedial line dusky, slightly sinuous, indented above dorsum; subterminal line indicated by a series of black dots parallel with termen. Hind wings whitish brown, suffused with fuscous; traces of a dusky discoidal dot. Under side pale brown, all the wings have a black discoidal dot and dusky postmedial line.

♀. Similar but without dark freckling on the fore wings, the postmedial line is more oblique and less sinuous.

Expanse, 32 millim. ♂ ; 35 millim ♀ .

Collections numbers, 1009 and 1876.

One example of each sex from Arizan (7500 ft.) taken in September, 1906.

Another female specimen captured at Arizan in August, 1908, appears to be referable to this species, but it is rather worn.

Closely allied to *A. oxydata*, Hampson.*

Heterogramma nigrisigna, sp. n.

♀. Head and thorax pale grey brown, dusted with rather darker brown; abdomen paler. Fore wings pale grey brown, dusted with darker; antemedial line black, wavy; postmedial line black, wavy, excurved round cell, indented above dorsum; discoidal mark black, lunular; subterminal line pale ochreous brown, edged internally by an interrupted black line, followed on the costa by a quadrate black spot, terminating on dorsum near tornus. Hind wings pale brown, suffused with darker on tornal area; medial line blackish, curved; postmedial line pale ochreous, angled and internally black edged towards dorsum. Fringes of all the wings pale brown inclining to ochreous towards base, preceded by a blackish line. Under side pale brown, suffused with blackish on the fore wings, whitish powdered with brown on the hind wings; all the wings have a black discoidal mark and the transverse lines of upper side are traceable.

Expanse, 29 millim.

Collection number, 1019.

One female specimen from Kanshirei, April 17th, 1906.

Near *H. discosticta*, Hampson.

NOTES AND OBSERVATIONS.

THE Annual Verrall Supper at the Holborn Restaurant was no less a success this year than is usual. The record was reached in 1914 with a total of just over the century; but on January 19th, 1915, this was run very close by the "ninety-and-nine" who sat down to an ample supper, after much enjoyable chat upon the entomological exploits of the past year. All, or nearly all, the familiar faces were present; the main exceptions were the brothers Waterhouse, Mr. E. A. Newbery who had accepted, and the very few who have passed away in the interim, such as Rev. E. N. Bloomfield. These were, however, replaced by many new faces, prominent among which were Prof. J. W. Carr, of Nottingham, and Mr. Bruce Cumings, of the British Museum. Several of those present were in khaki, and our Allies were represented by at least one Japanese gentleman, as the chairman remarked in a most particularly happy speech, concluded by those present drinking in silence to the memory of Mr. Verrall.—C. M.

* Journ. Bomb. Soc. xi. p. 707 (1898).

NEW WORK ON BRITISH BUTTERFLIES.—It is no doubt somewhat of an open secret that for some thirty years or more Mr. F. W. Frohawk has been collecting first-hand material for a complete history of the British Butterflies. In all some 1400 coloured drawings, delineating the various stages of each species from ova to imago, have been prepared in Mr. Frohawk's best style, together with copious explanatory manuscript. The whole was in order for the printer, and arrangements for publication were being made when the unfortunate outbreak of war rendered it impossible to proceed, and the publication of the complete work will, therefore, have to stand over until things have settled down again, when it is hoped that it may be produced in a style worthy of the labour that has been spent upon it. As, however, there is no guarantee when this opportunity may occur, it has been thought desirable that the whole of the vast information contained in the work should not be longer withheld from present-day entomologists. Arrangements have, therefore, been made with the proprietors of the 'Field' to publish it in an abridged form, and the first instalment appeared in the issue of that journal for December 26th last, and has since been continued weekly. In all some five hundred black-and-white reproductions of the more important of the original drawings, from photographs by Mr. A. W. Dennis, will appear, together with an abridged account of each species. The parts already published cover the introductory remarks and descriptions of the species of the Pieridæ, and are in all respects satisfactory. The present issue, although admittedly but an instalment of what it is hoped may follow later on, when it is possible to publish the complete work, bids fair to be a valuable addition to our knowledge of this interesting group of the British Lepidoptera, and as such we heartily commend it to our readers.—R. A.

USE OF FORMALIN IN SETTING INSECTS.—In reference to the notes on this process which have been published recently in the 'Entomologist' (xlvii. p. 325, and xlviii. p. 19), it may be of interest to offer some explanation of the action of formaldehyde on insect tissues. In the first place, formaldehyde is only known in solution, usually of about forty per cent. strength, and this is the "formalin" of commerce. "Formalin" liberates formaldehyde as vapour on evaporation, or more rapidly by boiling. Formaldehyde has the property of uniting chemically with gelatin and albumen; also with the animal tissues from which these are derived. It also, apparently, unites with chitin, the skeletal tissue of insects. The effect of this union of formaldehyde with any animal tissue or product is to render the latter insoluble in and resistant to the action of water: it is this property which no doubt explains the fixation of "set" insects, since after treatment with formaldehyde vapour these do not soften under the influence of moisture. With regard to the suggestion of Messrs. St. John and Kershaw, that this might be used also to prevent "grease," so far as I know formaldehyde does not combine with fats, but it is possible that it might prevent the decomposition which produces these undesirable greasy substances in the insects' bodies. In this connection I might again draw entomologists' attention to the use of formalin as a preventive of mould

(see 'Entomologist,' xxxiii. p. 90), but I should warn them not to subject "emeralds" to the treatment, as the tints are thereby spoiled; other colours seem to be quite resistant.—W. S. GILLES, F.I.C., F.C.S.; Bocking, Braintree.

FURTHER NOTE ON FORMALDEHYDE.—The interest—for I have received several communications on the subject—taken in my note in the 'Entomologist' of December last on the use of formaldehyde, prompts me to enclose a few further remarks which may be of interest to Mr. Kershaw and others. Solution of formic aldehyde or formaldehyde is synonymous with formalin, which is a trade term. It is usually sold in forty per cent. solutions, and should be kept in a well stoppered bottle, in a cool place, protected from light. Solutions of greater concentration than thirty-eight per cent. tend to crystallize out into the solid polymer, paraformic aldehyde. This is the usual form (mixed with a little paraffin wax) used for disinfecting houses, &c., by means of the "formalin lamp." In the concentrated form it is a powerful caustic, and should be handled with care. A one per cent. solution kills most micro-organisms, and a four per cent. solution is used as a hardening agent for microscopical purposes in pathology. It is incompatible with ammonia and fatty bases. From the above figures it is obvious that one can easily make a five or ten per cent. solution of formaldehyde in ether, in order to try Mr. Kershaw's excellent suggestion of hypodermically injecting insects. So far, I have not tried this method, because the vapour has hitherto given such good results with so little trouble, but I intend to at the first opportunity. One point occurs to me, *viz.* should the injection be done while the insect is still soft, or after the "initial set"? When soft, the needle would slip in easily, and there would be less risk of damage to the specimen, but the ethereal solution would probably permeate better when the insect was dry. Experience, however, will show.—WINSTON ST. A. ST. JOHN, M.R.C.S., L.R.C.P.; Derwent House, Derby.

LALIA CENOSA, &C., AT WICKEN.—With reference to Mr. G. B. Kershaw's notes on *Lalia canosa* at Wicken ('Entomologist,' January, 1915, p. 20), it may be as well to state, for the benefit of the younger generation of lepidopterists, that the last record of the occurrence of the species in Britain may be found in pages 229 and 230 of the 'Entomologist' for 1879. In that year I took three specimens on the night of July 26th, and two more two or three nights later. Mr. Kershaw is quite right in saying that I exchanged those five specimens, still unset, for as many *Nascia cilialis*; but it was not with the late Solomon Bailey, but with the late Albert Houghton. Since then that exchange has been the greatest entomological regret of my life! But at the time my then very short series of *canosa* was complete, and as *cilialis* was in those days considered rare, and a great desideratum with me, I let them go without any hesitation, never supposing there was even a possibility that *canosa* might never again be recorded in Britain. The five specimens were all very fine males, bigger than any I possess even now. Houghton sold them to Mr. W. H. B. Fletcher, in whose collection they still remain. The

plantation referred to by Mr. Kershaw, in which *Hadena atriplicis* used to occur, was on the other side of Wicken from the Fen, and near to what was then known as Mr. Johnson's farm. The species has, however, been taken, I believe, in some numbers, at no great distance from Wicken, nearer Ely, I was told, much more recently; and in my series are seven very nice specimens, bred from that locality by the Rev. C. D. Ash, in 1899.—GEO. T. PORRITT; Huddersfield, January 8th, 1915.

PHALERA BUCEPHALA AT REST.—The simulation by this moth of a dead twig is quite well known; but some detail as to its capture, under somewhat peculiar circumstances, may perhaps be of interest, and for myself, I was enabled to take a number of specimens, merely through their incautious choice, as to suitable surroundings, of their resting place. My natural history rambles almost invariably take me through a short lane near here, where I usually obtain some good captures, and, as usual, I started my day's ramble with the intention of taking my periodical survey of this lane. I had reached a point some little way through here, when, what was my astonishment at seeing on the back of a green leaf of the corked barked elm tree a fine male specimen of *P. bucephala*, the dead twig resemblance being so remarkable that, had I not been looking for these moths, I should have passed it by, but my attention was not drawn to it by the dead twig resemblance, but by the exceptionally showy green background which rendered the insect doubly conspicuous to the collector; whereas, had the insect been settled with a suitable background, it would have escaped the keenest observer, as numbers of them do. Moreover, I have observed this occur quite frequently.—E. PHILLIPS; 64, Quantock Road, Windmill Hill, Bristol.

MELLINIA OCELLARIS, &c., IN CAMBRIDGESHIRE.—I thought it might be of interest to record that last autumn I took over two dozen specimens of *Mellinia (Xanthia) ocellaris* here (Shelford) among wych elm. The food-plant of this species is given as black poplar, I believe, but there is only one poplar tree in the immediate neighbourhood, and that is quite a quarter of a mile away; moreover, one of my specimens was taken resting on an elm trunk, with wings undeveloped, fresh from the pupæ, and all were in such good condition that they could not have flown more than a few yards at the most. Unfortunately, I was unable to obtain eggs from several females retained for the purpose, so cannot try the larvæ on either elm or poplar, and should be glad if someone could give me a few particulars concerning the early stages of this local moth, as on the last occasion (1907) of taking it I was unable to obtain ova, the cause being the same, infertility. A female sent this autumn to Mr. L. W. Newman, of Bexley, proved to be in the same condition; no doubt all those taken (at treacle) had only just emerged. Another likely food-plant of the larvæ here are the various kinds of willows, and more than once I have taken specimens among these trees. Although my series of the perfect insect is not extensive, I have several nice forms; one fine female being suffused all over the fore wings with "salmon" pink, and looked very unusual and beautiful on the sugar. Another

(a male) is exceptionally dark on both wings. I have not seen, however, any tendency to a central band, though one or two certainly approach it. With the exception of a good many *Lithophane* (*Xylina*) *semibrunnea*, I took very little else beside *M. ocellaris* last autumn, and even *M. gilvago* was very scarce (only seven turning up). In fact, I had very bad luck with all the Lepidoptera during 1914, and gave most of my attention to the Hymenoptera, in which family, owing to the continual fine weather, I was well rewarded.—HUGH PERCY JONES; "Westwood," Great Shelford, Cambridge, January 2nd, 1915.

ARASCHNIA LEVANA IN HEREFORDSHIRE.—I was pleased to note (Entom. xlvii. p. 325) that this interesting butterfly has turned up again at Symonds Yat and the Forest of Dean since my capture of May 28th, 1913. Apparently the species has established itself in this country, and that locality, seeing that it was taken in numbers this season. It would, however, be interesting to know if those caught by Mr. Hughes and Mr. Oliver are of the first brood, as the second brood are so different from the first, and appears about the end of July, which is the time I note the specimens referred to were taken. The specimen I took in May, 1913, is of the first brood, and was identified by Mr. H. Rowland-Brown, and exhibited by him before the Entomological Society of London, October 1st, 1913 (see 'Entomologist,' December, 1913, p. 336). Would Mr. Hughes and Mr. Oliver kindly say if the specimens taken by them were var. *prorsa* (2nd brood)?—T. BUTT EKINS; Loxbere House, Windsor Terrace, Penarth, December 12, 1914.

HADENA ATRIPLICIS AT WICKEN.—Mr. Thurnall's short article in the December 'Entomologist' was specially interesting to me, inasmuch as I possess one—unhappily one only—*Hadena atriplicis*, taken by myself at Wicken, in 1879. In June of that year I went thither with my friend, the Rev. T. W. Daltry, and on our arrival, to our dismay we found the fen deep in water, so that collecting there was for the time impossible. We turned our attention to "sugaring" in a small plantation, called "Johnson's Spinney," which, I think, must be the same that Mr. Thurnall mentions; and there, amongst other things, mostly common, I was fortunate enough to obtain a fine male *atriplicis*, which still, after more than thirty years, adorns my collection. I only wish I knew where to get some more.—CHAS. F. THORNEWILL; 15, S. Margaret's Road, Oxford, December 8th, 1914.

UNUSUAL COCOONS OF HABROSYNE DERASA.—I have recently observed an occurrence which seems to me so unusual as to be worth recording. I have been breeding a number of larvæ of *Habrosyne derasa*, taken at large, and have found no less than three cases in which two larvæ have formed a cocoon in common. The cocoons are of normal form, but more extensively lined with silk than is common with the species, and in each case the two pupæ were lying side by side in the one cocoon, with no division of silk or ridge between them. The cocoons were formed in cocoanut fibre, and were, of

course, unusually large. I should be glad to know if this occurrence is as exceptional as it seems to me to be. I have never observed a similar instance in any of the Lepidoptera I have bred.—H. C. HAYWARD; The Croft, Repton, October 14th, 1914.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*Wednesday, October 7th, 1914.*—Mr. G. T. Bethune-Baker, F.L.S., F.Z.S., President, in the chair.—Dr. Leslie C. Coleman, D.Sc., Dept. of Agriculture, Bangalore, Mysore, India, and the Rev. Frederic S. F. Jannings, Warmsworth Rectory, Doncaster, were elected Fellows of the Society.—Mr. O. E. Janson exhibited an abnormal specimen of *Melitæa aurinia*, taken in Kent, in which six of the nervures were almost symmetrically deficient on either side.—Mr. G. T. Porritt, a series of *Chloropera venosa*, Steph., taken by Professor Carr and Mr. Mottram on the river Trent, near Nottingham; also a series of *C. grammatica*, Poda, for comparison.—The Rev. F. D. Morice, a specimen of *Crabo (Lindeinus) albilabris*, F., female, with abnormal ocelli; also a photograph, from nature, of eggs *in situ*, laid in a rose-stem in a double row by Vallisneri's "Moseca dei Rosai," *Arge pagana*, exactly as in the author's original figure.—The Rev. G. Wheeler, a gynandromorphous specimen of *Plebeius argyrognomon* taken by him in the Val Maggia on July 13th this year, exactly halved, the right wings being female, the left male. Also an extreme example of ab. *persica* of *Polyommatus icarus* taken on the marshes at Altmatt on July 11th, and a male of *Pararge mæra* with symmetrical deeply concave costa of both fore wings, taken on the Via Mala on July 17th; also a well-marked series of *Pieris manni* from Vernayaz, taken on July 5th this year.—Mr. Prideaux, a very perfect example of *Rumicia phlæas*, ab. *schmidtii*, of a pale yellow colour; also a male *Polyommatus icarus*, ab. *obsoleta*, and some very blue females of the latter species, all taken in the neighbourhood of Brasted, N. Kent.—Mr. Donisthorpe, specimens of *Platyphoru lubbocki*, Verrall, and *Enigmatias blattoides*, Meinert, which he had reared in a nest of *Formica picea*, Nyl., taken in the New Forest in July last. He pointed out that he believed he had proved that these two flies were the male and female of same species.—Mr. L. W. Newman (1) A curious gynandromorphic *Polyommatus icarus*, the right fore wing being female and the remaining three wings male except for one orange lunule on each of the hind wings. (2) A curious Zygænid of doubtful species, being small and having four spots only. (3) A short series of *L. ilicifolia*, bred from the wild female taken May, 1913, at Cannock Chase by Mr. Oliver. (4) A pair of beautiful *Neuria saponariæ* from the Cork coast, the ground-colour being a rich pink instead of the usual yellowish colour.—The following papers were read: "Contributions to the Life-History of *Polyommatus eros*," by T. A. Chapman, M.D., F.Z.S., F.E.S.; "Parthenogenesis in Worker-bees at the Cape," by R. W.

Jack, F.E.S. ; "Description of New Species of *Catanticta*," by W. F. H. Rosenberg, F.E.S. ; "Revision of the Species of the Genus *Odynerus* (Hymenoptera) occurring in the Æthiopian Region," by G. Meade-Waldo, M.A., F.E.S. ; "Some Remarks on the Coccid Genus *Leucaspis*, with Descriptions of two New Species," by E. Ernest Green, F.E.S.

Wednesday, October 21st.—The Hon. N. C. Rothschild, M.A., F.L.S., F.Z.S., Vice-President, in the chair.—Messrs. L. D. Cleave, Dept. of Science and Agriculture, Georgetown, British Guiana, and J. R. Menon, B.A., Trichur, Cochin State, South India, were elected Fellows of the Society.—The death was announced of Mr. William Warren, M.A., F.E.S.—Dr. T. A. Chapman exhibited three abnormal specimens of Anthrocerids, and read notes.—Mr. L. W. Newman, a long and varied series of *Dianthæcia barrettii*, bred from wild larvæ collected in Co. Cork, and dug pupæ from S. Devon ; also a series of *Boarmia repandata*, all bred from wild collected larvæ from a very small radius in the Wye Valley, the range of variation being startling.—Mr. A. E. Tonge, a specimen of the hybrid *A. populi* ♂ × *S. ocellatus* ♀, bred *ab ovo*, which emerged September 11th, 1914. A pairing had been obtained by Mr. T. H. L. Grosvenor, of Redhill, in May, 1913. About forty ova were laid, but only one hatched, the resulting larva pupating in August, 1913 ; also a specimen of *R. phlæas*, taken on Deal sandhills in September, 1914, without the red marginal band on the hind wings.—Mr. G. Meade-Waldo, a styloped specimen of the Sand-wasp, *Ammophila tydei*, Guill., from South Africa. There were no less than seven Stylops parasitic on it.—Mr. E. B. Ashby, some South European butterflies, chiefly from the South of France.—Mr. Rippon, a variety of *P. monacha*, which, as far as he had been able to ascertain, had not been previously recorded. The variation consists in the body being banded with black and yellow ; also, five specimens of *Triphana fimbria*, bred from Pamber Forest larvæ.—Mr. A. H. Jones, a number of moths from Sarepta, and read notes.—Dr. E. A. Cockayne exhibited : (a) Thirty-eight gynandromorphous *Agriades coridon* from Royston ; (b) Two females of *A. coridon* from Royston showing streaks of blue. Neither showed any signs of androconia. (c) One gynandromorphous *Polyommatus icarus* (Co. Clare, 1914), predominantly female *ab. cærulea*, but with streaks of male colour on the right fore wing and both hind wings. These showed androconia as regularly arranged and numerous as in areas of the same size and situation in a normal male.—The following paper was read : "On Hawaiian Ophioninæ (Hymenoptera, Fam. Ichneumonidæ)," by R. C. L. Perkins, M.A., D.Sc., F.E.S.—Rev. GEORGE WHEELER, *Hon. Sec.*

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—November 12th, 1914.—Mr. A. E. Gibbs, F.L.S., Vice-President, in the chair.—Mr. Sich reported having seen a *Pyrameis atalanta* in Holborn on that day, November 12th.—Mr. H. Moore exhibited a small colony of the ant *Camponotus abdominalis*, found in a banana from the W. Indies.—Mr. Step, abnormal catkins of hazel from Mickleham, probably due to the attack of the gall-mite *Eriophyes*

coryli.—Mr. Hall, a gynandromorphous specimen of *Agriades coridon*, essentially a female but with patches of blue scales and androconia on the right fore wing.

November 26th.—Mr. B. H. Smith, B.A., F.E.S., President, in the chair.—Mr. R. Adkin, long series of *Agriades thetis*, including males of aberrant colour, often asserted to be hybrids with *A. coridon*; females showing blue coloration of the male; and many under side varieties.—Mr. H. Worsley-Wood, a bred series of *Callimorpha quadripunctaria* (*hera*) and its aberration *lutescens*.—Rev. G. Wheeler, series of *Plebeius argyrognomon* var. *armoricanus* from Brittany with emphasised markings, series of *Hesperia malvæ* var. *taras* from the Rhone Valley, a gynandromorph of *P. argyrognomon*, right female, left male, &c.—Mr. Prideaux, a gynandromorph of *Trichiura crategi*, *Agriades coridon*, with silver-tipped peacock eyes on hind wings upper side, with albinistic and melanistic specimens of several species.—Mr. Talbot, for Mr. J. J. Joicey, rare exotic Lepidoptera, including *Ornithoptera alexandrae* and *O. rothschildi*, with several rare and new species of *Papilio*, very fine species of Hepialidæ from Australia, including *Charagia ramsayi* and a Tinæid which attacks the larvæ, and some very fine Cossidæ, also from Australia.—Mr. A. E. Gibbs, new world Papilionidæ, including *P. ornythion*, *P. montezuma*, *P. gundlachianus*, *P. sesostris*, *P. lycimenes*, *P. torquatus*, *P. homerus*, *P. glaucus*, &c., with their various local races, and gave notes on each species.—The Rev. A. S. Stiff, a series of *Epinephele tithonus* from Tavistock, showing much colour variation and considerable aberration in the spotting, and a very varied series of *Ematurga atomaria*, including very fine yellow forms and a female with male coloration.—Mr. Ashdown, a series of *Aphantopus hyperantus* with aberrant and asymmetrical spotting on the under side, including ab. *cæca*.—Mr. Turner, an aberration of *Argynnis niobe* with the upper side black, spotting coalesced into an irregular band and the under side silver basal spots coalesced into three large blotches.—Mr. Newman, a large number of Irish Lepidoptera, including *Pieris napi*, *P. rapæ*, *Polyommatus icarus*, *Dryas paphia*, *Melitæa aurinia*, *H. semele*, *Neuria reticulata*, &c., all more or less of local forms, bred *Dianthecia luteago* var. *barrettii*, *Pachnobia hyperborea*, and *Callimorpha dominula* ab. *rossica*, a long series of aberrations of *Agriades coridon*, two *Anthrocera filipendulæ* ab. *chrysanthemii*, eight bred *Gastropacha ilicifolia* from Cannock Chase, and many other striking forms and local species.—Mr. A. H. Jones, aberrations of *Melanargia galathea*, ab. *pallida* of *A. coridon*, ab. *pallida* of *Cænonympha pamphilus*, and melanic examples of *Amphidasys betularia*, *T. variata*, and *Cularia immanata* from Eltham.—Mr. Schmassmann, a number of *Ornithoptera* and *Morpho*, including *O. lydius*, *O. cræsus*, *O. bornemannii*, *O. poseidon* and its races, *O. paradisea*, *Morpho hecuba*, *M. justitia*, *M. amphybion*, *M. cacica*, *M. rhetenor*, and *M. aureola*.—Mr. West, the reference collection of the Society, including the numerous additions made by the Dawson donation.—Mr. Pickett, very long series of *Angerona prunaria*, the results of seventeen years' breeding and experiment, including many examples bred under varied colour conditions; he also showed long series of *Agriades coridon*, with many

aberrations and gynandromorphs.—Dr. T. D. Morice, a collection of British Chrysididæ and a collection of the more conspicuous species of Palæarctic Chrysididæ.—Mr. Curwen, series of the European *Parnassius*, *P. apollo*, *P. delius*, *P. mnemosyne* and *Dorilis apollonius*, and series of *Lycæna*, *L. arcas*, *L. arion*, *L. alcon*, *L. euphemus* and *L. iolas*, with several aberrations of *Apatura ilia*.—Mr. Mera, a long varied series of *Psilura monacha*, including ab. *erimita*.—Mr. Tonge, a male *A. thetis*, 22 mm. in expanse, *Polyommatus icarus* blue females and ab. *icarinus*, ab. *striata*, &c., with pink and melanic *Bryophila perla* from Deal.—Mr. H. B. Williams, aberrations of *Euchlōe cardamines*, *Cænonympha pamphilus* ab. *pallida*, *Aricia medon*, ab. *albimaculata*, *Rumicia phleas*, ab. *radiata*, ab. *obsoleta*, ab. *subobsoleta*, and ab. *anticostriata*, *Amorpha populi*, gynandromorphs, *Agriades coridon*, ab. *semisyngrapha*, ab. *obsoleta*, ab. *pallida*, and ab. *inæqualis*.—Rev. J. E. Tarbat, a *Pieris rapæ* measuring only 38 mm. in expanse.—Mr. Brooks, an *Abraxas grossulariata* with pale orange ground colour and no bright orange on fore wings.—Mr. Platt Barrett, the three *Parnassiids* of Switzerland, and noted the small amount of variation he had seen in the species this year.—Mr. Stallman, a varied series of *Xanthorhōe fluctuata*, some very dark, and including ab. *costovata*, and aberrations of *P. phleas*, *N. augur*, *T. comes*, and of *M. circellaris* red and slaty forms, light orange ground and streaky forms.—Mr. Edwards, many species of *Papilio* from the Indian and Austro-Malayan Region.—Mr. B. S. Williams, a melanic *Biston hirtaria*, the rare form ab. *fumaria*, from Finchley, bred.—Mr. Sheldon, the Lepidoptera taken by him in S. E. Russia during May and June, including local forms of western species and several more eastern species:—*E. cardamines* var. *volgensis*, *C. rubi* var. *schamyl*, *P. amanda* var. *lydia*, *M. aurinia* var. *sareptana*, *M. cinxia* var. *obscurior*, *M. phæbe* var. *atheria*, *M. trivia* var. *fascelis*, *A. niobe* var. *kuhlmanni*, *M. iapygia* var. *suwarovius*, *S. hernione* var. *tetrica*, &c., and *C. erate*, *P. eroides*, *S. anthe*, *H. cribrellum*, *P. clymene*, *N. lucilla*, &c.—Mr. Pearson, species and aberrant examples of alpine butterflies taken this year, including *Brenthis pales* ab. *napæa*, *E. medusa* ab. *hippomedusa*, *B. thore*, pale *E. lappona*, *E. ceto* ab. *obscura*, &c., from Engadine and Tyrol.—Mr. T. W. Hall, his collection of *P. icarus*, *A. coridon* and *A. thetis*, including many fine aberrations and several gynandromorphs.—Dr. Cockayne, the series of *A. coridon* described in his paper in the Ent. Rec. on gynandromorphs, and also two similar forms of *P. icarus*.—Mr. H. E. Page, series of *Plebeius argus* from many alpine localities, and also a series of var. *casaiicus* from Pajares, &c. in Spain.—HY. J. TURNER, *Hon. Rep. Sec.*

LONDON NATURAL HISTORY SOCIETY.—Arrangements have been made by the Lepidoptera Committee of the above Society for a member of the Committee to attend at Salisbury House at 6.30 p.m. on meeting nights (first and third Tuesdays in each month, except July and August) for the purpose of giving advice and assistance to young entomologists, whether members of the Society or not. A cordial welcome will be extended to any who care to avail themselves of this arrangement.

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W. J. LUCAS, B.A., F.E.S.

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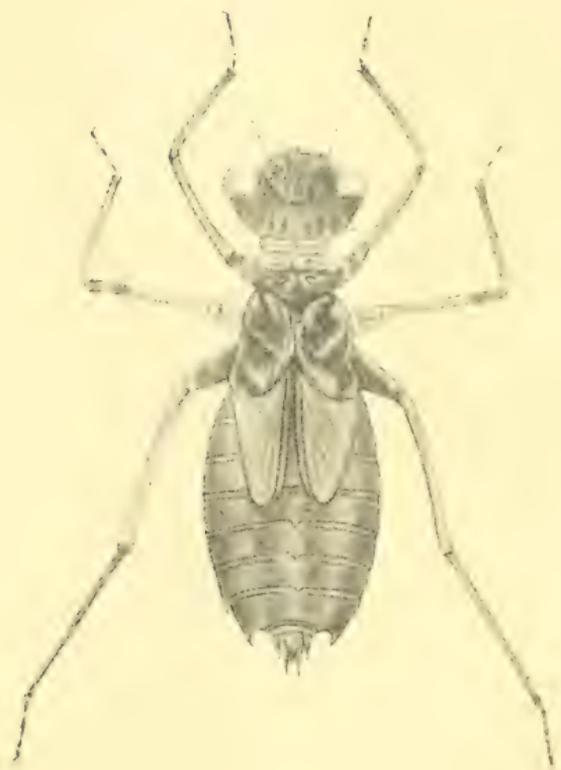
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THE ENTOMOLOGIST

Vol. XLVIII.]

MARCH, 1915.

[No. 622

ODONATA, &c., TAKEN BY DR. T. A. CHAPMAN IN
JULY AND IN MAY, 1914.

By W. J. LUCAS, B.A., F.E.S.

(PLATE III.)

WITH his usual kindness Dr. Chapman secured for me in July last a few Pyrenean insects belonging to the orders Plecoptera, Ephemeroptera, Odonata, Neuroptera, and Trichoptera. We must still, I fear, describe these orders as "neglected," but if other lepidopterists would in the same way spare a little time occasionally for entomology in general, the objectionable epithet would soon tend to become inapplicable. On the present occasion I have particularly to thank Dr. Chapman for enabling me to obtain a figure and description of the nymph of that very interesting dragonfly, *Sympetrum flaveolum*, which, like the Peacock Butterfly, is in Britain on the verge of its permanent habitation, apparently indeed just outside it. *S. flaveolum* occurs here as a migrant, not in most seasons as does *V. cardui*, but only very occasionally, though it is quite possible that after a large migration British-born examples may occur for a season or two, as may also be the case with *S. fonscolombii*. I am not aware that either the description or the figure of these nymphs has so far appeared; I have therefore prepared both for *S. flaveolum* from the material which Dr. Chapman has supplied.

During his visit to the Pyrenees Dr. Chapman's headquarters were: Gavarnie in the Central Pyrenees (July 12th-31st) at an altitude of 4430 ft., and Gabas in the Eastern Pyrenees (July 8th-11th) at an altitude of 3690 ft. In each case collecting was done chiefly up-hill, as high as 8000 ft. from Gavarnie and 6000 ft. from Gabas. The collection, though not an extensive one, was widely scattered over the Insecta, and I have to thank Mr. K. J. Morton and Rev. A. E. Eaton for assisting me with the identification of some of the species.

1. **Plecoptera.**

Perla cephalotes. Female, Gabas.

Arcynopteryx dovreensis. Two males, one female, Gabas.

Chloroperla grammatica. Gabas and Gavarnie.

Nemoura variegata. Gabas.

Nemoura (sp.?). One male, two females, Gabas, belonging to the *marginata* group and somewhere near *obtusa*, but the single male is in poor condition.

2. **Ephemeroptera.**

One male sub-imago, apparently of the genus *Rhithrogena*, without any dark longitudinal, submedian, femoral streaks. The Rev. A. E. Eaton cannot say definitely whether or not it is *Rh. semicolorata*. Gavarnie.

3. **Odonata (= Paraneuroptera).**

Sympetrum flaveolum. One male of mature colouring, four males teneral, one female teneral, one nymph-skin with a female recently emerged from it, another nymph-skin of the same species but without the imago. All from Gavarnie. Dr. Chapman says that the ponds producing *S. flaveolum* were above 4430 ft. in altitude (say 5000 ft.): a "hatful" (size not mentioned) of nymphs, nymph-skins, and teneral imagines had usually left the neighbourhood and what efforts he made to catch them were very unsuccessful.

Cordulegaster annulatus. One female, Gabas; the left hind wing deformed near the tip.

Calopteryx virgo. One male, Gabas; wings with teneral colouring.

Lestes dryas. Twelve males, Gavarnie.

Lestes sponsa. One male, Gavarnie.

Pyrrosoma nymphula. One male, Gabas; two females, Gavarnie.

4. **Neuroptera.**

Ascalaphus coccajus. One male, four females, Gavarnie; nice specimens from several localities at about 4800 ft. elevation.

Sialis fuliginosa. One, Gabas.

Panorpa meridionalis. One male, one female, Gabas; three females, Gavarnie; all strongly marked, and with very black spots.

5. **Trichoptera.**

Asynarchus cænosus. Male, Gavarnie.

Drusus discolor. Male, Gabas; male, Gavarnie.

Drusus rectus. Three males, Gavarnie.

Apatania meridiana. Male, Gavarnie.

Sericostoma pyrenaicum. Male, Gabas.

Micrasema morosum. Male, Gavarnie.

Hydropsyche pellucidula. Female, Gabas.

Wormaldia subnigra. Female, Gabas.

Plectrocnemia scruposa. Female, Gavarnie.

Rhyacophila occidentalis. Female, Gavarnie.

Rhyacophila tristis. Female, Gavarnie.

DESCRIPTION OF NYMPH OF *S. flaveolum*. (Plate III.)

General colour sepia, but varying in depth of tint. *Length*, including anal appendages, about 16·5 mm.; greatest *breadth* about 5·5 mm. *Head*, transversely about 4·25 mm.; longitudinally about 3 mm.; in shape pentangular, somewhat rectangular behind; surface fairly smooth, except for a few hairs of considerable length on the occiput; top of head rather flat; colour of head fairly uniform, though in places there are some slightly darker markings. *Eyes*, rather large, situated at the forward corners of the head, nearly hemispherical in shape. *Antennæ* of seven segments; length about 2 mm.; the basal segment globular, the next cylindrical, the rest hair-like; the fourth segment is short compared with the rest of the hair-like ones. *Labium* (mask) decidedly and deeply spoon-shaped, covering the mouth, somewhat rapidly narrowed towards the hinge, which is situated in front of the insertion of the mid-legs; mid-lobe, with apical angle considerably greater than a right angle, and margin almost entire; moveable lobes (palpi) sub-triangular, outer and inner margins convex and nearly entire, distal margin nearly straight and slightly toothed; moveable joint at junction of outer and distal margins rather long and slender (to all appearance of little use for purposes of holding); mental setæ about nine in each comb, lateral about eleven in each, all pale and slender, inserted in a rufous socket. *Prothorax* narrow, collar-like. *Mesothoracic spiracles* large and conspicuous. *Mesothorax* and *metathorax* smooth, mottled with darker brown markings. *Legs* nearly concolorous, neither very rough nor very hairy, though tibiæ have a fringe of hairs; length of fore-legs about 9 mm., of mid-legs about 9·5 mm., of hind legs about 14 mm. *Abdomen* practically without hairs, slightly mottled and bearing a few dark dots dorsally, smooth and unicolorous ventrally; a small blunt mid-dorsal spine on the hind margin of each of segments six, seven and eight, and small lateral sharp ones on the hind margin of segments eight and nine; the ninth segment truncated behind, the tenth small. *Anal appendages* small, pointed, surrounded by hairs, dorsal appendage of moderate length, triangular; laterals shorter and more slender; lower ones slender and longer than the other three.

Material.—A nymph-skin with the recently emerged female, and another nymph-skin presumably of the same species (and agreeing on examination); from Gavarnie, Hautes Pyrenees, July 12th–31st, 1914; brought home and given to the author by Dr. T. A. Chapman.

When compared with the nymph of *S. striolatum* (*vide* Entom. xlvii. pl. ii. 1914) the great difference in length of the lateral abdominal spines will be at once noticed, and these provide a sufficient means of discriminating the species.

In May Dr. Chapman paid a visit to Pallanza in Italy, whence he brought:—

Odonata.

Libellula quadrimaculata. One male.

Orthetrum cancellatum. One female.

Trichoptera.

Tinodes wæneri. A series.

Polycentropus flavomaculatus. One.

Neuroptera.

Megalomus hirtus. One specimen. As it is a female, it does not give much assistance towards identification in its anal structures, but it is more like the northern *hirtus* than the southern *tortricoides*.

Kingston-on-Thames: February, 1915.

THE BUTTERFLIES OF THE BUCKS. CHILTERNs.

By H. ROWLAND-BROWN, M.A., F.E.S.

(Continued from p. 30.)

S. Agriades thetis, v. Rott. (= *bellargus*, v. Rott.). I had always supposed this species to be extinct in the Chilterns, or, at all events, in that part of the range then known to me, until in June, 1900, I came across a small colony on a piece of ground less than an eighth of an acre in extent. Being abroad that year I did not revisit the spot at the normal time of the second emergence, but I have done so both in spring and in autumn many times since; though never again have I been fortunate enough to repeat the experience (*cp.* 'Entomologist's Record,' vol. xii. p. 349).

Writing to me on December 30th, 1900, Mr. Peachell, who was then living at High Wycombe, says: "Re *P. bellargus*, it is curious that we have never found the species in this neighbourhood till the present year." Mr. Spiller informs me that Mr. Hatton, of Postcombe, took a series in a chalk-pit somewhere between this point and mid-Bucks., but that he too had since visited the locality without result. Just over the county border, in Oxfordshire, the Rev. J. W. B. Bell discovered the species in September, 1899, at Pyrton, near Watlington. But Mr. Spiller, who recently searched the locality given ('Entomologist's Record,' vol. xiv. p. 51), did not observe it; and probably the attempt to extend westward had failed there also. But at no very distant date it must have pervaded the range, for the Rev. H. H. Crewe records it from Drayton-Beauchamp; the Rev. Joseph Greene from Halton. In 1900, also, it seems to have reached thus far, as Mr. N. C. Rothschild writes ('Entomologist,' vol. xxxiii. p. 352) that "it occurs about two miles from Tring, just beyond the Hertfordshire border, though it is always rare." Later search of these localities appears to have been fruitless. It remains to hope that under favourable conditions *A. thetis* (if that be the true specific name, which I doubt) may once more be re-established on a terrain apparently so well adapted to its natural history.

Earliest seen, June 9th, 1900; a week later the females

preponderated, none of them approaching the form which we have generally accepted as var. *ceronus*, Esp.

9. *A. corydon*, Poda. The usual form of the Chilterns is large, brilliant in colour, with deep black marginal borders on the fore wings, though the narrow-bordered form is by no means uncommon. In the males there are occasionally traces of orange above the ocellations nearest to the anal angle of the hind wings, as in ab. *suavis*, Schultz. The females display a wide range of variation, from deep brown, without a trace of blue scaling, to the extreme andromorphous ab. *tithonus*, Meig. (= *syngrapha*, Kef.), the one and only example of which, taken by me in Buckinghamshire on September 9th, 1913, is recorded in the 'Entomologist' (vol. xlv. p. 290). Ab. *semisyngrapha*, Tutt, occurs very rarely. On September 12th, 1907, when collecting with Miss Fountaine, one or two were taken among many intermediates; this being a late season. The form ab. *albipuncta*, Tutt, is also included in my series. Aberrations of the under side in the female with confluent and asymmetrical spots are not infrequent. I have also several ab. *parisiensis*, Gerh., from the same spot.

Locally abundant, it is generally to be found on all the north and westward facing slopes, with a few stragglers coming over to the south, but never beyond the chalk limit.

Earliest seen, August 3rd, 1899; latest, September 13th, 1908.

10. *P. icarus*, v. Rott. In warm summers there are usually three distinct emergences, the females presenting many charming forms, and, generally speaking, in the direction of decided male coloration. Ab. *icarinus*, Scriba, usually a few each year. Following the diagnosis of the species made by Tutt in his 'British Butterflies,' I find the following female forms well represented:—Ab. *cœrulescens*, Wheeler, ab. *semiclara*, Tutt, ab. *thestyliis*, Kirby. Besides which, I have ab. *cœrulea-angulata*, Tutt, and one interesting female taken in June, 1907; all the wings pale lavender-blue. On the fore wings the orange spots of the antemarginal band are obsolete, and the ground colour beneath pale whitish; in the same way the orange spots of the hind wings are obsolescent. The "all brown" female is decidedly rare. Mr. Warren reports an example of ab. *arcua*, Wheeler, August 9th, 1911; and I occasionally meet with the ab. *crassipuncta*, Courv.

Earliest seen, *gen. vern.*, May 19th, 1900. I have an unusually early date in my diary, April 23rd, 1901, but I am not sure from entry whether it relates to Bucks., or Middlesex. *Gen. æst.*, July 30th, 1899; *gen. auctumn.*, September 6th, 1902; latest seen, October 9th, 1913.

11. *P. medon*, Hufn. (= *agestis*, Schiff.). Always a common butterfly on the chalk downs; in favourable years first and

second emergence alike are plentiful. Mr. Wheeler reports that where he has collected on the Continent the species does not occur in quantities flying together ('British Butterflies,' Tutt, vol. iv. p. 228, note). In the Chilterns my experience is entirely to the contrary. Mr. B. C. S. Warren speaks of it in the second brood (*in litt.*) as, "apart from the common 'Whites,' quite the commonest butterfly I ever saw there; a very small form, but very well marked. Even in tiny males the orange lunules on the upper side of both wings were always complete." He, too, presents a lucid account of the local variation of the species in the second emergence; the costal spot being absent in all cases ('British Butterflies,' Tutt, *loc. cit.*, p. 233). In the eighteen years that I have collected in this neighbourhood I have observed no decrease in the relative abundance of the two emergences, except in very wet or otherwise uncongenial seasons when everything else has been equally affected.

Earliest seen, *gen. vern.*, May 22nd, 1914; *gen. aest.*, August 3rd, 1899; latest, September 27th, 1913, a female ovipositing.

[*Plebeius argus*, L. (= *agon*, Schiff.). I am quite at a loss to account for the absence of *argus* in the heath and gravel districts which border on the chalk towards the south of the Chiltern range. My correspondents have been no more successful than I in locating the species hereabouts. On the hills themselves also I have searched carefully each season, but so far I have been unrewarded. But it is a butterfly very easily overlooked among other "Blues," even by experienced collectors.]

12. *Celastrina argiolus*, L. I did not consider the Holly Blue at all a common insect in the Chilterns until the spring of 1912, when I found it in numbers flying over the dogwood bushes in a deep chalk lane. Since then I have observed it in May and August plentiful at the same spot, and in many other localities on the south slopes towards Great Missenden where there is holly. Mr. Peachell (*in litt.*) reports it at High Wycombe, "usually very fairly common, especially in the spring brood."

Earliest seen, *gen. vern.*, April 20th, 1912; latest, May 29th, 1912; *gen. aest.*, earliest, August 9th, 1913. On September 27th of that year I saw a male, of what I believe to be a third emergence, flying in the road at Aston Clinton.

13. *Callophrys rubi*, L. One of the commonest Chiltern butterflies in favourable seasons. Affects the fresh green foliage of the hawthorn and young oak, the males often flying high and fast. *Ab. immaculata*, Fuchs, is by no means rare. No trace of a second emergence has ever been detected by me. From High Wycombe (Peachell) to Drayton-Beauchamp (Rothschild).

Earliest seen, April 20th, 1912; latest, June 29th, 1909.

14. *Zephyrus quercus*, L. I myself have never come across this Hairstreak in the district. It is reported by Mr. G. C.

Barrett in the Buckinghamshire list ('Victoria History') at Wendover on the east; and Mr. Peachell used to take it in the neighbourhood of High Wycombe on the west. In the southern parts of the county it seems to be fairly common, *e.g.* at Chalfont St. Peter's, abundant; Rev. J. Seymour St. John (*Entom.* vol. xxii. p. 165), Burnham Beeches and Beaconsfield. Mr. L. E. Dunster writes (*in litt.*) that he has never taken the species in Bucks., but that a friend of his captured examples near High Wycombe on August 5th, 1913. Oak woods are infrequent on the Chilterns themselves, hence probably the scarcity.

(To be continued.)

NOTES ON BUTTERFLIES IN MAJORCA IN JANUARY, FEBRUARY, AND MARCH, 1914.

By H. O. HOLFORD, F.E.S.

HAVING spent many winters in the Island of Majorca on account of its excellent winter climate, its beautiful scenery, and friendliness of its inhabitants, my wife and I arrived there at the end of December, 1913. I have always done a certain amount of butterfly hunting whilst there, and I thought that the following notes on insects taken or observed might be of interest:—

Our headquarters were at Cas Catala Hotel, about four miles from Palma, along the coast, a most comfortable hotel situated right on the sea, and it was within a few miles from here that my collecting was done, until we went to the extreme east of the island.

The country for the last three years had suffered very much from drought, and all the vegetation, except in the highly cultivated parts, was visibly affected; wild flowers and almond blossom was quite six weeks late; insects were also later than usual. Running north from the hotel is a very long sheltered rocky ravine, with plenty of scrub and fairly well-wooded in parts; this has always been one of my best hunting grounds, but this year there was nothing much about, and it was much the same in other places, the insects were there but few in number. The weather was windy and much colder than I have experienced in previous years, but certainly very much better than in any of the usual European winter resorts. The whole of the ground here is rocky, except in the cultivated patches, partly covered with low scrub pines and ilex or evergreen oak; other parts mostly barren, steep, rocky ground; the lower parts and valleys were well cultivated with almonds, olives, figs and the locust bean tree. I found there were invariably more insects on the steep barren rocky south slopes than in more inviting-looking places, where there was plenty of vegetation

such as *Cistus* and tall heaths; this was, no doubt, due to the great heat on the bare rocks which attracted them. It was not an easy hunting ground, and string-soled canvas boots called "alpargatas" were almost a necessity.

January 10th.—*Macroglossa stellatarum*. In previous years these were swarming. I have taken several, they were not in very good condition; hibernated specimens. *Pyrameis atalanta* (one). 12th.—*Cyaniris argiolus* (one), *Pyrameis cardui* (one). 18th.—*P. atalanta* (one).

February 1st.—*P. atalanta* (one), *C. argiolus* (one). 2nd.—*P. atalanta* (one), *Lycæna telicanus* (two). 3rd.—*P. atalanta* (one), *L. telicanus* (two), *C. argiolus* fairly numerous. 5th.—*Pararge egeria* (one), *P. atalanta* (one), a few *C. argiolus* about. 6th.—*P. egeria* (one), *L. telicanus* (one). 7th.—*L. telicanus* (one), *P. atalanta* (one). 8th.—*Pararge megæra* (two), *L. telicanus* (three). 9th.—*C. argiolus* (one), fresh hatched. 11th.—*C. argiolus* (two). On February 12th, 1913, I took a female *L. bœticus* freshly emerged; this year I did not see this species. 14th.—*L. telicanus* (three), *P. atalanta* (one), *C. argiolus* (three), *Colias edusa* (one). 15th.—*P. daplidice* taken (two), a few others seen, *C. argiolus* (one seen). 16th.—*Callophrys rubi* (one), *P. daplidice* (one, male), *L. telicanus* (one), *Gonepteryx cleopatra* (one male). 18th.—*P. daplidice* (one). 19th.—*M. stellatarum* (one), *C. argiolus* (one, female), *P. egeria* (one), *P. megæra* (one), *P. atalanta* (one), *C. argiolus* numerous. 21st.—*P. egeria* (one). 26th, and 28th.—*Cænonympha pamphilus*, one each day.

March 1st.—*C. edusa* (one), *P. daplidice* (two), *P. megæra* (one), *G. rhamnii* (one), *C. rubi* (one), *C. argiolus* numerous. 2nd.—*Pieris brassicæ* (one male fresh from chrysalis), *P. rapæ* (two, just emerged), *P. daplidice* (one), *P. egeria* (two), *P. megæra* (one). 3rd.—*P. rapæ* (one, freshly emerged), *P. egeria* (one), *L. telicanus* (one, worn). 4th.—*C. rubi* (one), *C. pamphilus* (one), *P. megæra* (one), *C. argiolus* and *P. daplidice* numerous. 5th.—*G. cleopatra* (one, male), *C. rubi* (two), *P. cardui* (one), *L. telicanus* (one). 6th.—*P. machaon* (one), *G. rhamnii* (one, female), *P. daplidice* (one), *P. rapæ* (four, three males, one female), *P. megæra* (one female). 7th.—*G. cleopatra* (one, male), *G. rhamnii* (one, female), *P. daplidice* (one, female), *C. rubi* (one), *L. telicanus* (one). 8th.—*G. cleopatra* (one, male). 9th.—*C. pamphilus* (one). 10th.—*P. daplidice* (one), *P. egeria* (one), *P. rapæ* numerous.

On March 11th we left for the Port of Alcudia, situated in a magnificent sandy bay in the east of the island, where the scenery differed very much from Cas Catala. There are extensive flat lands, where formerly rice was grown, with numerous dykes and large lagoons of brackish water, bounded on the north and south by hilly land, with plenty of wild vegetation. The weather was very hot and at times very windy.

March 14th.—*G. rhamni* (one, female), *C. rubi* (two), several *M. stellatarum* about, *P. rapce* (one). 16th.—*C. rubi* were swarming in a ravine; I took several, and caught a great number for inspection, hoping to find *C. avis* amongst them, but my search was unsuccessful. 26th.—*C. rubi* (three), *G. cleopatra* (one, male), *C. phleas* (one), *P. megera* (one, female), *P. machaon* (one). 27th.—*C. rubi* (three). 28th.—*C. rubi* (one); a few *P. daphidice* seen. 29th.—*L. icarus* (one, male), *G. cleopatra* (two, males), *G. rhamni* (one, female), *C. rubi* (two). 30th.—*L. icarus* (two, one male and one female). 31st.—*C. pamphilus* (one), *C. rubi* (one), *G. rhamni* (one, female), *P. megera* (one, female), *G. cleopatra* (one, male).

On April 11th we left for Palma *en route* for Barcelona. Whilst in Barcelona I visited the museum, which is anything but up to date; the collection of insects was in glass cases exposed to the light, and they were mostly faded out of all recognition.

Elstead Lodge, Godalming.

GYNANDROMORPHOUS SPECIMEN OF *ABRAXAS GROSSULARIATA*.



THE above figure represents an exceedingly interesting specimen of *Abraxas grossulariata* which was reared last season by Mr. R. Tait, junr., of Ashton-on-Mersey. He writes:—"It came from a batch of Huddersfield larvæ, the progeny of light pairings, and was practically the only specimen out of some five hundred of the same batch worth keeping."

We incline to the opinion expressed by Mr. Tait that the insect is gynandromorphous. Judging from the photograph, we should say that on the left side the insect is male and on the right side, female. So far the genitalia have not been critically examined. If this were done, gynandromorphism would probably be found complete.

NEW SPECIES OF HETEROCERA FROM FORMOSA.

By A. E. WILEMAN, F.E.S.

GEOMETRIDÆ.

Euchlæna (?) *lilacina*, sp. n.

♂. Head and collar dark reddish brown, thorax and abdomen grey brown; antennæ ciliated. Fore wings bluntly angled about middle of termen, apex slightly produced; grey brown tinged with lilacine, costa sprinkled with black, discoidal spot black; postmedial line dark brown, oblique, outwardly pale edged, indistinct towards the costa; terminal line black, lunular; fringes pale. Hind wings angled on middle of termen; grey brown, tinged with lilacine; medial line dark brown, inner edge diffuse, outer edge pale; terminal line dark brown, interrupted at veins towards the costa; fringes pale. Under side pale brown, suffused with fuscous, discoidal spots black; traces of a dusky medial and postmedial lines indicated by black dots on all the wings.

♀. Termen of all the wings crenulate, angled at middle; the apex of fore wings more acuminate than in the male. Colour and marking agree with these characters in the male, except that the medial line on under side is more distinct.

Expanse, 36 millim. ♂; 40 millim. ♀.

Two male specimens from Kanshirei, one taken in May and the other in July, 1908. The July specimen has been described, the May specimen is rather browner in colour and the transverse lines are somewhat broader.

The female type, also from Kanshirei (Wileman), is in the British Museum.

Zethenia crenulata, sp. n.

♂. Head pale brown, thorax dark brown, darker behind; abdomen whitish speckled with dark brown and tinged with ochreous on the posterior edges of segments; antennæ ciliated, whitish marked with dark brown on basal third, and dark brown marked with whitish on remainder. Fore wings whitish sprinkled and clouded with purplish brown, costal and dorsal areas, also the venation, tinged with ochreous; antemedial and medial lines purplish brown, oblique, obtusely angled below costa; postmedial line formed of black dots on the veins, the costal three largest; space between medial and post-medial lines clearer of brown sprinkling than other parts of the wing; subterminal line blackish, white marked, only distinct towards the costa, followed by a short streak from the apex. Hind wings whitish sprinkled and clouded with purplish brown, the clouding chiefly on basal and terminal areas; discoidal spot black, medial line purplish brown, attenuated towards costa; postmedial line represented by black dots on the veins. Under surface similar to the upper side.

Expanse, 46 millim.

Collection number, 1886.

A male specimen from Arizan (7300 ft.), August, 1908.

Comes near *Z. inaccepta*, Prout, but the termen of all wings crenulate, deeply on the hind wings.

Arichanna flavitincta, sp. n.

♂. Head pale ochreous brown, antennæ bipectinated; thorax black brown, mixed with pale ochreous brown; abdomen pale ochreous brown, barred with black brown. Fore wings yellowish white, dotted and clouded with blackish, the clouding heavy and more or less confluent on basal half; costa and termen marked with yellow; two white spots, separated by a vein only, before the apex; an irregular edged blackish band from the lower spot to dorsum, the band traversed by an irregular brown line. Hind wings creamy white inclining to yellowish, densely dotted with blackish; discoidal spot blackish, large, its lower edge connected with a blackish band running to dorsum; subterminal line blackish; irregular and interrupted. Fringes of all wings blackish marked with yellow. Under side very similar to the upper side.

Expanse, 50 millim.

Collection number, 1818.

A male specimen from Rantaizan, May 7th, 1909.

Arichanna ochrivena, sp. n.

♂. Antennæ bipectinated; head and thorax blackish brown, the latter ochreous mixed; abdomen paler brown, suffused with fuscous on the back. Fore wings whitish, tinged with ochreous on the disc; costa and veins ochreous; subbasal, double antemedial, and double postmedial lines represented by black spots, costa striated with black, discoidal mark black, large; subterminal line represented by round black spots; a series of quadrate black spots on the termen, some towards costa united with subterminal series; fringes ochreous marked with black. Hind wings ochreous, suffused with blackish towards the base; discoidal spot black, almost round; medial line represented by five black spots, first on costa, second in line with discoidal; postmedial line represented by five black spots, the first between veins 4-6 and in line with the discoidal, the second minute, and the fourth and fifth hardly separate; seven black spots on the termen, the fourth, fifth and sixth larger than the other four. Under side ochreous, black spots as on the upper side.

Expanse, 56 millim.

Collection number, 1552.

A male specimen from Arizan, August 18th, 1908.

Closely allied to *A. hamiltonia*, Swinhoe.

Perizoma rantaizanensis, sp. n.

♀. Head white, mixed with black; thorax black, mixed with white, collar brown tinged; abdomen dark grey, brown marked. Fore wings white, flecked with grey brown; basal patch black, limited by an almost straight white line; antemedial line black, slender, excurved to median nervure, thence almost straight to dorsum; space between subbasal and antemedial line brownish;

postmedial line represented by black points on the veins; medial shade greyish, enclosing black discoidal dot; terminal area brownish, traversed by a white wavy subterminal line, and divided by a whitish spot between veins 3 and 4; the costal portion of terminal area is quadrate in shape, rather darker in tint, and edged with black. Hind wings whitish with black discoidal spot and two indistinct transverse lines beyond. Under side whitish sprinkled with grey brown, all the wings have a dusky discoidal dot; subterminal line on fore wings indicated by white dots; postmedial line on hind wings dusky.

Expanse, 26 millim.

Collection number, 1803 A.

A female specimen from Rantaizan, May 8th, 1909.

Perizoma ochreotincta, sp. n.

♂. Head whitish brown, thorax pale brown tinged with reddish ochreous and marked with blackish; abdomen grey brown marked with darker brown. Fore wings whitish brown tinged with reddish ochreous; basal patch black, limited by a whitish excurved line; medial band black, the inner edge indented below costa and again before dorsum, the outer edge bilobed about middle, both edges whitish; postmedial line dark brown, wavy, followed on costa by a blackish mark enclosing three white dots; terminal line black, fringes whitish brown, dotted with black at ends of the veins. Hind wings whitish suffused with fuscous. Under side whitish suffused with fuscous brown marking of upper side showing through on the fore wings; two slightly curved bands on the hind wings.

Expanse 18 millim.

Collection number, 1800.

A male, in rather poor condition, from Rantaizan, May 7th, 1909. There is a specimen from Formosa (Wileman) in the British Museum.

Allied to *P. decorata*, Moore.

Perizoma arizanensis, sp. n.

♀. Fore wings whitish, tinged with ochreous; basal patch black, limited by a slender white line, which is slightly angled below costa and turned inwards before dorsum; medial band blackish, limited by white-edged wavy black lines, and traversed by an interrupted wavy black line; space between basal patch and medial band clouded with greyish-brown; terminal area blackish, divided at middle by a large white spot which is freckled with greyish-brown; subterminal line indicated by white dots, connected towards costa; terminal line black, interrupted; fringes pale greyish-brown, paler at base and tips. Hind wings whitish, traces of a dusky discoidal dot and transverse line beyond. Under side of fore wings whitish fuscous tinged, traces of the upper side markings; hind wings whitish, speckled with greyish-brown, discoidal dot and interrupted postmedial line black, traces of a dusky subterminal line.

Expanse, 26 millim.

Collection number, 824.

A female specimen from Arizan (7500 ft.), September 15th, 1906.

Near *P. affinis*, Moore.

Ochyria mediofascia, sp. n.

♂. Head and thorax greyish white, the latter darker mixed; abdomen greyish white, mixed and banded with darker; antennæ ciliated. Fore wings greyish white, powdered with darker; subbasal line black, almost straight; antemedial band black, parallel with the subbasal line; postmedial band represented by three fine black sinuous lines, filled in with blackish at costal end, approaching the medial band on dorsum; two blackish marks on the costa before apex; terminal line black, interrupted; fringes grey, paler at base and tips. Hind wings whitish suffused with fuscous, indications of three dusky medial lines. Under surface whitish, suffused with fuscous on the fore wings, and powdered with dark greyish on the hind wings.

♀. Similar, but the costal extremity of postmedial not filled in with blackish.

Expanse, 28 millim.

Collection number, 1804.

A male from Arizan, March 2nd, 1908; and a female from Rantaizan, May 9th, 1909.

Closely allied to *O. designata*, Hufn., the North American form of which it closely resembles.

Ochyria viriditincta, sp. n.

♀. Head and thorax dark grey brown, abdomen rather paler. Fore wings pale olive green, basal patch and medial band purplish grey; the basal patch is outwardly limited by a slightly wavy black line; the medial band (which is traversed by two faint wavy black lines) is edged with black, the inner edge indented below costa and again near dorsum, the outer edges sinuous and bent outwards about middle; terminal border purplish grey, tinted with crimson between veins 3 and 5, interrupted towards costa by an oblique streak of the ground-colour from apex, the border is inwardly edged by a dentate black line; space between terminal border and the medial band traversed by a wavy olive line; space between medial band and basal patch transversely clouded with greyish; fringes dark grey, paler at base. Hind wings whitish, suffused with fuscous inclining to blackish on basal two-thirds; fringes pale grey, marked with darker at ends of the veins. Under side fuscous, marking of upper side of fore wings traceable; the hind wings have a blackish discoidal dot, a diffuse blackish sinuous postmedial line, and traces of a dusky subterminal band.

Expanse, 34 millim.

Collection number, 1878.

A female specimen from Arizan (7300 ft.), May, 1908.

Resembles *O. suffumata*, Schiff.

NOTES AND OBSERVATIONS.

PIERIS BRASSICÆ LARVÆ IN JANUARY.—On January 17th, in a garden at Southfields, Mr. H. J. Lee took thirteen nearly full-grown larvæ of *Pieris brassicæ*, which he describes as feeding greedily on cabbage at the time of their capture. It was a very sunny day but cold; five degrees of frost had been registered in the early hours of the morning. Mr. Frohawk, whose life-histories of our British Butterflies are now appearing serially in the 'Field,' records three other instances of the full-fed larvæ in January. Two of these may be found in the 'Entomologist' for 1908, pp. 39, 62.—H. WORSLEY-WOOD; 31, Agate Road, Hammersmith, W.

HIPPOTION (CHÆROCAMPA) CELERIO AT CHESTER.—“Come into our house, there's a big moth flying against the window and making such a noise!” So exclaimed the next-door neighbour of Mr. A. E. Goodman, of Laburnum Lodge, Boughton (a suburb of Chester), one evening at dusk, in mid-September, 1910. Mr. Goodman went and captured the moth with his hands, I believe, put it in a box, and there it remained until a few days ago, when he wondered if it would be of use to the Grosvenor Museum collection. It is hardly necessary to say the Museum was without a specimen, and that the gift was gladly welcomed. The Curator, Mr. A. Newstead, F.E.S., at once pronounced it to be *celerio*. Now that it is relaxed and set it shows damage to both left wings, is minus antennæ (which may yet turn up), and it is also minus some legs. But the wings on the right show that the moth, on entering the room (attracted by the light), had been in excellent condition, and probably had not flown very far. The only other Cheshire record I can find of a capture of the species appears in Day's List, “Alderley Edge, in May, 1878 (W. W. Keyworth, Ent. xi. p. 160, E. L.).”—J. ARKLE; Chester.

ARASCHNIA LEVANA.—With reference to Mr. Ekins' inquiry (Entom. xlviii. p. 44) as to which brood of *A. levana* was taken in the Forest of Dean last July, I may say that all I saw were of the second brood, in which the upper side is black with a broken white band across the wings. Thus, at first glance, they bear a strong resemblance to dwarf *sibylla*, and the few seen on the wing seemed to sail along with all the grace of that butterfly, but they were mostly observed settled with wings expanded, which fact was probably due to the generally dull weather experienced—rain, more or less, every day and overcast skies. Still, evidently the weather was not altogether too bad for them, as I obtained ova from a female and succeeded in rearing a few to pupa. The green ova were deposited in strings or chains of about a dozen, suspended from the under side of a nettle leaf, and appeared to be well protected by their similarity to the pendant green seeds of the nettle. The larvæ were not gregarious, although when young half-a-dozen or so, independent of each other, would take up their abode on the under side of a single leaf, and eat small holes through it. When full-fed, however, they might easily be mistaken for half-grown larvæ of *Vanessa urticae*. The chief difference noted was the absence of the yellow colouring of *urticae*,

which was replaced by a kind of brownish-buff. The pupæ are angulated, after the usual manner of Vanessids, and are of a mottled or variegated brown. Given a favourable winter and immunity from the attacks of the Forest ants, there seems no reason why *levana* should not be seen again in the coming season.—G. B. OLIVER; Park Road, Sutton Coldfield, February 16th, 1915.

LEPIDOPTERA AT HEATHER BLOOM.—While at Penmaenmawr in July last I found that sugar, as an attraction for moths, was a failure. On several occasions, however, insects were fairly plentiful on heather bloom. Among other species *Agrotis ashworthii*, *A. lunigera* (in numbers), *A. lucerneæ*, *Mamestra furva*, and *Acidalia contiguarica* visited the heather.—R. TAIT, jun.; Roseneath, Ashton-on-Mersey, Cheshire.

EURYMENE DOLABRARIA IN SCOTLAND.—In looking through South's 'Moths of the British Isles,' I notice that *E. dolabraria* is hardly known to be found in Scotland. It may be of interest to state that early in September, 1911, I took several larvæ on a beech hedge near Killin, Perthshire, N.B. Surely this cannot have been a casual occurrence?—J. G. BRYANS; Arundel House, Hayling Island.

TINEA MISELLA IN GLOUCESTERSHIRE.—Amongst some of my last year's captures submitted to W. E. Meyrick, F.R.S., he has referred a specimen taken at about 8.30 p.m. on Stroud Railway Station on May 21st, 1914, to this species. It appears to be new to our local list.—C. GRANVILLE CLUTTERBUCK, F.E.S.; 23, Heathville Road, Gloucester, February 3rd, 1915.

MELLINIA (XANTHIA) OCELLARIS.—Mr. Jones is to be congratulated on his large capture of *Xanthia ocellaris* at Great Shelford (*antea*, p. 43). In point of numbers it is probably a record for any single locality in this country, and is certainly, so far as the records and my personal knowledge go, the first occasion on which any number exceeding two or three have been taken anywhere outside a restricted area in the Thames Valley. Excluding this last named district, an examination of the records in our entomological journals shows that twenty-two examples in twenty-two years have been captured from ten localities, all in our east and south-east counties, with the exception of one in 1889 from Coxhaine, Gloucester. Two only of the twenty-two were of the banded form—*ab. intermedia*, Habich. The salmon-pink insect is no doubt a typical *ocellaris*, Bkh. which varies a good deal in its ground-colour. The male with dark wings if without any trace of ochreous or reddish, and with the pale veins prominent, is *ab. lineago*, Gn., a rare form in Britain. The food-plant of the species in Central Europe is always given as black and Lombardy poplar. In the Thames Valley it is quite certainly the hybrid *Populus serotina*. Aspen, willow and common elm have also been suggested, but without any corroborative details except in the case of the first named. Mr. Jones's note gives good ground for adding wych elm to the list, but it is an addition which cannot be regarded as surprising, when it is remembered that the congeners *gilvago* and *fulvago* both feed on poplar and elm, though the more

usual food of the last named is, of course, sallow and willow. The only obscure points in the life-history of *ocellaris* concern the later larval stages, and it is to be hoped, as elm is a very easy tree to work—poplar is, of course, very difficult—that they may be cleared up in the coming season. On the Continent the larva begins its life on poplar until brought down by storm or rain, when it becomes a general feeder. *Artemisia campestris* is the only plant I have seen mentioned by name. Freitschke gives a detailed account of larvæ collected thereon in the neighbourhood of Darmstadt, and it would be worth while for Suffolk and Norfolk collectors to examine their local worm-wood in late May, if found growing anywhere near poplars of the black or Italian variety. Knowledge of the wild larvæ in Britain is at present confined to seven specimens taken in some twelve visits which I made to the haunt of the species in April and May, 1913. All were taken in association with poplar. No larvæ have been found on any of the plants growing near the tree, though diligent search has been made by several collectors over a period of several years. No one, I think, has succeeded in getting bred larvæ to accept any kind of "low-plant." This suggests a change in larval habit, and may account for the usual scarcity of the insect in the localities where it appears to be firmly established. This is, perhaps, a good opportunity to ask if any of your readers have at any time found *gilvago* in any shape associated with poplar? In Seitz's 'Macro-Lepidoptera,' vol. iii., Warren, dealing with the Continental *Cosmia* (*Mellinia*) *erythrago*, an insect long regarded as a variety of *gilvago*, remarks that all the Continental poplar feeding *gilvago* will probably prove to be *erythrago* (European authors are quite definite on the point that *gilvago* does feed on poplar), and supports his case by stating that in Britain *gilvago* feeds solely on elm. I do not know what authority there is for so positive an assertion; it is probably based on the knowledge that as *gilvago* larvæ can be beaten out of elm, nobody has troubled to look any further. In the Thames Valley certainly, and I have no doubt elsewhere, *gilvago* does feed on poplar. I also want first-hand information as to how the wild *gilvago* female lays her eggs. I do not want to be told on elm (or poplar), but when and how?—H. WORSLEY-WOOD; 31, Agate Road, Hammersmith, W., February 5th, 1915.

AN ENTOMOLOGICAL TRIP TO ST. ANNE'S-ON-THE-SEA.—I spent the first week in August at St. Anne's-on-the-Sea with my friend, G. Brooks, and as I learned from a local collector, Mr. A. Murray, that few but northern collectors visit this spot, the following notes may be of interest. The number of lepidopterous species at St. Anne's is not great, owing to the restricted flora, there being little besides the usual sandhill plants, hedges are almost unknown, and the only trees are willows and an occasional poplar; dwarf sallows, however, are abundant. I need hardly say our first visit was to the *Luperina quenëei* ground, the extremely confined area of which had been previously indicated to us by a friend. It is interesting to note that this once priceless moth had been all the while within a stone's throw of the local collectors, its habitat being at the edge of one of their favourite haunts. This is, however, easily understood when I

say that the portion of the coast on which the insect dwells is almost bare, there being only about six blades of grass to the square foot, besides which the land is occasionally flooded. On the way a few *Chrysophanus phlæas* were netted, but were of the usual summer form, and beyond some var. *cæruleopunctata* were quite typical; a few *Pararge megæra* and *Epinephle ianira* were also seen. We then accidentally met Mr. A. Murray, to whom much of the success of our trip was due, for in addition to accompanying us, whenever possible, he placed his valuable local knowledge freely at our disposal. We proceeded to search for pupæ of *L. guenèei*. These may be obtained by raking the sand with the fingers when the sand is perfectly dry and capable of being drifted by the wind, and where the grass seems half dead. The pupæ are not deeper than an inch or two, and tumble easily out of their frail cocoons, and as they have the helpful habit of wriggling to the surface after disturbance, it is advisable to pay a second visit for those overlooked. We found one or two imagines struggling on the sand, apparently knocked off the food-plant by our raking about. We went for the imago in the evening, but owing to rain collecting was none too pleasant, and though we searched carefully we could not see a single specimen of *L. guenèei*. Mr. Murray, who was a little way behind, came up to us and said: "Can't see any! Why there are one, two, three, four, five quite close to you," and so there were, as we could readily see when they were pointed out to us. The difficulty of seeing this moth *in situ* is hard to realize until you start to work for it. It clings low down on its food-plant, quite close to the sand, the colour of which it closely mimics, and unless you shine your light about six feet ahead of you, on to the grass, you stand small chance of taking the species in quantity, as it appears not to fly. The females, I should say, never fly, as their bodies are very heavy, and the wings do not appear to be capable of supporting them. The male is rare, and not so often taken as the female. Probably if a sheet were erected the male would be found to come to light, but not in large quantities, as the proportion of males bred from pupæ was very small. The species is abundant in its restricted haunt, but is in danger of extermination at St. Anne's, as the Council are building a new Promenade along the sea-front, and will soon be up to the *guenèei* locality which it will cover. On our return home that evening we glanced at the ragwort heads, and, though raining heavily, we took a nice series of *Hydræcia nictitans* var. (? species) *paludis*, *Miana literosa*, *M. furuncula* (the St. Anne's form of this latter species seems to be very light, practically a unicolorous, pale ochreous grey), one or two *Agrotis tritici* and a few *A. nigricans* var. *fumosa*.

The next evening was devoted to ragwort heads on the Blackpool side of the town; there was a strong cold wind blowing in from the sea, so conditions were far from perfect; nevertheless, moths were on the heads in plenty, but the violent movements of the blossoms made boxing and selection a very difficult task. We experienced this difficulty every night, and though we tried to select a more or less sheltered dip in the dunes, it was generally impossible to escape the wind. The Agrotids did not seem to mind how strong a gale was

blowing, clinging very tightly to the ragwort. *A. tritici* was in thousands; every modification in marking and colour seemed to be represented. Some of the selected forms we brought home are very beautiful, but not so large as the few I took at Wicken in 1911. It is curious to note that the dull brown Wicken form seems to be very scarce at St. Anne's, and never so large. I took one with the wings a deep greyish fuscous, the costa broadly marked in pure snow white; there also are other pure white longitudinal marks along the nervures; a number of specimens we took have costa creamy white, but only one with the costa beautiful pure white. *A. cursoria* was there, too, in quantity, but not so commonly as *A. tritici*. One plain unicolorous form, without markings, except the black dot at the lower half of the reniform stigma, was captured, and worthy of mention, as Mr. Murray said he had rarely seen such a good example of this obsoletely marked form.

Another evening was spent in the *quenéei* ground, where we also obtained some beautifully fresh *Noctua umbrosa*; this insect, though usually taken in poor condition, was to be secured on the ragwort here in perfect state. We made one journey north of Blackpool to see if any belated larvæ of *Nyssia zonaria* were left. It was very easy to find where they had fed, but a long search only produced one larva; two pupæ were raked out of the sandy soil. The larva appears to be polyphagous, but shows a decided preference for *Lotus corniculatus*. In the evening we went to Lytham in search of *Mamestra albicolon* larvæ, these we obtained in fair abundance, together with the larvæ of *Agrotis ripæ*, feeding on the sea-plantain: they were of all sizes, from half-an-inch till practically full-fed. Mr. Murray said he had never found any difficulty in rearing them, but when we got them to London ours did not thrive, owing, perhaps, to the different atmospheric conditions. They readily ate the broad-leaved plantain with which we supplied them, but all became affected with diarrhœa and died. We found growing on a marshy patch quite close to the sea, at Lytham, a short fine species of rush, the flowers of which were a most attractive bait, *cursoria* was most abundant on this. I might also mention we took one or two *Eubolia limitata*; these were of a very rich dark brown, and very different to the southern forms of this insect. *Cidaria testata* was the only other Geometer we saw commonly, but they were rather worn, and do not appear to be very different from the Hampshire forms I have. Mr. Murray also showed us how to take larvæ of *Dicranura vinula* and *Smerinthus ocellatus* on the dwarf shallows, which abound on the sand-hills. His method was to notice where the twigs had been stripped of their foliage, then search the ground immediately beneath for frass; if this was fresh, he carefully searched the bush and generally found a fine full-fed *D. vinula* or *S. ocellatus*. The marvellous way in which these larvæ are protected can only be appreciated by actual searching. In fact, we found the best way to obtain them, once having the frass clue, was to feel along the branches. We took a number of *Eupithecia* larvæ from ragwort, but we have not yet been able to determine the species.

The following is a list of species observed, the practical absence of Geometers being worthy of note:—*Pieris brassicæ*, *P. rapæ*, *P. napi*,

Chrysophanus phlaeas, *Lycæna icarus*, *Vanessa urticae*, *Pyrameis atalanta* (one only), *Pararge megæra*, *Satyrus semele*, *Epinephele ianira*, *Orgyia antiqua* (larvæ and pupæ), *Leucania pallens* (one only), *L. impura*, *Hydræcia paludis*, *Xylophasia monoglypha* (polyodon), *Charæas graminis*, *Cerigo matura* (cytherea), *Spilosoma lubricipeda* (larvæ), *Hipocrita jacobæe* (larvæ), *Leucania lithargyria*, *Luperina testacea* (imago and pupæ), *L. guenèci* (imago and pupæ), *Apamea oculea*, *Miana literosa*, *M. furuncula*, *Agrotis velligera*, *A. nigricans*, *A. tritici*, *Noctua rubi*, *N. umbrosa*, *N. baja* (two), *Triphæna pronuba*, *T. comes*, *Acronycta megacephala* (larvæ), *Dianthæcia capsicola* (larvæ), *Eubolia limitata*, *Nyssia zonaria* (one larva and pupæ), *Agrotis exclamationis*, *Plusia gamma* (imago and larvæ), *Smerinthus ocellatus* (larvæ), *Dicranura vinula* (larvæ), *Mamestra brassicæ*, *Hydræcia micacea*, *Caradrina blanda*, *C. morphæus*, *C. cubicularis*, *Stilpnolia salicis* (one female), *A. cursoria*, *Noctua xanthographa*, *Mamestra albicolon* (larvæ), *A. ripæ* (larvæ), *A. præcox* (three) *Zyggæna filipendulæ*, *Eupithecia centaureata* (two), *Triphosa dubitata* (one), *Hadena oleracea* (larvæ), *Amphipyra trago-pogonis*, *Nænia typica*, *Crocallis ellinguarina* (one), *Lygris testata*, *Camptogramma bilineata*, *Pelurga comitata* (one). We returned home on August 6th, perfectly satisfied with our captures and thoroughly braced up, thanks to the wonderful air of St. Anne's.—B. S. WILLIAMS; January, 1915.

NOTES ON LEPIDOPTERA ATTRACTED BY LAMPS AT BEXHILL-ON-SEA.—I came to reside at Bexhill in the autumn of 1913, and as I did not know or come across any other resident lepidopterist, I had to find a hunting-ground for myself. During the autumn I pitched upon a very promising run of lamps, which this enterprising borough has extended from Bexhill to the village of Little Common, over a mile distant. As I took between two and three hundred species of Macro-Lepidoptera, the record may be of some interest. Though not traversing actual woodland, the road has a nice sprinkling of trees and plantations in its vicinity, especially oldish oaks and poplars, with some birch and Scotch fir (*Pinus*), and the thick hedges have plenty of sallow. The season was very favourable in one respect, *viz.* absence of wind, which is the great drawback to "lamping," especially at a very breezy seaside resort like Bexhill. The other chief drawback, however, the bats, were excessively abundant here, every British species, I should say; and one or more appeared to derive a living from each lamp. They certainly "bagged" half the insects. Lastly, the lamps were extinguished at a variable time between 11 and 12 p.m., always earliest on the most favourable nights!

January, February and March.—Although (perhaps "because"?) the autumn and winter were exceptionally mild, the species of *Hybernia* were very late in appearing. The first *H. rupicaprarina* came to my window on February 19th, and I had looked in vain for it on the hedges previously. It is less addicted to light than the rest of the genus however. February 24th—*H. marginaria* appeared, and was thenceforth abundant, as was *Anisopteryx æscularia*. March was so miserably wet and blustering that I seldom turned out, but on

the 31st I took *Melanydris multistrigaria*, *Teniocampa munda* and *Xylocampa arcola*, as well as *T. gothica*, *T. stabilis*, *T. cruda*, *T. incerta*, *T. gracilis*, and *Pachnobia rubricosa* on this and following days.

April 1st.—*Pachys strataria* (two). 2nd.—*T. munda*, *Melanydris multistrigaria*, first appearance of *Selenia bilunaria* (excessively abundant thereafter). 4th.—*T. opima* (one). 10th.—*Anticlea badiata* (very abundant later). 20th.—(A good night, east wind dying away to warmth) *Drymonia chaonia* (one), *Anticlea nigrofasciaria* (two). 21st.—A remarkable overlapping of the seasons; I took *Dicranura vinula* and *Noctua plecta* at a lamp on which were several *H. marginaria*. Also *Selenia tetralunaria* (two) and *Lobophora carpinata* (*lobulata*). 23rd.—*Triphosa dubitata* (one), *Diaphora mendica*. 24th.—*Cilix glaucata*, first appearance of *Spilosoma menthastri*, which continued out till end of July. *Anticlea badiata* and *Selenia bilunaria* were a perfect pest. 29th.—*Coremia designata* (subsequently very abundant, and a few second brood in August), *Tephrosia crepuscularia*.

May 13th.—*Gonodontis bidentata* and *Caradrina quadripunctata* at windows. 14th.—*Cucullia chamomillæ* (one), first appearance of *Dasychira pudibunda* and *Coremia ferrugata*, outburst of "cock-chafers" called "May-bugs" in Sussex; I counted dozens under one lamp. 18th.—*Drymonia chaonia* (two). First appearance of *Pheosia tremula*, *Lozogramma petrarum*, *Ephyra punctaria*, *Lomaspilis marginata*. 19th.—*Notodonta ziczac*, *D. chaonia* (one), *Cucullia chamomillæ* (one). First appearance of *Amorpha (Smerinthus) populi*, thereafter frequent, also appeared early in July (query, late first or early second brood). 20th.—*Abrostola urticæ*, *Noctua rubi* appeared. 21st.—*Notodonta trepida* (one, laid many eggs, but youngsters died of plague), *Cerura bifida* (two), *N. ziczac*, *Ephyra pendularia*; *Aspilates ochrearia*, first brood common, as was the second brood in August. 27th.—First *Grammesia trigrammica* (common later), and *Plusia gamma*. 28th.—*N. trepida* (one), *Smerinthus ocellatus*; first appearance of *Iodis lactearia* and *Perizoma flavofasciata* (both abounded afterwards over a very long season). 29th.—*N. trepida* (one), *Agrotis strigula*, *Mamestra genistæ*. 30th.—*Dianthæcia carpophaga*, *Drepana binaria*, and *D. lacertinaria*.—ERNEST A. C. STOWELL; Laleham, Bexhill-on-Sea. (To be continued.)

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*Wednesday, November 4th, 1914.*—Mr. G. T. Bethune-Baker, F.L.S., F.Z.S., President, in the chair.—Mr. Alleyne Leechman, M.A., F.L.S., F.C.S., of Corpus Christi College, Oxford, and St. Hubert's, Main Street, Georgetown, British Guiana; Dr. T. Miyaké, the Agricultural College, Tokyo Imperial University, Komaba, Tokyo, Japan; and Mr. George W. Murray, Dirimu Estate, Binaturi River, Daru, Papua, were elected Fellows of the Society.—On the motion of the Presi-

dent, a resolution was unanimously passed associating the Society with the reply published in the 'Times' to the declaration of certain German professors with regard to Great Britain's responsibility for the war. The Rev. F. D. Morice then proposed the following resolution:—"That all members of recognised Entomological Societies in the countries of our Allies, residing in or visiting this country, be invited during the continuance of the war to attend the Ordinary and Annual Meetings of the Society, and to make use of the Society's Library, in the same manner as though they were themselves Ordinary Fellows, except as to the right of voting." This was seconded by Dr. Burr, and carried unanimously.—Commander Walker exhibited, on behalf of Dr. R. C. L. Perkins, specimens of *A. trifolii* and *P. plantaginis* showing the effects of isolation, and read notes contributed by Dr. Perkins. Commander Walker also exhibited, on behalf of Mr. Morris N. Watt, of New Zealand, a photograph of a "Weta" (*Deinuerida* sp.) fully winged, the species being usually apterous.—Mr. A. H. Jones exhibited a series of *Colias erate*, from Sarepta, and its supposed hybrids, with *C. hyale* and *C. edusa*.—Dr. G. B. Longstaff exhibited a fine series of *Meneris tulbaghia*, L., a large and handsome Satyrine butterfly having much the appearance and habits of a Nymphaline. A long and important discussion followed on the fondness of certain insects for flowers of a particular colour; and on the question as to which sex carried the other during copulation in the case of different Rhopalocera.—Prof. Poulton read a letter, written June 27th, 1914, by Mr. T. R. Bell from Karwar, N. Kanara, in the Bombay Presidency, on the proportion of the female forms of *Papilio polytes* in North Kanara; also a letter, dated October 6th, 1914, from Rev. K. St. Aubyn Rogers at Sagalla, near Voi, British East Africa, on the male and female of *Acræa chilo* in coitû. Prof. Poulton exhibited the specimens and read a note contributed by Mr. A. H. Hamm, of the Hope Department, on males of *Ceratopogon myrmecophilus* and *Formicoxenus nitidulus* on the hillock of *Formica rufa* near Bournemouth.—Mr. G. Talbot, on behalf of Mr. J. J. Joicey, exhibited specimens to illustrate a paper by Messrs. Joicey and Rosenberg on new species of *Catasticta*.—The following papers were read: "Notes on the Life-History of *Plebeius zephyrus* var. *lycidas*," by T. A. Chapman, M.D., F.Z.S., F.E.S.; "Note on the Manubrium of the ninth sternite in the male Earwig," by Malcolm Burr, M.A., D.Sc., F.E.S., &c.; "The Opisthomeres and the Gonapophyses in the Dermaptera," by the same; "On the Male Genital Armature of the Dermaptera"—Parts I.-III., by the same.—Rev. GEORGE WHEELER, *Hon. Sec.*

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*Dec. 10th, 1914.*—Mr. A. E. Gibbs, F.L.S., Vice-President, in the chair.—Mr. W. Schmassmann, F.E.S., was elected a member.—Mr. W. J. Lucas read a paper, "The British Long-horned Grasshoppers," and showed a large number of lantern slides.—Mr. H. Moore, a drawer of Decticinidæ, Long-horned grasshoppers containing *Decticus albifrons*, *D. intermedius*, *D. tessellatus*, *D. verrucivorus*, &c.—Mr. Step, a long-horned grasshopper, *Hetrodes petersi*, female, from S. Africa, both sexes were said to be apterous.—Mr. A. E. Gibbs

referred to the two large British sawflies, *Sirex gigas* and *S. noctilis*, and exhibited their large parasite, *Rhyssia persuasoria*, from Berkhamstead, Herts, and read notes on the species.—HY. J. TURNER, *Hon. Rep. Sec.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Meeting held at the Royal Institution, Colquitt Street, Liverpool, November 16th, 1914.—The President, Mr. R. Wilding, in the chair.—Dr. W. J. Fordham, The Villa, Bubwith, near Selby, was elected a member of the Society.—The subject for the evening, entitled "The most interesting Field Observations made during the last Season," gave rise to a discussion which was entered into by most of the members present.—Mr. R. Wilding brought his collection of the genus *Bembidium* (Coleoptera), and made descriptive remarks upon the occurrence and peculiarities of each species, particularly mentioning the following, viz. *Bembidium 5-striatum*, *B. fumigatum*, *B. schuppeli*, *B. nigricorne*, *B. stomoides*, *B. lunatum*, *B. testaceum*, *B. anglicanum*, *B. fluviatile*, *B. prasinum*, *B. adustum*, and *B. argenteolum*.—Mr. A. W. Hughes exhibited a yellow variety of *Euchelia jacobæ*, a series of *Epinephele ianira*, including an example with strongly pupillate spots on the upper side of the hind wings, also a specimen of *Agriopsis aprilina* taken at sugar on the Crosby sandhills.—Mr. W. Mansbridge the following Micro-Lepidoptera, viz. *Tortrix pronubana*, bred from larvæ found in the palm house in one of the Birmingham parks by Mr. W. Bowater—the caterpillars were doing great damage to the acacias in the house; *Peronea variegana* with vars. *albana* and *cirrana* bred from Wavertree larvæ; *Mixodia schulziana*, a series from Delamere Forest, where it was plentiful, though not previously on record for the locality; *Pædisca solandriana*, selected varieties from Huddersfield and Hebden Bridge, West Yorks; *Ephippiphora trigeminana* from the sandhills at Crosby, very small specimens; and a fine series of *Eupacilia dubitana*, light and dark forms from the same locality.—WM. MANSBRIDGE, *Hon. Sec.*

THE MANCHESTER ENTOMOLOGICAL SOCIETY.—October 7th, 1914.—Exhibition evening.—The following were the exhibits:—Mr. Mansbridge showed a beautiful selection of Micro-Lepidoptera as follows: *Scoparia dubitalis*, *S. cratægella*, and *S. mercurella* from Silverdale; *S. angustea* from Hebden Bridge; *Mimæsoptilus bipunctidactylus*, a cinnamon-coloured form from Crosby; *Tortrix pronubana* from Birmingham, where it was damaging the acacias in the Palm House; *Peronea variegana* and vars. *cirrana* and *albana* from Liverpool; *Cnephasia politana* and *Mixodia schulziana* from Delamere; a varied series of *Pædisca solandriana* from West Yorks; and, finally, a very fine series of *Eupacilia dubitana* from Crosby.—Mr. J. H. Watson, full-grown larvæ of *Attacus atlas* and *Actias selene callandra* from Andaman Islands; young and mature living specimens of *Pulchriphylum crurifolium*, the great leaf-insect, reared on oak from ova from Ceylon.—Mr. B. H. Crabtree, Lepidoptera from Braemar, 1914; *Argynnis aglaia*, *Lycæna alexis*, *Plusia interrogationis*, *Noctua festiva*, *Zygana exulans*, *Gnophos obfuscata*, *Thera simulata*, *Crambus myellus*, &c.—Mr. W. Buckley showed *Gonodontis*

bidentata from Mr. Bowater of Birmingham (all black forms), and from Urmston, nearly all dark forms; *Dianthæcia conspersa* from Anglesey; *D. carpophaga* from Lewes, light forms; *Barathra brassicæ* from Urmston, with brown blotches on hind margins; a varied series of *Boarmia repandata* from Penmaenmawr, 1914; *Agrotis ashworthii* and *brunnea* from the same locality; also ichneumon from *A. ashworthii*.—Mr. R. Tait, jun., Lepidoptera taken at Branscome, S. Devon, June 1914; *Leptidia sinapis*, *Polyommatus alexis*, blue females; *Zonosoma omicronaria*, *Z. linearia*, *Emmelesia affinitata*, *Bapta temerata*, *Asthena luteata*, *A. blomeri*, *Numeria pulveraria*, *Cidaria silaceata*, *C. picata*, *Hesperia malva* var. *taras*, and one ovum; also the following taken at heather-bloom at Penmaenmawr, July, 1914: *Agrotis lunigera*, *A. lucerneæ*, *A. ashworthii*, *Mamestra furva*; also *Boarmia repandata* bred from Sussex parents; *Ægeria culiciformis* from Delamere; *Plusia festucæ* and *Triphæna fimbria* from Carrington, both at sugar; a box of vars. of *Abraxas grossulariata*, including a number of fine var. *nigro-sparsata*, and one specimen having the two left wings black with a few white veinings on the margin, and the right wings more or less typical, all bred from Huddersfield larvæ.—Mr. C. F. Johnson, a long series of *Canonympha tiphon* and some *L. icarus* showing a good deal of blue in the females; also a few *Hyria auroraria* of the purple moss form, all from Witherslack; some well-marked *Thera variata* and *Elloperia fasciaria*, showing a good range of colour, from Delamere.—Mr. L. Nathan, *Vanessa urticæ*, *Satyrus semele*, imago and cocoon both bred from Prestatyn larvæ, 1914; *Æschna cyanea*, a dragonfly caught in a city office, July, 1914; also *M. persicariæ*, from Stockport.—Mr. W. F. Windle, live specimens of *Parasemia plantaginis* (second brood), bred from ova taken at Forres in June.—Mr. J. H. Shorlocks, *Sirex gigas*, caught in a joiner's shop.—Mr. J. E. Cope, a selection of exotic Coleoptera, including large Longicornia from Singapore; Cetonides from the same district and from Africa; also large-horned Lamellicornia from Malay Peninsula, and several species of Coprides from Africa.

LONDON NATURAL HISTORY SOCIETY.—October 20th, 1914.—Mr. L. W. Newman exhibited a series of *Dianthæcia barrettii* bred from wild larvæ and pupæ from Co. Cork and South Devon, the specimens being very varied, and a few showing tendencies to melanism. Also a very varied series of *Boarmia repandata*, including melanic specimens, very pale forms, and ab. *conversaria*, all from wild collected larvæ taken in April in the Wye Valley.—Mr. A. W. Mera, a series of *Psilura monacha* bred from ova received from Middlesborough, the original parents coming from Ringwood and North Kent. The specimens varied from typical to black, the males showing a stronger tendency to melanism than the females.—Dr. E. A. Cockayne, a series of *Agriades coridon* from Herts, 1914, including two very fine ab. *semisyngrapha*, and five fine obsolete forms.—Mr. V. E. Shaw, five very dark *Abraxas grossulariata* bred in 1914 from some two thousand North London larvæ. Also a fine ab. *radiata* from Eltham.—Mr. W. E. King, a fine series of varieties bred from North London, 1914.—Mr. L. A. E. Sabine, a

fine variety of *Melitæa aurinia* from Co. Sligo, also a remarkable *Polyommatus icarus*, having fore wings and body male, hind wings female, on superficial appearance.—Dr. Cockayne, having examined the specimen with a microscope, said that though only a low power was available he thought he could detect androecenia, showing that the specimen was gynandromorphous.—Mr. J. Riches, a series of *E. smaragdaria* bred in 1914, including ab. *obsoleta*, Burrows.—Mr. H. B. Williams, two pupæ of *Euchloë cardamines*, one green and the other ochreous, both of which pupated on the same day, in the same box.

THE DERBYSHIRE ENTOMOLOGICAL SOCIETY.—The Annual Meeting for exhibits was held on October 31st, 1914, at Littleover House, Derby.—The President was unable to attend on account of the inclement weather, and Dr. Winstan St. A. St. John occupied the chair.—Mr. James Douglas exhibited two cases containing a complete series of the various species of Wainscots, including specimens of *hessii*, Boisd., *favicolor*, and *brevilinea* ab. *sinelinea*, Farn. Also a superb series of *Caradrina exigua*, picked out of a large number taken by himself at Freshwater in August and September, 1906, amongst which was a specimen, probably unique, with extraordinarily enlarged stigmata.—Mr. H. C. Hayward contributed a drawer containing over four hundred *Eupithecia*, comprising thirty-five species, twenty-four of which were local specimens, including *albipunctata* var. *angelicata*, *tresignaria*, *sobrinata*, and *dodoneata*. Also a box of local specimens, including melanic forms, particularly of *Cabera pusaria* and *Boarmia repandata*. Of species locally rare there were specimens of *Helotropha leucostigma* var. *fibrosa* and *Teniocampa opima*, the latter hitherto unrecorded in Derbyshire. *Sesia scoliformis* from Cannock Chase, *Cirrhædia xerampelina* var. *unicolor* and *Macaria liturata* var. *nigrofulvata*.—Dr. St. John showed specimens of inbred *Abraxas grossulariata* var. *varleyata*, and also a long graduated series from dark to light with very few spots, bred from wild Derbyshire larvæ, all from one bush. A long series of *Lymantria monacha* reared from New Forest ova, of which the males in particular were of dark smoky colour with suffused markings. A graduated series of *Ennomos autumnaria*, a specimen of *Lycæna corydon* var. *semisyngrapha*, and also *Vanessa urticæ* of a curiously dull shade.—Mr. John Hill, a box containing a very large number of beautifully preserved larvæ with the natural colouring remarkably clear and distinct.—Mr. C. F. Druitt, some of his captures on a recent holiday in the Isle of Man, amongst which were some *Zygæna trifolii* with the red spots suffused, so as to produce a red-spot variety.—The Secretary showed a series of *Epunda lichenea*, bred from larvæ taken on the Lincolnshire coast.—G. HANSON SALE, Hon. Sec.

ERRATUM.—Page 42 line 13 from bottom for 'Entomologist' for 1879, read 'Entomologist' for 1878.

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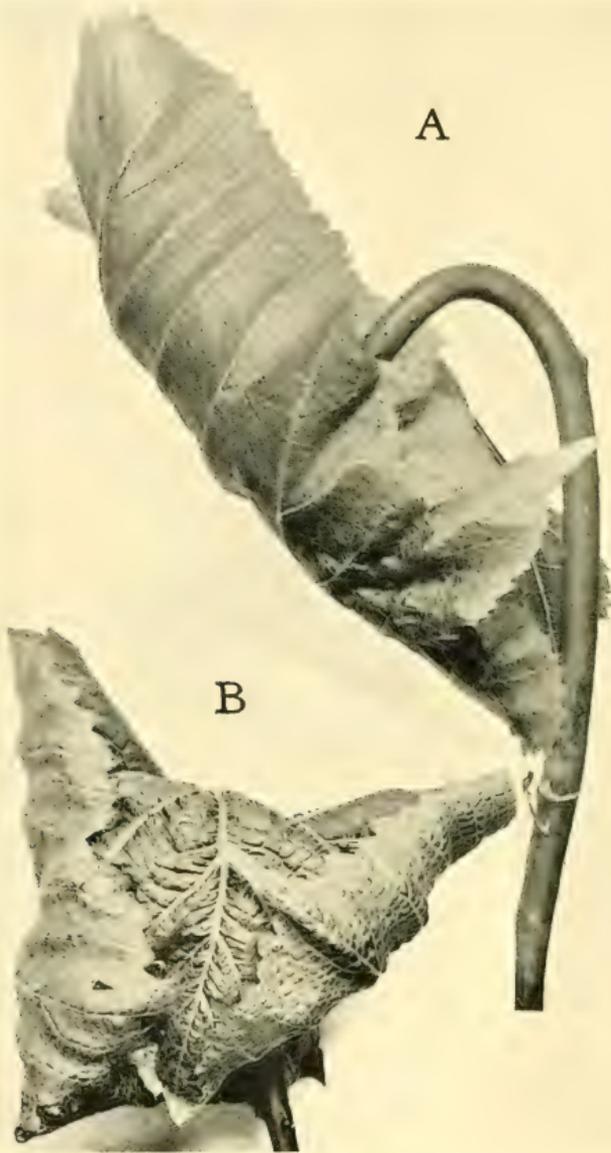
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THE ENTOMOLOGIST

VOL. XLVIII.]

APRIL, 1915.

[No. 623

NOTES ON A LIME TREE APHIS, *PACHYPAPPA* *REAUMURI* KALTENBACH, NEW TO BRITAIN.

BY FRED V. THEOBALD, M.A.

(PLATES IV. & V.)

A VERY marked leaf-monstrosity was noticed by Reaumur on the lime (*Tilia*) and figured by him (Ins. iii. pl. 23, figs. 1-3) due to the work of an aphid. The insect causing this malformation was described by Kaltenbach as *Schizoneura reaumuri* in 1843 (Mono. d. Pflanzenläuse, pp. 175-176); Ratzeburg in 1844 also listed it as *Aphis* (*S.*) *Reaumuri* Kalt. but only refers to it in a few words ('Die Forst Insecten.' iii. p. 221, 30). It has also been referred to by Kieffer in 1901 (Ann. Soc. Ent. Paris, t. 70, p. 532); Schouteden lists it from Belgium in 1903 (Ann. Soc. Ent. Belg. t. 47, p. 188). Del Guercio also gives some valuable notes on it with figures in 1904 ('Redia,' ii. fas. 2, pp. 306-315), and I quite agree with this aphidologist in placing it in Koch's genus *Pachypappa* ('Die Pflanzenläuse,' p. 269, 1857); lastly, Trotter in 1907 mentions it ('Marcellia,' Avellino, t. 6, p. 31, n. 26). Neither Buckton nor Walker refer to it as occurring in Britain, so that this is the first record of this evidently rare aphid and one which is of special interest.

Lichtenstein ('Les Pucerons, Monographie des Aphidiens,' p. 30, n. 58) appeared inclined to consider that Koch's *Pachypappa vesicalis* ('Die Pflanzenläuse,' p. 272, figs. 346-347) was the same as Kaltenbach's *Schizoneura reaumuri*; Del Guercio first clearly pointed out that they are very distinct, *vesicalis* being a poplar insect, whilst *reaumuri* lives on *Tilia* or limes. There is no doubt on this point, but they both belong to the same genus called *Pachypappa* by Koch.

In June, 1914, Mr. E. E. Green sent me alive specimens of these insects from Bearsted, Kent, and on the 13th of that month I visited the locality, and through the kindness of his sister found them swarming on a broad-leaved lime tree in her garden. It was causing a very unsightly appearance to the tree and was undoubtedly doing a considerable amount of harm to the foliage. More than this, it was a great annoyance on

account of the vast numbers of ants it attracted to the tree. I found the curious galled leaf masses or "topnots," as Del Guercio describes them (Plates IV. and V.), in great quantities on this particular tree, and also elsewhere in the locality. They appeared to occur chiefly low down—not many could be seen higher up than twenty feet from the ground. Many were present on the tops of the suckers around the base of the tree.

This aphid has been recorded as feeding on *Tilia grandifolia*, *T. parvifolia*, *T. argentea*, and Del Guercio refers to it on *T. europæa*, Linn., *T. platyphylla*, Scop., and *T. argentea*, Dec., in Italy. The leaf-galls, for one can call them by no better name, are very marked, but vary somewhat in form.

The usual type I found (Plate IV. A) has one large leaf rolled up in cigar fashion, with the top of the shoot and the smaller terminal leaves crumpled up inside; the stalk is markedly bent over just before the final "leaf gall" arises. Sometimes this form is somewhat irregular. The second type (Plate IV. B) has the large outer leaf bent over from above downwards and backwards, forming an irregular triangular mass, with often the sides of the leaf folded laterally over the median portion. The longest galled mass I found was a little over four inches in length. The inner crumpled leaves and contorted, stunted shoot were more or less chlorotic, and sometimes the outer leaf was paler than usual. The tip of the shoot is often very much twisted and lies with the smaller terminal leaves in a crumpled mass inside the large outer curled leaf. The leaves, both internal and external, were remarkably crisp, and broke at the least touch; this was also pointed out, I find, by Del Guercio.

Later on I noticed the whole leaf mass turned brown and died, due to the constant sucking of the masses of insects sheltered within, and to the quantity of very sticky honey-dew that they produce.

At the time of my visit to Bearsted the leaf-galls were almost entirely tenanted by nymphæ, but here and there I fortunately found a large viviparous female, clearly an old "Queen" or "Fundatrix," and a few of her progeny in a later stage than that figured by Del Guercio. This viviparous foundress was 4 mm. long, one about 5 mm.; their form is globular and very bloated in appearance; the colour varied from deep greenish-brown or olive-brown to dark-brown, and one was a deep orange-yellow; in all, the head, antennæ, and legs almost black. The few young I noticed were the same colour as the countless nymphæ, which varied from dull yellow to yellowish or brownish green, the nymphæ having dark wing-pads and dark legs, and the head with dark marks; some of the nymphæ showed five pairs of small lateral tufts of white wool. In all the apteræ there now and then appeared a slight farinaceous coat.

One is at once struck by the relatively small size of the progeny of the large globular foundress, both in the apteræ and alatæ. At the time of my visit, very few alatæ were to be seen, but from material I brought away great numbers of alate females commenced to hatch out on the 15th, and continued to do so until the 20th. Roughly, within the week all had become winged, and this was also noticed by Del Guercio at Florence.

The alate viviparous females—the fundatrigenia—have a black head and thorax, antennæ, and legs, and a yellow-green to deep-green abdomen. The wings are somewhat smoky, with dark veins. The winged females were noticed to fly away from the trees, and those hatched out in the breeding jars at once flew away on being released, and showed if confined great agitation and apparent desire to migrate.

Those kept in a large breeding cage dropped their young on the soil. These very minute young were pale yellow, and whilst still very small crawled into the ground. Later I found them attached to the roots of grass and primroses growing in the breeding cage. The number of young produced by each female was not counted, but from the vast numbers found in the jars, it must be very great. This aphid then leaves the lime trees in June and, according to Del Guercio's observations in Florence, returns to them in September. Of this return to the lime I am unfortunately unable to speak, but I can fill in some of the intervening stages, which are spent in the soil, just as we find is done by the allied *Anacia corni*, Fabricius, and the *Schizoneura ulmi*, Linnæus. The return migrants or sexupara come from the soil and produce the sexuales, and the ova deposited on the limes give rise to the "queen foundress," described here, and which deposits its young on the young tender top shoots; these seem to arrange themselves at first in a row up the shoot and then on the median ribs of the leaves. According to Del Guercio, who found this curious aphid in the Florentine gardens and neighbourhood, it occurs, as I have found it, "in the centre of bunches of leaves" in various kinds of *Tilia*. Del Guercio found infection in March and April in town gardens, and in June and July on the hills and more elevated positions above Pratolius on *Tilia platyphyllus*, Scop., and noticed that on this lime it rolled up the leaf, which it did not do in *Tilia europæa*. At Bearsted I noticed that this aphid was very largely attended by ants (*Lasius fuliginosus*), which formed a long black column coming from and returning to the garden near the attacked tree. The ants were found hurriedly passing backwards and forwards in a line about six inches wide, between their nest and the aphid-laden lime tree. There must have been thousands of them. Those going to the tree kept on one side, those returning from it on the other. The latter were frequently noticed to be carrying the aphids back with them. When the

ants had ascended the trunk, they spread out and swarmed amongst the dense masses of aphides in the leaf tufts, and then greedily sucked up the honey-dew. So intent were these ants on feeding that they would not leave the leaf-tufts even when violently shaken. They were noticed to carry the nymphæ back with them with great care, now and then putting them down and resting awhile, then hurrying on again with their captives. Mr. Donisthorpe tells me that the ants could not be taking them back to their nests, as plants do not grow on the nests of this ant. Probably, as this aphid is a root feeder during part of its life-cycle, they were carrying them back to plants near their habitations, so that the alatae could deposit their young close to them. If *Pachypappa reaumuri* is not a true myrmecophilous species, it comes very near to being so. It is certainly attended by ants who take pains to see that they occur in the soil close to their formicaries.

The characters of the different stages observed are as follows (and I here include the description of the progeny of the "Queen Foundress" more fully noticed by Del Guercio than by myself, the majority having reached the nymphal stage when I became acquainted with this insect).

APTEROUS VIVIPAROUS FEMALE (Fundatrix).

Length 3·8 to 5 mm. Globular in form, very convex above, flattened below. Deep greenish or olive brown to deep brown in colour, one being orange-yellow and some deep olive-green. Head, antennæ, legs, and cauda black. Antennæ

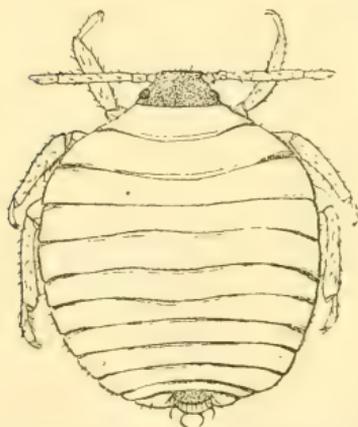


Fig. 1.—*Pachypappa reaumuri*, Kalt.
(apterous viviparous female).

(fig. 2, c) not quite as long as the head and thorax; the first segment small, the second a little longer than the first, the third the longest, from two and a half to three times as long as the fourth; the third and fourth segments with scattered silky hairs all over; the first and second also with a few hairs, mainly on one side. The eyes are of moderate size, dark; stemmata pale and prominent. Rostrum thin and acuminate, pale at the base, dark on the apical half, reaching just past the base of the second pair of legs, the apical segment a little longer than the penultimate, the next long and thin. The legs are dark, thick, and rather short, with

short scattered hairs; the legs all project a little beyond the sides of the body. The body has the segments deeply constricted, especially dorsally; with fine, scanty, short hairs, and to some extent farinaceous, especially between the segments.

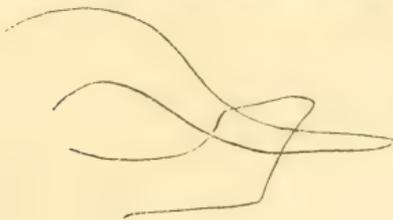
(To be continued.)

ON THE SPECIFIC DISTINCTION OF *LYCÆNA*
CORETAS AND *L. DECOLORATA*.

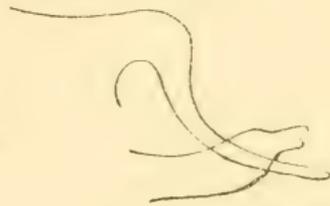
BY THE HON. N. CHARLES ROTHSCHILD, M.A., F.L.S., Pr.E.S.

MONS. CHARLES OBERTHUR* was, I believe, the first to urge that *Lycæna argiades* and *L. coretas* were distinct species. This is now generally admitted to be the case.

In the Cséhtelek † district of Hungary three closely allied species of *Lycæna* occur: *L. argiades*, *L. coretas*, and *L. decolorata*. They all inhabit the open spaces in woods and localities where the forest has been cleared, but where the soil still retains its wild plant life. All three species are double-brooded.



L. coretas.



L. decolorata.

L. decolorata is generally supposed to be an aberration, or at best a dimorphic form, of *L. coretas*. An examination of the genitalia convinces one that this is not the case, and that the two insects are distinct species. In *coretas* the two prongs of the ninth sternite (sometimes called the penis support) are scarcely as long as the stem, while in *decolorata* they are at least as long as the stem.

It is, however, in the apical portion of the pleuræ of the ninth segment (the harpagones) that the two insects differ most. We figure these to show the difference.

It is quite possible that the two insects have different food-plants, and their larvæ may also differ.

THE BUTTERFLIES OF THE BUCKS. CHILTERNs.

BY H. ROWLAND-BROWN, M.A., F.E.S.

(Continued from p. 55.)

15. *Zephyrus betuleæ*, L. This butterfly, as a rule difficult, I think, to locate, should haunt the sloe bushes which form so conspicuous a feature in many of the hill lanes. I have no personal

* 'La Feuille des Jeunes Naturalistes,' Quatrième Série, No. 429, p. 149, 1^{er} Juillet, 1906.

† Cf. 'Entomologist,' vol. xlvi. pp. 87-89, 1913.

acquaintance with it, however; due possibly to my being seldom able to collect hereabouts at the normal time of appearance. Mr. L. E. Dunster, therefore, has been kind enough to communicate to me his experiences of the Brown Hairstreak in the West Wycombe district, and I cannot do better than quote them. "My locality," he says, "is the only locality I know of in Bucks. My first record is September 11th, 1910, when I took a female about 4 o'clock in the afternoon, flying low over some stunted sloe bushes. I thought she was seeking a suitable place for depositing ova, and made a good search without success. I took another female on September 3rd, 1911. . . . On September 8th, 1912, I was collecting in this locality with a friend, and we saw several *Z. betulæ*. They were flying high over the tops of the sloe bushes, and we were not successful in taking any. I visited the locality again at the latter end of May, 1913, hoping to get the larvæ, but was not able to find any; neither did I see the perfect insect in August and September. . . . Last year (1914), though I spent many days there, . . . I did not see anything of this species." Mr. Peachell reported it from the neighbourhood of High Wycombe in 1900.

16. *Thecla w-album*, Knoch. Reported (*in litt.*) by Mr. Peachell from the High Wycombe district; but I have no precise information of locality or time of appearance. Seems to be seasonally common in the southern part of the county. There is also a somewhat vague record in Newman's 'British Butterflies': "In gardens (William Walker)."

LEMONIIDÆ.

17. *Hamearis lucina*, L. This is another butterfly which, for many years apparently, I overlooked in this part of the Chilterns. I came across it quite unexpectedly last year at the edge of a beech wood, where there was also plenty of cowslip growing in the near neighbourhood, and as there are many localities where the food-plant grows all along the hills, I daresay it will prove to be not uncommon. Judging from a number of pupæ sent me eleven and twelve years ago by Mr. Goodson, of Tring (Herts), it is plentiful in that district. It is recorded also from Drayton-Bauchamp and Aston Clinton (Harpur Crewe); and from Halton by Mr. N. C. Rothschild. Mr. Peachell (1900) says that he had never taken it in the High Wycombe district, and Mr. Spiller that he can claim but a single example for the Bucks. hills. On the other hand, the late Mr. G. C. Barrett (Victoria County History List) describes it as "plentiful near High Wycombe."

Earliest seen, May 22nd, 1914, when the males were already wasted; but a week later they were quite fresh in a wood on the borders of Northamptonshire.

PIERIDÆ.

18. *Pieris brassicæ*, L. Common on the warm hillsides, and in the second emergence sometimes occurs in vast numbers, as in August, 1909. There is, no doubt, a partial third brood in favourable seasons, as in 1897.

Earliest seen, *gen. vern.*, April 13th, 1914; *gen. æst.*, July 8th, 1899; *gen. auctumn.*, October 30th, 1897, somewhere in the neighbourhood of Great Missenden.

19. *P. rapæ*, L. Common.

Earliest date observed, *gen. vern.*, April 8th, 1908; *gen. æst.*, *aut auctumn.*, latest seen, October 9th, 1913.

20. *P. napi*, L. Commoner, as a rule, than either of the preceding; at the outskirts of the woods, and in lanes.

Earliest date observed, *gen. vern.*, May 1st, 1900; *gen. æst.*, *ab. napææ*, Esp., August 3rd, 1899.

[*Pontia daplidice*, L. I know of no Chiltern specimen in collections. Every year, both at the time when the spring migration takes place, and in September, I have visited a certain locality where the wild mignonette (*Reseda lutea*) grows in abundance, and spreads with the lean pastures which at other times have been arable. So far I have not been rewarded.]

21. *Euchloë cardamines*, L. In most seasons abundant, especially in May, 1911. Males often on the open down; the females preferring the hedge-banks where *Sisymbrium alliarica* grows.

Earliest date observed, April 20th, 1912; latest, June 26th, 1897, when it was still quite fresh.

[*Leptosia sinapis*, L. Another butterfly which should be found in woods on the southern incline. Locally abundant in certain woods on the Northamptonshire border, in one of which I found it on June 4th, 1908.]

22. *Clias hyale*, L. I have not yet met with this species on the Bucks. Chilterns, but Professor Cartier reports capture in 1900 in the neighbourhood of High Wycombe, and Mr. Spiller in the Buckinghamshire clover fields towards Bledlow Ridge, also on the west.

[Taken September 13th, 1900, by the Rev. F. A. Walker ('Entomologist,' xxxiii. p. 273) near Chorley Wood, and near Chalfont Road, August 21st, 1901, by Mr. G. B. Oliver (*loc. cit.*, xxiv. p. 291); both localities rather outside my southern limit.]

23. *C. edusa*, Fabr. I had never seen this butterfly in any profusion before 1913, even in *edusa* years. In August, September, and October of that season it was to be seen in all localities visited by me, the males outnumbering the females by three to one at least. It flew on the hillsides and adjacent clover and lucerne fields from Princes Risborough to Aston Clinton, and westward to the Wycombes.

Earliest date observed, *gen. vern., advena*, May 30th, 1912; *gen. aest.*, August 14th, 1913; and as examples were taken in perfectly fresh condition as late as October 9th, it is probable that a third (or British second) emergence took place.

24. *Gonepteryx rhamni*, L. Usually abundant throughout the range, and, of course, one of the earliest butterflies on the wing in springtime.

Earliest seen. I have not noted it on the Chilterns earlier than April 12th, 1906, as I have not visited the locality in most years at a previous date. *Gen. aest.*, July 22nd, 1908; latest, October 9th, 1913.

(To be continued.)

NEW SPECIES OF HETEROCERA FROM FORMOSA.

By A. E. WILEMAN, F.E.S.

Brabira costimacula, sp. n.

♂. Head whitish brown, antennæ bipectinated; thorax and abdomen pale brown. Fore wings pale brown, suffused with dusky on terminal area and marked with blackish on the costal area, veins marked with blackish; antemedial line dusky, double, dentate, outer dotted with black on nervures; postmedial line dusky, dentate, excurved, white edged; discoidal spot black; subterminal line white, crenulate; terminal line black, interrupted; fringes pale brown, marked with darker at ends of the veins.

Expanse, 32 millim.

Collection number, 1633A.

A male specimen from Rantaizan, May 6th, 1909. A female specimen, also from Rantaizan (Wileman), in the British Museum is probably referable to this species.

Allied to *B. artemidora*, Oberthur.

Acidalia quadrimacula, sp. n.

♂. Fore wings pale brown, finely flecked with black, and suffused with darker brown on basal and terminal areas; antemedial and medial lines dusky, undulated, indistinct, each with a black dot on it in the cell; postmedial line dusky, excurved, dotted with black towards costa; black dots on the termen, and a black lunule between veins 4 and 6, the latter connected with postmedial line. Hind wings pale brown finely flecked with black, suffused with darker brown on basal and terminal areas; discoidal spot black, conspicuous, terminal dots black. Fringes of all wings pale brown dotted with darker at ends of the veins. Under side whitish brown, suffused with blackish on basal area of the fore wings; all the wings have a black discoidal spot and postmedial line, the latter on the fore wings is wavy and sinuous, and on the hind wings bidentate about middle; terminal line black, lunular.

Expanse, 33 millim.

Collection number, 1690.

One male specimen from Arizan, August 25th, 1908.

Allied to *A. extimaria*, Walk.

Acidalia limbata, sp. n.

♀. Fore wings white, powdered with pale brown; antemedial and medial lines pale brown, the first nearly straight and the second indented before dorsum; postmedial line blackish, undulated, wavy towards costa; area beyond postmedial line clouded with pale brown; discoidal dot and terminal lunules black. Hind wings whitish powdered with pale brown, and clouded with brown on terminal area; antemedial and postmedial lines pale brown, the former diffuse, the latter wavy and indented before middle. Fringes of all wings whitish. Under side whitish; fore wings yellowish tinged and suffused with dusky on the disc; all the wings have a black discoidal dot and blackish undulated postmedial line.

Expanse, 20 millim.

Collection number, 890.

A female specimen from Kanshirei, April 22nd, 1906.

There is a female, also from Kanshirei (Wileman), in the British Museum.

Near *A. fluidaria*, Swinhoe.

Ptychopoda indigata, sp. n.

♀. Fore wings whitish, dusted with pale brown; three transverse dusky lines, the inner two parallel, and the outer somewhat wavy and excurved. Hind wings whitish, dusted with pale brown, two transverse dusky lines corresponding with the second and third of fore wings. Under side whitish, transverse marking as on fore wings faintly traceable.

Expanse, 22 millim.

Collection number, 894A.

A female specimen from Rantaizan, May 4th, 1909.

Allied to *P. aspilataria*, Walk.

Ptychopoda limbaria, sp. n.

♂. Head and collar pinkish-brown, thorax and abdomen pale buff, the latter marked with pinkish-brown. Fore wings pale buff, finely sprinkled with pinkish-brown; costa, except at apex, pinkish-brown; discoidal dot and traces of antemedial and postmedial lines pinkish-brown; terminal border pinkish-brown, rayed inwardly, tapering towards apex; fringes pinkish-brown, dotted with pale buff at the base. Hind wings pale buff, medial line pinkish-brown, sinuous, slender; terminal border and fringes pinkish-brown, the fringes pale buff at the base. Under side pale buff, tinged with pinkish-brown on margins of all the wings; transverse lines of upper side faintly indicated.

♀. Similar to the male, but the transverse markings are purplish, and on the fore wings there are traces of a double postmedial

line, and a distinct fine and sinuous subterminal line ; the inner edge of terminal border is not rayed.

Expanse, 22 millim.

Collection number, 893.

The male described was taken at Kanshirei May 31st, 1908, and is in my collection ; the female type, which is also from Kanshirei (Wileman), is in the British Museum.

Ptychopoda rantaizanensis, sp. n.

♂. Antennæ bipectinated ; head bone-white, collar brown ; thorax and base of abdomen bone-white, rest of abdomen brownish (perhaps discoloured). Fore wings bone-white, costa ochreous-brown finely sprinkled with dark brown ; antemedial line pale brown, indented before dorsum, commencing in a brown spot on the costa ; discoidal dot black ; postmedial line brown, outwardly oblique at costa, where it originates in a brown spot, inwardly oblique from vein 2 to dorsum, obsolescent between veins 2 and 6 ; subterminal line pale brown, dotted with black, irregular, only distinct below the costa and before dorsum. Hind wings bone-white, discoidal dot black ; antemedial line brown, indistinct ; terminal line of all wings black, fringes brown. Under side bone-white, rather glossy, markings of upper side only faintly in evidence.

Expanse, 28 millim.

Collection number, 1808.

A male specimen from Rantaizan, May 14th, 1909.

Very near *P. ferrilineata*, Moore.

NOTES ON THE SUCCESSFUL BREEDING OF
PAPILIO MACHAON.

BY B. PRITCHARD.

As I have been fortunate enough for the past three successive years to breed a very fine series of this lordly insect, in a locality far from its native haunts, perhaps a few notes as to my methods would not come amiss at this slack time of the year ; at least to the younger brigade of entomologists, which we all hope is increasing in strength.

The first year, from paired imagines, I was successful in rearing about seventy larvæ from the egg, the year following about thirty only, but as the third attempt (last year) yielded about one hundred and ninety, I will select it for the one describing my *modus operandi*.

First, the breeding cage is built against a wall facing nearly due south, and is six feet long, four feet broad, and about seven feet high to the apex of roof, the whole being raised from the ground about three feet nine inches, that being a convenient height for purposes of attention, observation, &c.

The autumn of 1913 I obtained a few dozen chrysalids of *machaon* from various sources, including Cambridge fen-collected wild ones, and a good supply from the Continent, placing them in the breeding cage, fully exposed to the winter frosts, but protected as far as possible from predatory lice, earwigs and other small game having a penchant for succulent pupæ.

The second week of February, 1914, I planted a dozen good carrots in six-inch pots in order to provide a supply of luxuriant foliage at time of emergence of the butterflies, as I have found that they oviposit very freely on this easily obtained food-plant.

The butterflies commenced to emerge about the second week in May, and continued doing so at intervals for nearly a month: meanwhile, I had also prepared a good supply of honey-yielding flowers, such as hyacinths, narcissi, wall-flowers, &c., grown in pots and boxes, and I also hung sponges in small pieces soaked with honey, in different parts of the cage.

The weather was rather cold and sunless at first, and the imagines which ventured out first were quite dormant, and appeared starved; however, a few days' hot sunshine made a marvellous difference, and one fine morning on going to visit them I was pleased to see that a very handsome couple had paired, and others were coquetting and sportively flying amongst the flowers and food-plants which I had arranged to fill up the whole of the floor. As days passed other pairings took place, two that I noted, though probably there may have been others, as the ova, laid indiscriminately on upper and under sides, and edges of foliage, began to appear in very considerable quantities.

There were observable differences in size, one batch being distinctly larger, and of a much darker green, than the rest, the hues varying from that colour to pale lemon. It was quite easy and interesting to examine them at this stage with a powerful hand-lens, by simply removing one of the pots of carrots for the purpose. On about the fifth day after having been laid, the egg assumes a darker colour, and continues so doing to the point of hatching, when it becomes a very deep purplish-black with a definite bloom on it. On examination through the lens the shell appears perfectly transparent, and the young larva can be distinctly seen wriggling about, quite ready to eat its way out, and I watched the actual process many times. On complete emergence the young larvæ generally crawled an inch or two away from the shell, returning in about two hours to demolish the remnants of the empty shell as the first solid meal. They soon commenced to crawl over the foliage, and fed for about five days before laying up for the first moult.

As the butterflies kept emerging I watched carefully for ova, but on a strict examination of all the carrot plants I was really astonished at the large number, which could not have totalled

much less than two hundred over all the layings. As the larvæ grew and matured, no small difficulty was created in maintaining a sufficiency of food for such a voracious crew, and I had to adopt special expedients. There was a large bed of carrots in the garden exclusively provided for their benefit, and in due course the half-fed larvæ were transferred to it, being kept from straying by the medium of rough oblong frames covered with lino. Under these shelters the larvæ thrived apace, and it was truly a superb sight to see a host of these handsome creatures—some over two inches long—feeding for all they were worth. One admiring friend said they put him in mind of a troop of "Zebras," apparently a far-fetched simile; but the allusion was quite understandable, the association of ideas being inspired by the endless array of stripes, which first struck on one's vision. There was a perfume arising from the cages, so intense and unequivocal that everyone remarked on the "strong smell of pears"; and there it assuredly was. From this batch of larvæ, all but about six spun up, some on the foliage, others on the sides of the cages, and it was curious that the numbers of grey and green chrysalids were pretty equal, it being perfectly hopeless, however, to try to discover any outward reason for the difference, nor from observation after emergence was it possible to say there was either a sex or colour identification.

Greatly to my mortification the whole of the pupæ very rapidly showed signs of the imago within, and all the butterflies came out, so I had either to kill for the cabinet, or free them, for circumstances prevented my preparing for a second brood.

Another season, for winter stock it might be advisable to place a supply of chrysalids in a refrigerator in order to retard them till all chance of emergence has gone. I therefore let about fifty go, in the hope that they would establish themselves somewhere in the vicinity, and obtained a fine series to replenish the cabinets, with heaps of spare specimens for friends.

The whole series showed little variation from the normal, excepting that of size, which ranged from an expanse of $3\frac{3}{4}$ in. to a little under 2 in., and the intensity of blue in the hind margin, which from a dense blue-black varied to a most delicious brilliant sky-blue; the red anal spot also differs from blood-red to a dirty brick colour.

Machaon is certainly easy to breed under proper and favourable climatic conditions, and there ought to be no serious difficulty in naturalising this species in Shropshire, as the county contains many suitable localities where the ordinary food-plants, *Peucedanum palustre* or *Daucus carota*, are plentiful. I should welcome collaboration from any Shropshire entomologists in this coming season to endeavour to establish it.

"Headingley," Shrewsbury: December 14th, 1914.

NOTES ON FORCING *CROCALLIS ELINGUARIA*, AND
AN ATTEMPT TO HYBRIDISE WITH *ODONTO-
PERA BIDENTATA*.

BY W. BOWATER, Lieut. R.A.M.C.T., F.E.S.

IN February, 1913, I received a batch of about one hundred ova laid by a wild female *Crocallis elinguaris*. They were kept in a bacteriological incubator at 68° F. A few hatched each day from March 3rd–16th inclusive, all proving fertile. About sixty of the larvæ were kept in the incubator, and were fed on *Prunus pissardi*, and later on hawthorn. They varied very much in rate of growth.

On March 31st the first pupated, three on April 1st, and a few daily till April 17th. The temperature in the incubator varied from 66° F.–78° F.; almost all light was excluded, but the air was moisture-laden, and there was some ventilation. Inside measurement, 12" × 10" × 9".

Glass-topped metal boxes were used to contain the larvæ for about the first half of their existence, then an ordinary breeding cage.

The rest of the larvæ (about thirty) were kept after hatching in a room with temperature varying from 45° F.–60° F. The last of these pupated May 3rd. In all about fifteen larvæ died.

The pupæ were kept in the incubator till May 17th, and were then taken to Rhyl, and kept in a warm room. A male emerged on May 20th at 5 p.m. Tried with two female *Odontopera bidentata*, but did not pair. A female emerged on 22nd, and was tried with males of *bidentata*, without result.

On 28th two females and on 29th one female *elinguaris* emerged, and were put with four male *bidentata* type. One couple paired at 10 p.m. on 29th, and were still *in cop.* at midnight. They had separated at 7 a.m. next day.

No ova were deposited till June 6th. The female died on the 10th, having laid twenty-five ova, infertile.

Less than 5 per cent. of the *elinguaris* were crippled; most were full sized, and all were practically normal in colour. They paired freely *inter se*, and deposited over one thousand ova.

I hope some day to repeat the experiment, but trust some one else will try this year. The chief difficulty is to retard the emergence of the *bidentata* pupæ, as low temperatures often fail to do this.

I am much indebted to Mr. J. W. H. Harrison for advice on this matter.

Moseley, Birmingham : February 20th, 1915.

NOTES AND OBSERVATIONS.

MELLINIA (XANTHIA) OCELLARIS.—I was much interested both in Mr. Jones's and Mr. Worsley-Wood's notes on this species (*antea*, pp. 43 and 63). Mr. Jones's capture was undoubtedly a very good one, but certainly far from a record. A friend and myself on September 13th, 1911, captured thirty-eight specimens in one of the Thames Valley localities, and might have taken several more had we wished to do so. Mr. Worsley-Wood asks if *M. gilvago* has at any time in any shape been found associated with poplar. Many years ago I took here a specimen of *M. ocellaris* at sugar. In April, 1908, I was struck with the large number of catkins lying on the ground beneath a row of black poplars, which line the drive to my house. My thoughts reverted to the *M. ocellaris* previously taken, and I swept up about a peck of catkins, which I placed, just as they were, in a box. Night after night I inspected the box in the hopes of seeing a larva crawling about, but fruitlessly. After a month of this, the catkins being in a mouldy and semi-rotten condition, I turned them out to throw them away, when, catching sight of a larva at the bottom, I had a good search, and found nine in all. Of course I was sure they were *M. ocellaris*, and I took the greatest care of them, feeding them on poplar leaves (hitherto they had fed solely on the dead and mouldy catkins), and pupating them successfully. In September following I bred from these five *M. gilvago* and two *M. cerago*, but, needless to say, no *M. ocellaris*!—PERCY C. REID; Feering Bury, Kelvedon, March 7th.

THE LYMAN COLLECTION OF LEPIDOPTERA.—We understand that the collection of Lepidoptera formed by the late Major Henry Herbert Lyman, of Montreal, stated to be one of the finest in Canada, has been bequeathed, together with his library, to the McGill University. An ample endowment fund has also been provided to defray expenses of upkeep, &c. The collection will be accessible to all students of entomology.

It may be remembered that Major Lyman lost his life in the awful disaster that befel the Canadian Pacific steamship 'Empress of Ireland' in the St. Lawrence river on May 29th, 1914.

BRITISH SIPHONAPTERA. — In the 'Entomologists' Monthly Magazine' for March last (vol. li. [3rd series, vol. i.], pp. 49–112), an article is published on the fleas known to occur in the British Islands. It is entitled "A Synopsis of the British Siphonaptera," and is by the well-known authority on this group of insects, the Hon. N. Charles Rothschild. Altogether some forty-five species, in sixteen genera, are dealt with. These are classified under two Suborders—Integricipita and Fracticipita. In the former there are two Families and four Subfamilies, and in the latter three Families.

Ninety-six drawings of structural details, by Dr. Jordan, are admirably reproduced on the eight plates issued with the Synopsis.

A FEW NOTES ON LEPIDOPTERA, CHIEFLY BUTTERFLIES, DURING 1914.—The spring, hereabouts, was characterized by some very warm weather at the end of April: another quite summer-like spell, about

May 20th, was succeeded by bitter winds later in the month, so that in many spots the prematurely-forced shoots of oak, ash, bracken, and even bramble, were blackened and withered. The effects of this wintry return after really hot weather were specially noticeable on a visit to Holmbury Hill, Surrey, on June 13th, when whole acres of the whortleberry that clothes the hillside were seared and brown, where the exposure was greatest. Butterflies were fairly abundant in this poorly represented district of Kent. A very noticeable feature in the spring of 1914 and for the last few seasons has been the absence or scarcity of larvæ of the genus *Hybernia* and those of *Cheimatobia brumata* and *Oporabia dilutaria*, the expanding oak leaves being almost untouched, and, it may be added, the beauty of the woodlands being very much enhanced thereby. The natural result was a scarcity of the resulting imagines in the autumn and winter, during which I only saw a few males of *H. aurantiaria*, and none of *H. defoliaria*. Eight years or so ago the spring oak-shoots were regularly denuded by the above and some other species, and on any mild day in autumn or winter specimens of the males could be taken at rest in the greatest profusion on the fences and tree trunks close at hand. These discrepancies in numbers of such common species seem specially worth recording, being the result of purely natural conditions, neither "over-collecting" nor any other artificial interference with the insects themselves, or with their localities, being conceivably responsible for them. The following notes on butterflies refer, when not otherwise mentioned, to the sandy wooded uplands in the neighbourhood of Brasted Chart, or to the parallel range of chalk hills (the North Downs) about two miles further north:—

Pieris brassicae.—First appearance, April 21st, North Downs; the first brood was in fair numbers, but the second far more abundant. I record a specimen as late as September 25th. *P. napi*.—From April 21st. *P. rapæ*.—April 19th; both broods plentiful. Last seen, October 5th.

Euchloë cardamines.—Plentiful. First seen at Reigate, April 26th; a male seen here as late as June 12th. As this butterfly is not usually associated with the cultivated Cruciferae, it may be of interest to record a female on May 22nd depositing eggs on the immature pods of "swedes" in a neglected field where were some flowering survivors of last year's crop. The resulting larvæ were fed to maturity entirely on the same food-plant as was selected by the parent female. They pupated about June 24th. It was also found that larvæ of this species would feed readily on the young pods of the wild cabbage (*Brassica oleracea*) picked from plants growing close to the sea in Folkestone Warren.

Colias edusa.—I have no personal record of this butterfly during 1914.

Gonepteryx rhamni.—This butterfly persists in comparative scarcity about here, though the numbers for 1914 were certainly an improvement on the two previous seasons. First appearance (hybernated), March 31st; seen singly afterwards. Ova observed in Mereworth, May 16th. First of the fresh emergence, August 2nd, and more frequently seen in the garden, at the phloxes, &c., subsequently, than in the woods. Last record, September 6th.

Vanessa urticae.—Common before and after hibernation. First appearance, March 31st; freshly emerged, June 22nd; last seen, October 10th. In August a specimen had settled up in an outhouse, apparently for hibernation. *V. io*.—Only two hibernated specimens seen here, on April 18th and 20th. I rarely see the larvæ hereabouts, but found a small brood of half-grown ones near Sevenoaks on June 24th; the subsequent butterflies, which began to emerge on July 25th, being released in the garden. Specimens—possibly my released ones—were seen in the garden from August 14th–24th, and one at *Buddleia* flowers in the town of Sevenoaks, August 25th.

Pyrameis cardui.—I do not record any hibernated (or migrated) specimens here, but saw a few early in July near Folkestone. Later on the larvæ were common on thistle near by, and one was bred as late as September 6th. The butterflies were by no means plentiful; last seen, September 26th. *P. atalanta*.—Hibernated specimens were not common: one in the garden, June 16th; another, June 24th; and two near Folkestone, July 1st. The first undoubtedly fresh specimen seen, August 10th; common at treacle patches later. Larvæ not very abundant hereabouts. The fine late autumn was very favourable to the butterflies. I record one in Kensington, October 7th; another at 9.15 a.m. on October 26th here (an early hour on a late date for the species to be on the wing); and, finally, a specimen on November 7th.

Argynnis euphrosyne.—From May 17th scarcer than usual near here; rather abundant close to Sevenoaks, May 20th. *A. aglaia*.—I never see this species here, nor, except singly, on the chalk downs near by. One wasted female near Oxted, August 11th.

Epinephele ianira.—First record, June 13th, North Downs near Dorking; several specimens.

Cænonympha pamphilus.—From May 15th.

Arge galathea.—July 3rd, one, at Alkham, near Folkestone.

Aphantopus hyperanthus.—From June 28th. This species is distributed throughout the woodland, but is never abundant.

Thecla rubi.—Several specimens on the North Downs, near Westerham, April 29th, and fairly common subsequently. Last seen, June 13th, near Dorking.

Chrysophanus phlaeas.—Very scarce in the earlier part of the season here, and even more so on the chalk. First recorded, May 14th. On August 11th and subsequently, common. Last seen on October 8th. On September 15th, a chilly and windy morning, I had the good fortune to "pill-box" a female specimen of the variety *schmidtii* whilst walking to Sevenoaks; the capture being the more remarkable as being the only butterfly of any sort on the wing seen that day.

Lycæna icarus.—First seen near Oxted, one male, May 15th. On June 1st in great abundance on the nearer chalk downs. One paired female was found, quite unable to fly, with the wings still limp. Ova laid on May 30th hatched June 15th, and the first larva pupated July 23rd, and emerged August 13th, a male. The majority of the larvæ from the above ova showed signs of hibernating as such at a very early stage, as I have repeatedly found to be the case with this species. A female at rest on a black tarred fence on August 5th

seems worth noting. The butterflies were still flying on September 18th. The second brood was first recorded on July 22nd, and was produced in great abundance. *L. corydon*.—Fairly abundant locally on the North Downs on August 11th; wasted on September 2nd. *L. adonis*.—A worn pair near Folkestone, July 1st, and a male in the same locality, July 7th. I have records of this species in every month, from April to October, both inclusive, in exceptional seasons. *L. agestis*.—I have never seen this species on these hills; it is fairly common, but local, on the North Downs. First record, May 30th. *L. argiolus*.—First seen in Sevenoaks, April 16th; several in Reigate, April 26th; two in Kew Gardens, May 7th. Ovipositing on dogwood, near Westerham Hill, May 19th. The first brood was abundant hereabouts, the second less so. The first record of the latter was on August 1st; larvæ on ivy-buds, August 23rd.

Hesperia alveolus.—April 21st and subsequently; fairly common on the North Downs, less so on these hills. Still on the wing, June 13th.

Thanaos tages.—From April 29th, North Downs, and very abundant later. (On the above date it may be here worth noting a specimen of *Hypocrita jacobææ* was on the wing—a very early date for this species.) On August 16th a fresh-looking specimen of *T. tages* was seen on the North Downs, presumably of a second brood. Though he has not the exact dates, Mr. Gillett tells me that late summer specimens were observed by him thereabouts in 1911.—R. M. PRIDEAUX; Brasted Chart, Kent, February 10th, 1915.

NOTES ON LEPIDOPTERA ATTRACTED BY LAMPS AT BEXHILL-ON-SEA (concluded from p. 68).—*June 5th*.—First appearance of *Miana fasciuncula*, *Leucania impura*, *Anaitis plagiata*, and other common things. Also the only *Bapta temerata* I have taken here. 12th.—*Arctia villica*, *Dianthæcia capsincola*. 17th.—*A. villica*, *Boarmia consortaria* (one), *Cerura bifida* (one), *Acidalia marginepunctata*, *Petilampa arcuosa*, *Noctua primulæ* (very abundant henceforth, as were other common insects, e.g. *Miana strigilis*). 18th.—*Pterostoma palpina*, *Ephyra pendularia*, *Cleora lichenaria*, *Lygris associata*; first *Boarmia repandata*. 19th.—*Eurymene dolabraria*, *P. palpina*, *Pachys betularia* (common). 21st.—*Cybosia mesomella* (one), *A. marginepunctata*, and *A. subsericeata* (one), *Cucullia umbratica*, *D. capsincola*; first *Acidalia imitatoria*, which afterwards swarmed at my window. 24th.—*Cidaria fulvata*. 25th.—*Boarmia roboraria* (one). 27th.—*Hylophila prasinana* (caution: turns bright orange in ammonia), *Mesoleuca albicillata*, *Cleora lichenaria*, *Thyatira batis*, *Plusia pulchrina*; first appearance of *Nola cucullatella*, *Hemithea strigata*, and *Acidalia dimidiata*, which all swarmed later; also 28th, *Acidalia aversata*. 29th.—*Ellopiu prosapiaria*, *Plusia chrysitis* (common after). 30th.—*Arctia villica* (two). (N.B.—*Pericallia syringaria*, flying in garden now, never came to light. A curious exception among "thorns".)

July 6th.—*Habrosyne derasa* (common, but only one *T. batis* taken), *Asthena sylvata* (*testaccata*). 13th.—*Palimpsestis fluctuosa*, *Geometra papilionaria*, *Bryophila glandifera*, *Mitochrista miniata* (common), *Lithosia complana* (one), *L. lurideola* (this swarmed, but though I examined scores I only detected one *L. complana*); first

Porthesia similis. 14th.—*Palimpsestis octogesima*, *Herminia derivalis*, *Stilpnotia salicis* (the only one), *Malacosoma neustria*, *Eupithecia succenturiata* (I have omitted most of the genus *Eupithecia*, as I do not trust my identifications, and prefer to breed them); first second-brood *S. bilunaria*. 16th.—First *Nudaria mundana* and *C. matura* (both common); second brood of *Cilix glaucata*; appearance of *Ortholitha limitata* (*mensuraria*). 18th.—*Lithosia griseola*, &c., *Ania emarginata* (one). 20th.—*Chærocampa elpenor* (worn). 21st.—*Lymantria monacha*, *Agrotis strigula* (? second brood), *Cleora lichenaria*. 25th.—First *Epione apiciaria*. 27th.—*Agrotis puta*, *Acidalia marginepunctata* (second brood), *Xanthorhoë unangulata*, *Thamnonoma wavaria*, *Lygris associata*.

August 1st.—*Triphæna ianthina*. 7th.—*Bryophila perla* abundant just now. 11th.—*Pterostoma palpina* (second brood). 12th.—*Pheosia dictæoides* (one), *Hepialus sylvina*; second brood of *Noctua plecta* and *H. rubi* appeared. 13th.—*H. sylvina*; first *Crocallis elinguaris*, *P. dictæoides* (two). (Is this species commoner in the second brood? I only took this brood here, and the same thing happened in 1912 when "lamping" on Kingston Hill. In both cases *P. tremula* was commoner as a first brood.) 14th.—First *Ennomos alniaria* (very common later). 20th.—*N. ziczac* (second brood), *Lymantria monacha*, *Ennomos fuscantaria*, *Ligdia adustata*. 22nd.—*E. fuscantaria*.

September 7th.—*Gortyna ochracea*. 8th.—*Epineuronia popularis* (common), *Noctua neglecta*. 18th.—*Thera firmata*, *Epione apiciaria*; first appearance of *Omphaloscelis limosa*, which swarmed henceforth. At this date I began collecting here in 1913, and it is interesting to compare the first appearances of the autumnal species in two such different seasons. *O. lunosa* appeared on the 20th in 1913. 22nd.—*Cidaria miata* appeared and was common to the end of October. 25th.—*Xanthia fulvago*, *Amathes lychnidis* appeared (1913 on the 30th). 27th.—*Xanthia lutea*, *Noctua c-nigrum* (30th in 1913), *Percnoptilota fluviata*.

October 2nd.—*Thera firmata*, *Ortholitha cervinata* (September 26th, 1913). 8th.—*Tholera cespitis* (one, worn), *T. firmata*. 9th.—*Calamia lutosa* (one), *Porthesia similis* (second brood?). 10th.—*Ennomos erosaria* (one). 13th.—*Cidaria siterata* (*psittacata*) (scarce here compared with *C. miata*, but both species very fine and richly coloured); first *Miselia oxyacanthæ* (1913 on the 11th). 14th.—First *Diloba cæruleocephala* (1913 on 22nd), and *Himera pennaria* (1913 on 25th). 21st.—*Agriopsis aprilina*, *Thera firmata*. 23rd.—*Chesias spartiata* appeared (1913 on 22nd). 24th.—*Oporabia dilutata* appeared (1913 on 22nd), and *Hybernia defoliaria* (quite scarce here). 25th.—(1913, *P. fluviata*). 26th.—*C. siterata*.

Among other species, for which I have no dates, I may mention *Phalera bucephala*, *Arctia caia*, *Hipocrita jacobææ*, *Acronycta megacephala*, *Noctua triangulum*, *Hydræcia nictitans*, and *H. micacea* (common). *A. exclamationis* is of course a pest, and *Rusina tenebrosa* and *Caradrina morpheus* are common.

A very curious visitor to a suburban lamp was *Hydrelia uncula*. This swarms in the marshes two miles away, but one vagrant turned up at light. Probably *C. lutosa* is a wanderer from the same

locality. Some common species are only occasional visitors to light, *e. g.* I have taken solitary specimens of *Amathes lota* and *A. macilenta*, *Eupsilia satellitia*, &c. There is hardly any Geometer that will not turn up occasionally, whereas the Noctuæ are very pronounced in their likes and dislikes. *Luperina testacea* swarms at the end of August, as does *Amathes lychnidis* at the end of September, and *Diloba cæruleocephala* at the end of October; *Pacilocampa populi* was very common in November, 1913.

There are many species I have not made a note of because, like the poor, they are always with us, such as *Xanthorhoë fluctuata* and *X. sociata*, *X. montanata* and *Rumia lutcolata*; *X. fluctuata* first appeared on April 4th. Also some I omitted to note at the time, *e. g.* one *Eustroma silaceata*, too worn to take. There are also curious omissions on the part of Nature. It is nothing less than providential that *Campptogramma bilineata* is blind to artificial light, otherwise the lamps would have been obscured.

Since writing the above I may add:—

November 5th.—*Hybernia aurantiaria*, and first appearance of *P. populi*; also a wasted specimen of *E. apiciaria*. I took this first on July 25th. I doubt if it is a second brood specimen, as some ova I obtained from an early example have not hatched even in the house.—ERNEST A. C. STOWELL; Laleham, Bexhill-on-Sea.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*Wednesday, November 18th, 1914.*—Mr. G. T. Bethune-Baker, F.L.S., F.Z.S., President, in the chair.—Messrs. Harry George Champion, B.A., c/o U.S. Department of Agriculture, Entomological Bureau, Washington, U.S.A.; J. J. Lister, St. John's College, Cambridge, and Merton House, Grantchester; and Rev. James Waterston, B.D., B.Sc., 22, Blandford Road, Bedford Park, W., were elected Fellows of the Society.—The President announced that the Royal Society had awarded the Darwin Medal to Prof. E. B. Poulton, a former President of the Entomological Society.—Before announcing the nominations of the Council for the next year's officers and council, the Secretary said that the Council desired to put on record their great regret that Dr. Chapman had again declined to be nominated for the Presidency. The council felt that his continued absence from the Presidential chair would be a lasting stigma on the Society, unless it were somehow put on record that it was by his own desire that he did not occupy it. The nominations of the council were as follows:—President, the Hon. N. Charles Rothschild, M.A., F.L.S., F.Z.S.; Treasurer, A. H. Jones; Secretaries: Comm. J. J. Walker, M.A., R.N., F.L.S.; the Rev. George Wheeler, M.A., F.Z.S.; Librarian, G. C. Champion, A.L.S., F.Z.S.; Other Members of Council: G. T. Bethune-Baker, F.L.S., F.Z.S.; E. A. Butler, B.A., B.Sc.; E. A. Cockayne, M.D.; J. E. Collin, F.Z.S.; H. Eltringham, M.A., D.Sc., F.Z.S.; C. J. Gahan, M.A.; E. Ernest Green; G. B. Longstaff, M.A., M.D.; G. Meade-Waldo, M.A.; G. W. Nicholson, M.A., M.D.; H. Rowland-Brown, M.A.; A. E. Tonge.—Mr. E. E.

Green exhibited two specimens of an *Anthrocera* (*Zygæna*) from Camberley, taken August 20th, 1914, which appeared to be *A. meliloti*, though South states that "the only part of Britain that the species inhabits is the New Forest, Hampshire." He also exhibited a specimen of the rare Hypenid *Parasestia fuliginosa* taken at light at Camberley, July 21st, 1914. The President said that he should have named the specimens *meliloti* without hesitation, and Mr. Jones concurred.—Mr. E. B. Ashby, on behalf of Mr. Dickinson, a few butterflies from Hinterzarten in the Black Forest and from Pontresina.—Mr. Prideaux, a cocoon of *Bombyx quercus*, with the dead, shrivelled larva inside, together with the empty puparium of a dipterous parasite, which, with the wings unexpanded, lay beside it, imprisoned within the cocoon of its host.—Mr. Simes, a series of *Agriades thersites*, *Plebeius zephyrus* var. *hesperica*, and *Melitæa desfontainii* from Albarracin taken in the end of May and the beginning of June this year. The females of *A. thersites* were strongly marked with blue, and amongst the males was a specimen the under side of which had only the discoidal and marginal spots.—The following papers were read: "A Revision of the Mexican and Central American Telephorinæ (Fam. Telephoridae), with Descriptions of New Species," by George Charles Champion, A.L.S., F.Z.S., F.E.S.; "Descriptions of two New Genera and New Species of Mymaridæ from Tasmania," by Chas. O. Waterhouse, I.O.S., F.E.S.

Wednesday, December 2nd.—Mr. G. T. Bethune-Baker, F.L.S., F.Z.S., President, in the chair.—Prof. Lameere, of Brussels, was elected to the Honorary Fellowship vacant by the resignation (and subsequent death) of Dr. August Weismann.—The Rev. F. D. Morice exhibited a few Hymenoptera of various groups from Egypt, Algeria, &c., showing the silvery pubescence and pale colours frequently characteristic of Desert insects. Also a lantern slide showing the seventh ventral segment in the male *Prosopis communis*.—Mr. H. J. Turner exhibited a striking aberration of *Argynnis niobe*, with symmetrically coalescent dark markings on the upper side and the silver spots on the under side hind wing forming a triple basal blotch and marginal streaks.—Mr. S. A. Neave exhibited a large series of insects, 1326 in all, forming the prey of a common Asilid, *Promachus fasciatus*.—Mr. W. J. Lucas exhibited a specimen of *Drepanopteryx phalænoïdes*, Linn., taken about the end of July, 1914, by Mr. E. A. C. Stowell, B.A., at Bexhill.—Dr. H. Eltringham exhibited a little machine of his own invention consisting of a mechanical stage specially adapted for the microscopical examination of pinned insects.—Prof. Poulton exhibited the flower of an *Acacia*, probably *A. baileyana*, F. v. Muell., together with a female Lycænid, *Nacaduba biocellata*, Feld., and the pupa-case from which it had emerged; the larva bore the most remarkable resemblance to the yellow fluffy balls of the inflorescence. The likeness, mainly due to the long yellow hairs with which the larva was clothed, was increased by its attitude, the body being rather strongly curved.—Prof. Poulton also read notes on Dr. G. D. H. Carpenter's observation of the epigamic use of its anal brushes by the male *Amauris psyttalea*, and also Dr. Carpenter's further observations on the Driver Ant, *Dorylus nigricans*.—The following paper was read: "Further Observations on the

Structure of the Scent-organs in certain Brush-bearing Male Butterflies," by H. Eltringham, M.A., D.Sc., F.E.S.—GEORGE WHEELER, *Hon. Sec.*

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*January 14th, 1915.*—Mr. B. H. Smith, B.A., F.E.S., President, in the chair.—Dr. Chapman exhibited an *Anthrocera exulans* with six wings, an *A. anthyllidis* with three tarsi on the left mesothoracic leg, and an *A. achilleæ* with symmetrical wing notches. He also showed exotic lattice-work cocoons, probably Syntomid or Lithosiid, and pupal burrows of *Scardia boleti*, showing the trap-door closing the cocoon proper.—Mr. Moore, cases of *Psychida* from the Island of Rhodes, cases of *Ceeticus kirbyi* from Antigua, &c.—Mr. R. Adkin, various cocoons of British species of Lepidoptera, and read a paper entitled "Some Pupal Habitations."—Mr. Sich read an extract from the 'Flora of Middlesex,' Trimen & Dyer, 1869, giving an account of a natural history field meeting which took place in 1629 to Hampstead Heath.

January 28th, 1915.—The President in the chair.—Annual Meeting.—The balance sheet and the report of the council were read and adopted. The president read his address, dealing with the position and work of the Society during the past year, and with general entomology during the same period. The usual votes of thanks were passed. The following is a list of officers and council for the session 1915-16: President, B. H. Smith, B.A., F.E.S.; Vice-Presidents, A. E. Gibbs, F.L.S., F.Z.S., F.E.S., and A. E. Tonge, F.E.S.; Treasurer, T. W. Hall, F.E.S.; Librarian, A. W. Dods; Curator, W. West (Greenwich); Editor of Proceedings, E. Step, F.L.S.; Hon. Secretaries, Stanley Edwards, F.L.S., F.Z.S., F.E.S., and H. J. Turner, F.E.S.; Council: R. Adkin, F.E.S., S. R. Ashby, F.E.S., J. Platt Barrett, F.E.S., Dr. T. A. Chapman, F.Z.S., F.E.S., B. S. Curwen, W. J. Kaye, F.E.S., D. R. Morford, N. D. Riley, F.E.S., and W. G. Sheldon, F.E.S. Ordinary Meeting.—Mr. Buckstone exhibited a bred series of *Bupalus piniaria* showing much variation; aberrations of *Hipocrita jacobææ*, smoky, streaked with pink, and entirely smoky hind wings; and *Spilosoma menthastris*, which on emergence had a pink flush which was evanescent.—Mr. Edwards, living specimens of *Ephestia kuhniella* with pupæ and cocoons.—Mr. G. T. Porritt, a fine series of ab. *nigrocostata* and ab. *nigrosparsata* of *Abraxas grossulariata*.

February 11th, 1915.—Mr. A. E. Gibbs, F.L.S., Vice-President, in the chair.—Messrs. E. J. Bunnett, M.A., of Forest Hill, and Gordon Fryer, of Twickenham, were elected members.—Mr. L. W. Newman communicated a long record of the results of the October pairing of *Pyrameis atalanta*, and of his unsuccessful attempt to keep the fertile females alive through the winter. He felt convinced that we were almost entirely dependent upon immigration for our supply of this species.—Mr. Frohawk said that *P. atalanta* was on the wing all the winter in suitable weather in the Scilly Isles.—Mr. Barrett said that it occurred similarly in Sicily all the winter.—Mr. R. Adkin exhibited photographs, highly magnified, of the silken thread construction of the cocoons of *Saturnia pavonia*, *Anthrocera filipendulæ*, and *Dicranura vinula*.—Mr. Frohawk showed a large

number of lantern slides of birds, and gave an address incorporating his own observations on the Scilly Isles.

February 25th.—Mr. B. H. Smith, B.A., F.E.S., President, in the chair. A special exhibition of lantern slides by Messrs. W. West (Ashtead), A. E. Tonge, E. J. Bunnett, C. W. Colthrup, and by Mr. Colthrup on behalf of the members of the Nature Photographic Society, including Messrs. Bedford, Salmon, Sanders, Main, Hoeking, Tonge, Irving and Stanley Cook.—Mr. Newman, a long series of *Celerio galii* bred from N. Cornwall ova.—Mr. J. Platt Barrett, a series of *Euchloë damone* from Sicily, and remarked on the small amount of variation in the species.—Mr. F. W. Frohawk, a series of yellow forms of *Arctia caia* from the Scilly Isles, where it was met with in some numbers.—HY. J. TURNER, *Hon. Rep. Sec.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—*December 21st, 1914.*—Annual Meeting.—The President in the chair.—Messrs. Vincent Fogarty, 56, Bolton Road, Ewood, Blackburn, and William Buckley, 59, Roseneath Road, Urmston, near Manchester, were elected members of the Society.—The usual business of an annual meeting was transacted, and the following members were elected as officers and council of the Society for the ensuing year, *viz.*—President: Prof. R. Newstead, M.Sc., F.R.S.; Vice-Presidents: R. Wilding, J. Cotton, M.R.C.S., &c., J. R. le B. Tomlin, M.A., F.E.S., H. R. Sweeting, M.A.; Hon. Treasurer: J. Cotton; Librarian: F. N. Pierce; Hon. Secretary: Wm. Mansbridge, F.E.S.; Council: L. West, P. F. Tinne, M.A., S. P. Doudney, Wm. Webster, R. S. Bagnall, F.L.S., F.E.S., Chas. Frederick Burne, J. W. Ellis, M.B., Ch.B., F.E.S., Arnold W. Hughes, J. Collins.—The retiring President, Mr. R. Wilding, read his address, in which he reviewed the entomological events of the past year in an able and interesting manner.—Mr. F. N. Pierce exhibited and described the hitherto unrecognised species of Tortricidæ as follows, *viz.* *Cnephasia genitalana*, found in various collections mixed with other species of the genus. Hab. Essex and Kent. *Pacilochroma pomedaxana*, an apple-feeder, until now considered to be a variety of *P. profundana*. Hab. Devon and Herefordshire. *Lepoptycha æratana*, for some time represented only by a single specimen in his collection, but lately found in Threlfall's series of *Dichrorampha tanacetii*. These have all been distinguished through examination of the genitalia, and full descriptions are published in the 'Entomologist's Monthly Magazine' for January, 1915.—Mr. W. A. Tyerman showed a fine series of *Sphinx ligustri*, most of which had laid over until the second year before emerging; a fine and long series of *Melanippe galiata* from Ainsdale; the ova were deposited in September by a very late female; also from Ainsdale, *Acronycta leporina*, *Cucullia chamomilla*, and *Chariclea umbra*.—By Mr. Wm. Webster, a large species of Cicada from India.—WM. MANSBRIDGE, *Hon. Sec.*

THE MANCHESTER ENTOMOLOGICAL SOCIETY.—*November 4th, 1914.*—Mr. J. E. Cope gave a paper on the "Adephaga." This large and important group was first discussed as a whole, emphasis being laid on the fact that the majority of the terrestrial members at least are more or less useful agents to man, feeding as

they do on many of the smaller injurious creatures such as larvæ, earthworms, mulluses, &c. He then proceeded to take the various families more in detail, mentioning as types the Tiger-beetles (Cicindelæ), the Ground-beetles (Carabidæ), and the great Water-beetle (Dytiscus).—Mr. C. F. Johnson showed Lepidoptera taken at Courmayeur, in North Italy, in July, 1914: *M. didyma*, females showing a good deal of variation; *M. parthenie* var. *varia*, *E. melampus*, *E. tyndarus*, *E. lycaon*, *L. pheretes*, *L. hylas*, *L. escheri*, *L. damon*, *Z. carniolea*, *Z. achilleæ*, *Z. scabiosæ*.—Mr. B. G. Crabtree exhibited vars. of *Arctia villica*, with cream tips to the wings.—Mr. V. Coryton brought living larvæ of *U. sambucaria* and a living imago of *H. defoliaria*.—Mr. L. Nathan showed *P. atalanta* and *P. cardui* from Kersall, October, 1914.

December 2nd.—Mr. J. H. Watson showed preserved specimens of the life-histories of the common house-fly, the blow-fly, and the gnat. These preparations were by Messrs. Flatters & Garnet.—Mr. B. H. Crabtree showed, for Mr. R. Tait, jun., *Cidaria russata* from South Devon, with vars. He also exhibited *Abraaxas grossulariata*, bred from York this year from wild larvæ, var. *nigro-sparsata*, and one remarkable specimen asymmetrical in the hind wings.—Mr. Mansbridge had examples of the same species, var. *lacticolor*, bred from wild larvæ taken at Huyton, near Liverpool.—Mr. J. E. Cope exhibited living specimens of *Ptinus tectus*, found in dog-biscuits.—Mr. F. N. Pierce showed beautiful series of the genus *Sciaphila* of the Tortrices, mostly taken from the Tutt collection.—Mr. L. H. Suggitt gave a very interesting paper entitled "The Evolution of Insects." As an introduction he mentioned the relationship which exists between *P. icarus* and *P. artaxerxes*. He gave further illustrations from the various geological formations, noting that the earliest known type of an insect was found in the Silurian epoch. The evidence of embryology is also of great interest in this regard, inasmuch as by its aid we are able, to a certain extent, to trace the rise of any given species from earlier forms.

LONDON NATURAL HISTORY SOCIETY.—*November 8th, 1914.*—Dr. E. A. Cockayne exhibited four extreme suffused forms of *Rumicia phleas* from Japan, much darker than any English specimens; Mr. W. E. King, *Aricia medon* from Wendover, including an immense female, obsolete under sides, and one partly striated, also *Zizera minima* from Horsley, including abs. *obsoleta* and *extrema*.—Mr. H. B. Williams, four *Aricia medon* showing obsolescence in the under side spotting, a striate under side of *Agriades thetis*, five specimens of *Cænonympha pamphilus* ab. *pallida*, Tutt, from Herts; *Rumicia phleas* ab. *infra-radiata*, Tutt, two ab. *raviata*, Tutt, ab. *obsoleta*, Tutt, and an ab. *cæruleopunctata*, Staud., with pallid patches on the fore wings, from Wimbledon, also a male of the same species from Herts, with left fore wing almost entirely white.—Mr. L. A. E. Sabine a store-box of Noctuæ from Co. Sligo, 1914, including a remarkably fine series of *Agrotis tritici* and a fine form of *Epunda lichenea*.—Mr. A. W. Mera, comparative series of *B. repandata* illustrating the marked darkening that has taken place in the general facies of this species in the London district during the last thirty years.

December 1st, 1914.—Mr. A. W. Mera exhibited a mixed gynandromorph of *Saturnia carpini*, right side predominantly male but with large female patches, antennæ intermediate, a regularly halved gynandromorph of *Boarmia repandata*, left side female, right male. Mr. V. E. Shaw, an *Amorpha populi* bred June 10th, 1909, left side male, right female, antennæ, genitalia and wing markings, the line of division along the centre of the body being clearly defined.—Dr. E. A. Cockayne, *Polyommatus icarus*, a symmetrical gynandromorph with upper side predominantly male, under side predominantly female; another of the same species predominantly female, but with streaks of male colour on right fore wing and both hind wings. Androconia were numerous on the male areas and the genitalia externally purely male. Four gynandromorphous *A. populi*, all showing mixture of male and female parts in their external genitalia, three were predominantly female in their internal organs, having ovaries but no testes, the other was predominantly male. A *Smerinthus* hybr. *hybridus*, male. Two gynandromorphous *Anthrocera hippocrepidis* (doubtful), a heterochroic gynandromorph of *Hemerophila abruptaria*, right side male, ab. *fuscata*, left side female, typical. A heterochroic gynandromorph of *Abraxas ulmata*, right side male, ab. *pantarioides*, left side female, typical. Thirty-seven gynandromorphous *Agriades coridon* with one side smaller than the other, and hairy blue scales and androconia on the smaller side. One with blue scales and androconia on both sides, two with streaks female colour. Also drawings of dissections of gynandromorphous lepidoptera of various species.—Mr. H. B. Williams, a regularly halved gynandromorph of *Fidonia piniaria*, left side female, right male; a female *Ematurga atomaria* with wing coloration of the male; a female *Euchloë cardamines* with a splash of male colour on the under side of left fore wing; a regularly halved gynandromorph of *Amorpha populi*, left side female, right male; a mixed gynandromorph of the same species, left wing and antenna female, right antenna and (apparently) wing intermediate, body apparently male. Also specimens of *Agriades coridon* abs. *inæqualis*, Tutt, and *roystenensis*.—Dr. Cockayne delivered an instructive and interesting address on "Gynandromorphism."—Mr. L. Prout, series of *Cidaria truncata* and *C. immanata* from a Scotch locality, showing considerable variation.

December 15th, 1914.—Mr. L. B. Prout, a short series of *Melanthia bicolorata* bred from Forres ova, showing an interesting modification of the *plumbata* form of variation, the fore wing being largely infuscated, but with parts, in particular a broad subterminal line, remaining white, while the hind wing showed infuscation in the terminal region only. The following officers were elected for 1915:—President: Dr. E. A. Cockayne, M.A., M.D., F.E.S.; Vice-Presidents: Mr. A. Bacot, Rev. C. R. N. Burrows, Dr. T. A. Chapman, Messrs. M. Greenwood, F. J. Hanbury, A. W. Mera, L. B. Prout, R. W. Robbins; Trustees: Messrs. A. W. Mera, C. S. Nicholson, L. B. Prout; Librarians: Messrs. W. E. Glegg and A. L. Mera; Curators: Messrs. S. Austin, C. S. Nicholson, A. J. Wellson; President of Research Section: Mr. E. B. Bishop; Treasurer: Mr. F. G. Dell; Secretaries: Messrs. J. Ross and H. B. Williams; Council: Messrs. F. B. Cross, L. B. Hall, L. W. Newman, H. E. Stevenson, H. Worsley Wood.

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1



2

Upper side, ♀.

Under side, ♀.

About half natural size ($\frac{1}{2}$).



3



4

Fig. 1. *Elymnias smithi*, sp. n.

Fig. 2. *Elymnias smithi*, sp. n.

Fig. 3. *Pyrameis atalanta*, ab.

Fig. 4. *Smerinthus hybridus* (gynandromorph)

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SOME UNDESCRIBED BORNEAN NYMPHALIDÆ.

By J. C. MOULTON, F.E.S.

Curator of the Sarawak Museum.

(PLATE VI., FIGS. 1 & 2.)

IN preparing a key to the butterflies of Borneo it became apparent that a few forms needed description. As the completion of my work has to be postponed indefinitely, it is, perhaps, useful to publish these few descriptions without further delay. The types are at present in the Sarawak Museum; they will be deposited in the British Museum in due course, as has been done with other types formerly in the possession of the Sarawak Museum.

Subfam. DANAINÆ.

Danaida limniace, Cr., *kuchingana*, subsp. nov.

Shelford records both *septentrionis* and *microstieta* from Borneo, the latter, I think, based on one female in the Sarawak Museum, which should be referred to *limniace*, hitherto unrecorded from Borneo.

Typical *limniace* comes from the Himalayas, China, Hong-Kong, and Formosa. A lighter form from Ceylon and South India has been named *mutina* by Fruhstorfer. The single Bornean female before me differs from this last subspecies in the following points: hyaline streak from base of cell in fore wing larger, hyaline patch below cell divided and a circular spot cut off distally. In the hind wing the cell is divided by prominent cell-streak nearly reaching the base of wing; the white lines bordering the median and submedian nervures are as long as the next pair which border the submedian and internal nervures. Beneath (including abdomen) the general colour is dull-golden olive, the discal region of the fore wing browner.

Exp. al. 90 mm.

I name this subspecies *kuchingana*, as the only known specimen bears the label "Kuching (Sarawak) December 23rd, 1895."

Subfam. SATYRINÆ.

Mycalesis amœna, Druce, *rampaiana*, subsp. nov.

M. amœna was described from Sarawak. This was verified for me by Mr. N. D. Riley, who kindly examined the type in the

British Museum. Fruhstorfer, in Seitz's 'Macro-Lepidoptera of the World,' vol. ix. p. 341. notes it in his collection from North Borneo only, and figures a typical Kinabalu under side. A short series from Kinabalu, collected in September, 1913, shows several points of difference on comparison with the Sarawak series; so that it becomes necessary to restrict typical *amœna* for Sarawak specimens, and separate those from Kinabalu as a distinct subspecies, which I name *M. amœna rampaiana*, subsp. nov., and describe as follows:—

Upper side of both sexes differs from typical *amœna* in the heavier fuscous apical shading; in the male this hides the apical ocelli which are visible in *amœna*.

General colouring below dark fuscous-brown instead of reddish-brown; one broad median band across both wings, which is darker on the margins, lighter in the centre. In typical *amœna* this band is divided into two narrow reddish-brown bands separated by a broader band of ground-colour; in fore wing of male *amœna* the basal band is obsolete.

The tuft of hairs on the costal margin of the hind wing above in the male is greyish-ochreous, not conspicuous; in typical *amœna* this is pale yellow, and at once seen on raising the fore wing.

Subfam. ELYMNIINÆ.

Elymnias smithi, sp. nov. (Plate VI., figs. 1 and 2.)

Female.—*Under side*: A rough mimic of female *Euploea dioletianus lowi*.

Fore wing: Brown-fuscous, a rusty brown tinge on inner-marginal area; three large confluent internervular white spots obliquely placed beyond cell, the lowest beyond the third median nervule but not reaching the second median nervule. Some white scales about the centre of costa. *Hind wing*: More rusty-brown than in fore wing, especially in the post-discal and apical region; a white patch in lower corner of cell, slightly extending beyond cell below but not above the radial nervure, and spreading more below median nervure from base of second and third median nervules to the submedian nervure. Cilia white.

Under side: Mottled fuscous relieved by white distal patch in fore wing and white discal patch in hind wing. A submarginal row (on the hind wing only) of five small black internervular spots inwardly touched with white scales.

The hind margin of the fore wing is conspicuously scalloped as in *E. nesæa*; the largest tooth-like projection between third and second median nervules. The hind wing also scalloped; prominent tail formed by prolongation of third median nervule.

Exp. al. 77 mm.

Type and only known specimen collected by Professor Harrison W. Smith on or near Mt. Molu, Sarawak, in 1912.

As the male is unknown, it is impossible to assign any definite place for this species in the genus *Elymnias*. But for the fact of its being a Euploëine mimic instead of Danaine, I

should have placed it near *hypermnestra* and *caudata*. On coloration alone I place it provisionally near *hicetina*, which it resembles roughly. The tailed hind wing, of course, separates it from this Celebes species, and the white patch on the hind wing is nearer the base in *smithi*. In *hicetina* it is clear of the cell. The distal white marks of the fore wing are about half the size of those in *hicetina*.

Subfam. AMATHUSINÆ.

Faunis stomphax, Westw., *barrauti*, subsp. nov.

Differs from typical *stomphax* in lacking the white band across the apex of fore wing below. A thin dark brown line replaces it in *barrauti*.

Habitat.—North Borneo (Mt. Kinabalu, Marapok Mts., and Limbang). Further west and south it is replaced by typical *stomphax*, which Fruhstorfer states also occurs in the Kinabalu district. All the individuals collected on my recent expedition there are referable to *barrauti*, as also specimens from Northern Sarawak (Marapok Mts. and Limbang); the only typical *stomphax* before me comes from Western Sarawak.

Named in honour of the Hon. E. H. Barraut, Resident of the West Coast, British North Borneo, to whom I am much indebted for kind help in facilitating my expedition to Kinabalu.

Subfam. NYMPHALINÆ.

Ducapa fasciata, Feld., *alleni*, subsp. nov.

Differs from the Continental form figured by Moore ('Lepidoptera Indica,' vol. iv. pl. 363, figs. 3, 3a, 3b, 3c) in the much narrower yellow post-median band on the hind wing above, which is only half as broad (or less) as the succeeding (distally) fuscous band of ground-colour. By this character alone *alleni* in both sexes can be distinguished from all other races, as in these the yellow post-median band is broader than the distal band of fuscous ground-colour.

The yellow spots of the fore wing above are also reduced in both sexes, especially in the female, which differs from the male in having the median yellow band nearly twice as broad.

A local species in Borneo. The Sarawak Museum series comes from Mt. Kinabalu, Baram, Tatau, and Banting. At the last-mentioned locality I obtained it first in 1909. There is a Mission station here in the charge of the Rev. G. Dexter Allen, with whom I stayed on that occasion, and after whom I now name this subspecies.

Fruhstorfer, Bingham, and de Nicéville place this species in the genus *Cirrochroa*, but I prefer to follow Moore and Shelford in giving it full generic distinction.

Terinos atlita, Fab., *albonotata*, subsp. nov.

Recorded by Shelford as *teuthras*, Hew., from which it differs, on comparison with Distant's figure of the upper side, in the absence of

fuscous scales at the base of the inner margin in fore wing and in cell of hind wing, in the fuscous scales of the inner margin in hind wing extending to the first median nervule, and in the reduced white distal edging to the two large violet-white subanal spots on the hind wing.

Type and only known specimen (a male) from Simanggang, Sarawak, August, 1900.

The colouring above is very different to that of *fulminans*, with which it agrees, however, on the under side and in the square caudate hind wing.

Fruhstorfer places *T. fulminans* as a subspecies of *atlites*, but in view of the occurrence of another subspecies (described above) in Sarawak, it would appear preferable to give it specific distinction. The under sides of *fulminans* and *albonotata* are exactly similar, but the upper sides are entirely different. Fruhstorfer notes that *fulminans* occurs in both North and South-east Borneo. It is in the Sarawak Museum from Kinabalu, but not from Sarawak. It is, of course, possible that *albonotata* takes its place there, but I consider the upper side is sufficiently different to render this unlikely.

Apatura parisis, Westw., *borneana*, Fruhst.

The female of the Bornean form appears to be undescribed. I have five before me, taken on Mt. Kinabalu in September, 1913, at an altitude of about 3000 ft.

General colouring above tawny ochreous, close to the Ceylon form *camiba*, as figured by Fruhstorfer in Seitz's 'Macro-Lepidoptera of the World,' but lacking the rufous tinge of that form. From the same author's figure of *javana* it differs in the more pronounced row of four black spots in the post-median area of the hind wing above. Beneath, a fifth spot is just visible below the first subcostal nervule. In the fore wing beneath the two apical spots of the submarginal row are white, the next three inwardly edged with black, the sixth large and black, the last also black but smaller.

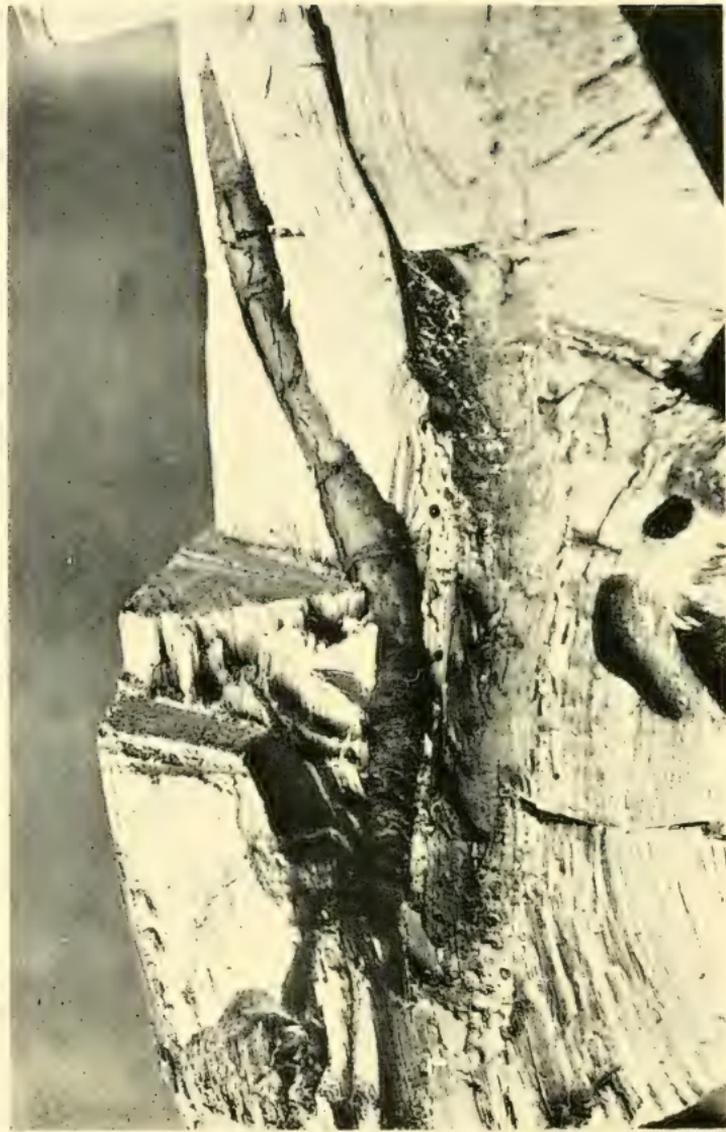
A sixth female from the same locality, and taken at the same time, differs from the above in the absence of all ochreous colouring, the general colour above and below being grey-brown, banded with white instead of orange. For this I propose the name *balua* (female) form. nov.

NOTES ON THE CELL-MAKING OF *MEGACHILE*
LIGNISECA, KIRBY. [HYMENOPTERA.]

BY ANDREW B. LUVONI.

(PLATE VII.)

WHILST out collecting towards the end of August, 1912, my attention was drawn to several bees of the genus *Megachile* flying round and entering holes in a branch containing several



NEST WITH SIX CELLS OF THE LEAF-CUTTER BEE, *Megachile ligniseca*, IN BRANCH OF OAK.
Photo A. B. Luvoni.

of their nests. On capturing two, and comparing them later with specimens in the British Museum, they proved to be the somewhat rare species *ligniseca*, which I learnt later may be determined with certainty by the habit peculiar to this species of constructing their burrows in solid oak. This branch, which was of oak about 12 ft. long and 8 in. in diameter at its thickest part, had been broken off a tree near by, and had fallen with the thick end resting up in a hedge. The opposite end through resting on the ground had become rotten for about an inch inward, and had been much bored by these insects in former years.

The plate, taken of a specimen now in the British Museum, shows a nest in the solid part of the branch with the surface-wood removed to expose the six cells, except in the vicinity of the entrance in top left-hand corner of plate, this being closed by a plug or wad of circular pieces of leaf placed one on top of the other to a depth of $2\frac{1}{2}$ in., finishing off flush with the surface of wood and through the outermost pieces of leaf becoming dry and brown requires a very close examination to reveal its existence.

About fifteen tunnels were examined, which, with two exceptions, took various undulatory courses, in one case running parallel with the surface for about half its length, then abruptly turning at an angle of 40 degrees and striking across the wood to within half an inch of the opposite side. The average length was $6\frac{1}{8}$ in. With the exception of one containing seven, each nest was composed of six cells made up of a number of oblong, almost square-ended pieces of leaf firmly fixed together, and tightly fitting the burrows, the form of which they take. The ends are formed by three or four pieces of leaf cut to the shape of the tunnel, and arranged in the same fashion as those used to stop the entrance of burrow. These pieces are worked on to the ends of the cells in a slightly concave form, the end of each cell fitting into that of its predecessor after the manner of a number of thimbles placed within each other, the whole assuming somewhat the appearance of a large jointed green worm.

Several cells, which I pulled to pieces for the purpose of examination about the end of September, contained full grown larvæ spun up in a smooth brown cocoon, the frass in every case being carefully excluded between the sides and posterior end of the cell and cocoon. These cells varied a good deal in size, all the larger ones being slightly flattened on their sides, thus imparting to them a lozenge or oval shape, measuring 10 mm. by 8 mm. across their ends. The length ranged from 12 mm. to 17 mm., the smaller specimens being quite cylindrical and much more uniform in construction. As far as I could ascertain, the leaves used appeared to belong to a species of elm, but being in such small pieces, and in many cases cut from the centre of the

leaf, rendered it an extremely difficult matter to determine with any certainty. The larva is a stout yellowish-white grub, resembling those of other bees in general appearance. In all the cells opened the larvæ were found resting on their backs in a curved position, with the extremities raised and the head in the direction of the entrance to burrow. Four of the larger cells were removed and placed in a glass-top box on October 10th, a portion being cut away from the side of each to expose the larvæ within. The cells being loose in the box often rolled about on its being moved, thus causing them to take up different positions, but whatever position the cell rested in the larva would always assume the above-mentioned position within a short time. From these observations I presume this is the position most favourable for its development.

The largest larva measured in normal curved position 10 mm., extended 15 mm., and 6 mm. across its widest part. The dimensions of the smallest were: length in curved position 7 mm., width 4 mm.

By observing the larvæ as above described, I had hopes of being able to throw some light on the method of the imagines' emergence; but owing no doubt to the artificial conditions under which it was necessary to keep them, and the difficulty of regulating the supply of moisture, they unfortunately perished about Christmas. Two of these larvæ became infested with numbers of pale grey *Acari*.

HOPLOTHRIPS CORTICIS: A PROBLEM IN NOMENCLATURE.

By J. DOUGLAS HOOD, M.A.

(Of the United States Biological Survey, Washington.)

In their 'Histoire Naturelle des Insectes, Hémiptères,' Paris, 1843, Amyot and Serville divide the Tubuliferous Thysanoptera into three genera, *Hoplothrips*, *Haplothrips*, and *Phlæothrips*, the first two being described as new. For the purposes of this paper we are interested only in these two genera, in the interpretation of which there is some disagreement.

Hoplothrips is described as having the sides of the head parallel and the anterior femora armed with one tooth on the inner surface, and to it are assigned four species—*H. aculeata*, Fabricius, *H. corticis*, De Geer, *H. flavipes*, Haliday, and *H. statices*, Haliday. *Haplothrips* is said to differ from *Hoplothrips* in that the fore legs are not dentate; and in it is placed only one species, *H. albipennis*, Burmeister.

In deciding the validity and application of these generic names, it is first necessary to select the type-species of each

genus. To *Haplothrips*, as has been noticed, Amyot and Serville assigned only one species, *Haplothrips albipennis*, Burmeister, 1838; and this is consequently the type of the genus (type by monotypy). According to Uzel this insect is identical with *Thrips aculeata*, Fabricius, 1803. The type of *Hoplothrips* was designated by Karny in 1912 as *Hoplothrips corticis*.

In all this the modern students of Thysanoptera are agreed. But in the application of the name *Hoplothrips*, the writer, for nomenclatorial reasons, has been forced to disagree with the conclusions expressed in previous papers on this subject.

In his 'Memoires pour servir à l'Histoire des Insectes,' tome iii. Stockholm, 1773, De Geer describes a *Trips corticis*, which he says is the same as the "*Thrips elytris albidis, corpore nigro, abdominali seta*" of Geoffroy. The name *corticis* is printed in Roman type (the rest of the sentence is in italics), and is included in parenthesis. According to the Entomological Code (Banks and Caudell, 1912), this makes the name truly binomial, for "when an author writes the first Latin word after a generic name in a different type from that of the other Latin words, or puts it in parentheses, such word is the specific name, and the author is considered as having fulfilled the requirements of binomial nomenclature." Three of Linné's species of Thysanoptera, namely, *Trips physapus*, *T. juniperina*, and *T. fasciata*, are diagnosed in the same way by De Geer in this memoir. His contemporaries and successors accepted and employed all names so proposed, almost invariably without question. The Hymenoptera which he describes in the same volume and in the same way are credited to him by Dalla Torre in his monumental 'Catalogus Hymenopterorum'; the names of Orthoptera are accepted by Kirby in his 'Synonymic Catalogue of Orthoptera'; and those of Coleoptera by Gemminger and Harold in their 'Catalogus Coleopterorum.' If De Geer's *Trips corticis* is to be rejected, we must also drop such familiar names as *Necrobia rufipes*, *Hylobius piceus*, and *Harpalus pennsylvanicus* among the beetles; *Ischnoptera pennsylvanica*, *Melanoplus femur-rubrum*, and *Nemobius fasciatus* of Orthoptera; and *Anasa tristis*, the current name of the destructive American squash bug. It is evident that entomologists are agreed that De Geer understood at this time the principles of binomial nomenclature, and adhered properly to them. *The name Trips corticis, De Geer, is thus valid for the purposes of zoological nomenclature.*

Now, having apparently settled the question of the acceptability of this name, it remains to decide to what European species it should be applied. This is a simple matter, for his description is of a Phleothripid which he found abundantly in June, presumably in the vicinity of Stockholm, under the bark of some old alders, and which, after passing the pupal stage, had become "noire ou d'un brun très-obscur. Les cuisses sont

aussi noires, mais le reste des pattes & les antennes sont d'une couleur pâle & transparente." The pale tibiæ and antennæ indicate its identity with Uzel's *Trichothrips copiosa*, an hypothesis which is strengthened by a study of his figures on plate i., especially fig. 11, which shows an unarmed, swollen, fore femur, and a strongly toothed tarsus. But final corroboration comes when we read, towards the end of his description: "Voilà donc des *Trips* d'une même espee, dont les uns sont ailés & les autres entièrement dépourvus d'ailes, mais qui à cela près se ressemblent parfaitement. Différent-ils de sexe? C'est sur quoi je n'ai pu encore avoir des éclaircissemens." This places the species definitely in the genus *Trichothrips*, Uzel, and absolutely precludes any possibility of its being either *Phlæothrips coriaceus* (Haliday), 1836, or *Acanthothrips nodicornis* (Reuter), 1880. Consulting the distribution of *copiosus* in the literature, we find that it is a common and well-distributed species, having been recorded from Finland, Poland, Hungary, Italy, England, and the United States of America. Its closest European allies (*Thrips ulmi*, Fabricius, 1781; *Phlæothrips pini*, Haliday, 1837; and *Trichothrips affinis*, Reuter, 1899—all of which are now placed in the genus *Trichothrips*, Uzel), in addition to having nearly black tibiæ and dark antennæ, are, on the other hand, rare or almost unknown species and of restricted distribution. *Trichothrips copiosa*, Uzel, 1895, is thus a synonym of *Trips corticis*, De Geer, 1773.

So far we have discussed only the *Trips corticis*, De Geer, omitting all reference to the insect which Amyot and Serville identified as that species, and referred to their new genus *Hoplothrips*. Their description is of an insect with "les cuisses antérieures épaissies, bidentées." This character makes impossible its reference to De Geer's species, and Karny in 1912 identified it as *Acanthothrips nodicornis* (Reuter); but that species has only one tooth on the fore femur. The insect which they really had before them was doubtless the male of a species of *Hoplandrothrips*, Hood, of which there are now known several European species. Burmeister's *Phlæothrips coriacea* is also a male of *Hoplandrothrips* (at least, in part), an opinion in which Mr. Bagnall concurs (*in litt.*). But whether or not these opinions are correct, we are certain that *Amyot and Serville's Hoplothrips corticis* is a misdetermination and not the proposal of a new name, and is thus without standing in nomenclature.

The case, then, is that of a genus based upon a wrongly determined species. The International Commission on Zoological Nomenclature holds (Opinion 65) that "as a specimen is the type of a species, so a species is type of a genus, and that when an author names a particular species as type of a new genus, it is to be assumed that it has been correctly determined," and that even if subsequent investigation should disclose the fact

that the species before him was erroneously determined, the type of the genus is what he says he had, and not what he actually had. Obviously, this principle obtains also when a subsequent author designates as type of a polybasic genus an originally included, misidentified species. Karny's designation of "*H. corticis*" as the type of *Hoplothrips* must thus be taken to refer to *Trips corticis*, De Geer, and not to *Hoplothrips corticis*, Amyot and Serville nec De Geer (= *Hoplandrothrips* sp.).

The one matter remaining unsettled is that of the scope of the genus—in other words, the determination of the congeners of the type species *corticis*. It would seem that in the genus *Trichothrips*, Uzel, we really have two distinct groups, generically distinct, the one including such species as *T. pedicularis*, *T. semivaeus*, *T. americanus*, and *T. angusticeps*; the other embracing those species grouping about *T. ulmi*, *T. pini*, *H. corticis* (= *T. copiosus*), *T. karnyi*, and *Dolerothrips flavipes*. The former may be denoted as the genus *Trichothrips*, Uzel, with the type *Phlaeothrips pedicularia*, Haliday (hereby designated); the latter may be called *Hoplothrips*, Amyot and Serville, with the type *Trips corticis*, De Geer, designated by Karny, 1912.

The following catalogue lists all the known species belonging in the several genera effected by these changes in nomenclature, those prefixed by an asterisk (*) being represented in the material before me. Many names will perhaps be missed by various systematists; but these appear to the writer to belong elsewhere. It should be remembered that it is impossible to work satisfactorily from many of the existing descriptions.

Genus HOPLOTHRIPS, Amyot and Serville, 1843.

1843. *Hoplothrips*, Amyot and Serville, Hist. nat. d. Ins. Hémip. p. 640. (Type, *Trips corticis*, De Geer (= *Trichothrips copiosus*, Uzel), designated by Karny, Zool. Ann. Bd. iv. p. 323, 1912.)

1895–1915. *Trichothrips*, auctores, pars.

1910. *Dolerothrips*, Bagnall, Fauna Hawaiensis, vol. iii. p. 682. (Type, *D. flavipes*, Bagnall, by designation.)

Species: *affinis*, Reuter, 1899, Finland; *angusticeps*, Bagnall, 1910, Hawaii; *barbatus*, Bagnall, 1910, Hawaii; **beachi*, Hinds, 1902, U.S.A.; *bicolor*, Bagnall, 1910, Hawaii; **corticis*, De Geer, 1773 (nec Amyot and Serville, nec Karny), Europe, U.S.A.; *dubius*, Bagnall, 1910, Hawaii; **flavipes*, Bagnall, 1910, Hawaii; *intermedius*, Bagnall, 1910, Hawaii; *japonicus*, Karny, 1913, Japan; **karnyi*, Hood, 1914, U.S.A.; **karnyi major*, Hood, 1914, U.S.A.; *lanaiensis*, Bagnall, 1910, Hawaii; *ovatus*, Bagnall, 1910, Hawaii; *perkinsi*, Bagnall, 1910, Hawaii; *pini*, Haliday, 1837, England; **ulmi*, Fabricius, 1781, Europe.

Genus TRICHOTHRIPS, Uzel, 1895.

1895. *Trichothrips*, Uzel, Monogr. d. Ordn. Thys. p. 246.
(Type, *Phlæothrips pedicularia*, Haliday, designated in the present paper.)

Species: *aceris*, Karny, 1913, Japan; **ambitus*, Hinds, 1902, U.S.A.; **americanus*, Hood, 1908, U.S.A.; **angusticeps*, Hood, 1908, U.S.A.; **anomocerus*, Hood, 1912, U.S.A.; *cæspitis*, Uzel, 1895, Bohemia; *cephalotes*, Karny, 1913, S. America; *dispar*, Karny, 1910, Austria; **flavicauda*, Morgan, 1913, U.S.A.; *laticornis*, Bagnall, 1910, Hawaii; *lewisi*, Bagnall, 1914, Japan; *longicornis*, Bagnall, 1913, W. Africa; *longisetis*, Bagnall, 1910, England; **longitubus*, Hood, 1908, U.S.A.; *nigricans*, Bagnall, 1910, Hawaii; *papua*, Karny, 1913, New Guinea; **pedicularius*, Haliday, 1836, Europe; *propinquus*, Bagnall, 1910, England; **semicæcus*, Uzel, 1895, Bohemia, England, U.S.A.; **smithi*, Hood, 1909, U.S.A.; **zonatus*, Hood, 1914, Panama; *zuluensis*, Trybom, 1912, Zululand.

Genus HOPLANDROTHRIPS, Hood, 1912.

1839. *Phlæothrips*, Burmeister (nec Haliday), Gen. Ins. vol. i. coloured plate (pages and plates unnumbered).
1912. *Hoplandrothrips*, Hood (subgen. of *Phlæothrips*), Proc. Ent. Soc. Wash. vol. xiv. No. 3, p. 145. (Type, *Phlæothrips (Hoplandrothrips) xanthopus*, Hood, by designation.)

Species: *armiger*, Jones, 1912, U.S.A.; *bidens*, Bagnall, 1910, Hungary; *collinsi*, Bagnall, 1914, England; **ellisi*, Bagnall, 1914, England; *floridensis*, Watson, 1913, U.S.A.; **funebri*, Hood, 1912, U.S.A.; *hoodi*, Bagnall, 1913, German E. Africa; **insolens*, Hood, 1912, U.S.A.; *jennei*, Jones, 1912, U.S.A.; **juniperinus*, Hood, 1912, U.S.A.; **microps*, Hood, 1912, U.S.A.; *natalensis*, Trybom, 1912, Natal; *pergandei*, Hinds, 1902, U.S.A.; *raptor*, Crawford, 1910, Mexico; **uzeli*, Hinds, 1902, U.S.A.; **xanthopus*, Hood, 1912, U.S.A.

Genus ACANTHOTHrips, Uzel, 1895.

1895. *Acanthothrips*, Uzel, Monogr. d. Ordn. Thys. p. 259.
(Type, *Phlæothrips nodicornis*, Reuter, by monotypy.)
1912. *Hoplothrips*, Karny (nec Amyot and Serville), Zool. Ann. Bd. iv. p. 323. (Key to known species.)

Species: **albivittatus*, Hood, 1908, U.S.A.; *doaneii*, Moulton, 1907, U.S.A.; *grandis*, Karny, 1912, Argentina; **magnafemoralis*, Hinds, 1902, U.S.A.; **nodicornis*, Reuter, 1880 (= *corticis*, Karny, nec De Geer, nec Amyot and Serville), Europe, U.S.A.

Genus EOTHRIPS, gen. nov.

(ἠώς, dawn, i. e. east; ἔριψ, a wood worm.)

1912. *Dolerothrips*, Karny (nec Bagnall), Marcellia, vol. xi. p. 124. (Type, *Dolerothrips crassicornis*, Karny, hereby designated.)

Species: **annulicornis*, Karny, 1913, Java; *armatus*, Karny, 1913, Java; *connaticornis*, Karny, 1913, Java; **crassicornis*, Karny, 1912, Java; *jasmini*, Karny, 1913, Java; *laticauda*, Karny, 1912, Java; *picticornis*, Karny, 1913, Java; **trybomi*, Karny, 1913, Java.

BEES FROM THE PHILIPPINE ISLANDS.

By T. D. A. COCKERELL.

PROFESSOR C. F. BAKER, of the College of Agriculture at Los Banos (Luzon), is the first to extensively collect the bees of the Philippines; and the material received from him shows that the islands contain very many species, but very few, if any, endemic genera. When the species are found to be identical with those of other Oriental countries, they usually belong to genera (*Xylocopa*, *Ceratina*, *Megachile*) which nest in wood.

Nomioides dapitanellus, n. sp.

♀. Length about 6 mm., robust, with broad abdomen; head and thorax yellowish green, with the clypeus (except two black spots), tubercles and upper border of prothorax, scutellum (except a median longitudinal band), and postscutellum (except anterior edge and extreme sides), all yellow (reddened by cyanide in type); the scanty hair on head and thorax above pale reddish; supraclypeal area and sides of front shining, but middle of front wholly dull, appearing blackish; apical part of mandibles dark red; scape ferruginous, the apical part black above; flagellum black; punctures of mesothorax excessively feeble and minute; femora black, anterior and middle ones broadly, hind narrowly, red (yellow?) at end; anterior and middle tibiae and tarsi red (yellow?), the middle tibiae with a dusky spot behind; hind tibiae and basitarsi largely dusky, with much pale reddish hair, which is beautifully plumose; second joint of hind tarsi broad; tegulae hyaline, with a yellow spot; wings dusky-hyaline, stigma and nervures dilute yellowish brown; first r. n. meeting second t. c.; marginal cell truncate at end; abdomen black (first segment obscure greenish), with broad yellow bands at bases of second to fifth segments, those on second and third with the hind margin concave, the band on fifth occupying most of the segment; hind margin of fifth segment pallid, subhyaline; pygidial plate keeled; venter with much pale reddish hair.

Hab. Dapitan, Mindanao (Baker, 3161). The genus is new to the Philippine Islands. *N. dapitanellus* is readily known from *N. obscurus*, Friese, from Java, by the entire yellow abdominal bands. It is known from *N. formosicola*, Strand, from Formosa, by the absence of a yellow band on hind part of mesothorax, as well as other characters. The mesothoracic band also occurs in *N. punjabensis* (Cam.), which Cameron described as a *Ceratina*.

Coelioxys luzonicus makilingensis, n. subsp.

♂. Length a little over 8 mm.; differing from *luzonicus* thus: mesothorax anteriorly (but not posteriorly) with a rather large triangle of pure white hair; oblique hair-marks on scutellum larger, pure white; spot above posterior end of tegulæ pure white; first r. n. joining second s. m. very close to basal corner; upper apical teeth of abdomen longer, and not on the same horizontal plane, the inner on each side being higher than the outer, which is not true of *luzonicus*. The hair on the eyes is very short.

Hab. Mount Makiling, Luzon (Baker, 2555). Easily known from *C. manilæ*, Ashm., by the absence of a triangular patch of pale hair on posterior margin of mesothorax. The male of *C. philippensis*, Bingham, on the other hand, has not even the anterior patch.

Coelioxys bakeri, n. sp.

♂. Length 8.25 mm.; black, with the dorsal markings, due to scale-like pubescence, bright orange-fulvous; region about antennæ with orange-fulvous hair, but that on clypeus and adjacent parts, and under side of head, creamy-white; hair of pleura (except uppermost end) and under side of thorax, also under side of coxæ, dense and white; trochanters black, femora, tibiæ and tarsi ferruginous, the anterior and middle femora largely black beneath; antennæ black; eyes with short brown hair; sides of vertex with scattered, irregularly placed large punctures; mesothorax with large distinctly separated punctures; principal hair-ornaments on thorax above consisting of a dense patch in front of tegulæ, a broad triangle on mesothorax anteriorly (but not posteriorly), a stripe (claviform posteriorly) above tegulæ, a broad band at base of scutellum, partly invading mesothorax, and emitting a median stripe, enlarged at the end, posteriorly (the whole shape like that of a Taube aeroplane), and dense, long, paler hair at sides of metathorax; scutellum simple; axillar teeth moderately long, slightly curved; area of metathorax with fine fluting at extreme base; tegulæ piceous; wings strongly infuscated, paler basally; b. n. meeting t. m.; abdomen well punctured, with narrow entire orange-fulvous hair-bands, the third segment has traces of a second (median) band, while the fourth has a well-developed basal one; hind margins of fourth and fifth segments ferruginous; short spines on lateral margins of fifth and sixth segments; apical armature of six spines, the two lower ones wide apart, slender, those of the upper pairs rather short, the inner of each pair higher than the other; venter with very broad dense hair-bands, slightly stained with fulvous.

♀. Length about 7 mm.; colours and ornaments essentially as in the male, but mandibles, base of legs, and under side of abdomen ferruginous; sides of vertex closely punctured; punctures of mesothorax smaller and much denser; axillar spines not at all curved inward; tegulæ ferruginous; last dorsal segment of abdomen shining, with fine scattered punctures, but apically rugose, very broad, subtruncate; last ventral segment extending a moderate distance beyond last dorsal, broadly truncate, but not so broad as the dorsal; sub-basal punctures of last ventral extremely minute, those of the other ventral segments much larger.

Hab. Male (= type), Iligan, Mindanao (Baker, 3150); female, Dapitan, Mindanao (Baker, 3151). It is not improbable that the female represents a distinct race, or closely allied species. The species is readily known from the other Philippine forms by the colour and character of its ornaments. The nearest relative is probably *C. sumatrana*, Enderl., from Soekaranda, Sumatra.

Coelioxys dapitanensis, n. sp.

♂. Length a little over 6 mm.; black, with the knees, tarsi, subapical band on mandibles, and tegulae, dull ferruginous, the tarsi more brightly coloured than the other parts; hair of eyes short and brown; face, sides of front, and cheeks with pale fulvous hair; antennae black; sides of vertex dull, with scattered very large shining punctures; mesothorax dull, with large, well-separated shining punctures, sides of disc more or less longitudinally ridged; scutellum sharp-edged, axillar teeth short; extreme base of area of metathorax finely rugose; thoracic ornaments pale fulvous, formed nearly as in *C. bakeri*, but the scutellar band is nearly or quite divided in the middle, and there is no longitudinal stripe behind it; there is also a large bare space in the middle of the pleura; wings brownish, b. n. falling short of t. m., first r. n. joining extreme basal corner of second s. m.; abdomen shining, with large punctures, the narrow entire bands dull pale fulvous; quite long spines at sides of fifth and sixth segments; apex with only four spines, the lower very long, slender, divergent; first ventral segment dull red.

Hab. Dapitan, Mindanao (Baker, 3152). Readily known from other Philippine species by the small size and the apical armature of abdomen. The apical armature resembles that of the Australian *C. froggatti*, Ckll., except that *C. dapitanensis* has the lower spines much longer.

Ceratina tropica, Crauford.

Dapitan, Mindanao (Baker, 3130, 3132).

Ceratina philippinensis, Ashmead.

Cuernos Mountains, Negros (Baker, 3131).

Professor Baker also sends two species new to the Philippines, which he collected at Los Banos, namely *C. beata*, Cam., and *C. dentipes* Friese, both determined by Friese. The first of these has been known from Ceylon and Burma, the second from Java.

Allodape mindanaonis, n. sp.

♀. Length about 7.5 mm.; like *A. marginata*, Sm., but pale yellow area of clypeus confined to the upper end and a median longitudinal band; tubercles yellow, but no line on prothorax; second submarginal cell longer; basitarsi black, with red hair.

Var. *a.* Only 6 mm. long, but apparently the same species.

Hab. Dapitan, Mindanao (Baker, 3164, 3163). The small

variety resembles the female of *A. cupulifera*, Vach. (det. Friese), taken by Baker at Los Banos, Philippine Islands, but is readily distinguished by the narrow, capitate, clypeal mark, the longer second s. m., and the red hair on hind legs.

A NEW GENUS AND FIVE NEW SPECIES OF HETEROCERA FROM THE PHILIPPINES.

BY A. E. WILEMAN, F.E.S.

ARCTIADÆ.

TINOLIODES, Hampson, gen. nov.

Proboscis aborted, small; palpi porrect, extending as far as the frons which is clothed with rough hair; eyes smooth; antennæ of male bipectinate with rather short branches to apex; thorax clothed with rough hair; mid and hind tibiæ fringed with rather long hair on outer side and without spurs; a tuft of hair from below origin of hind wing; abdomen with lateral tufts of down-turned hair. Fore wing with vein 3 from long before angle of cell; 6 from upper angle; 7, 8, 9, 10 stalked; 11 from cell. Hind wing with vein 3 from before angle of cell; 4, 5 from angle; 6, 7 stalked; 8 from middle of cell; the under side in male clothed with rough hair scales.

In key differs from *Menas* in the mid and hind tibiæ being without spurs.

Type *T. benquetensis*.

Tinoliodes benquetensis, sp. n.

♂. Head and thorax ochreous yellow, two black spots on collar, and a black spot at base of patagia; abdomen ochreous yellow, black spots on the back, three black spots on anal segment. Fore wings grey brown with slight purplish tinge, base ochreous yellow with black spot at base of costa; a creamy white spot at outer end of the cell and an ochreous yellow spot above it on the costa; a creamy white spot below vein 2 and a small ochreous yellow spot on the dorsum. Hind wings ochreous yellow. Under side similar to above, but the fore wings are paler.

Expanse, 48 millim.

A male specimen from Palali (2000 ft.) in the subprovince of Benguet, Luzon. Captured December 27th, 1912.

Diacrisia venata, sp. n.

♂. Head and thorax pale buff, collar edged with crimson, patagia with crimson edges and black dots; antennæ bipectinated; abdomen crimson with black dots on the back of each of the four middle segments, pale buff dotted with black beneath. Fore wings yellowish orange, inclining to reddish on basal two thirds, venation pale ochreous; antemedial line represented by a black spot on the costa one fourth from base and two black spots below it near dorsum;

postmedial line indicated by a black spot on the costa one third from apex, an inwardly oblique streak from vein 3 to just below vein 2, and two dots near dorsum; fringes paler. Hind wings pale ochreous, tinged with reddish orange on dorsal area, veins darker, discoidal spot blackish. Under side of fore wings reddish orange; of hind wings pale ochreous, tinged with reddish orange on dorsum, discoidal spot black.

Expanse, 58 millim.

A male specimen from Haight's Place, Pauai, Luzon (7000 ft.), November 24th, 1912.

Closely allied to *Diacrisia whiteheadi*, Rothsch., from the Philippines.

Diacrisia venata bipuncta, ab. nov.

♂. Agrees with typical *venata* except that all but two of the black spots are absent, these are the pair forming dorsal end of the postmedial line and are very minute. The discoidal spot of hind wings is also absent.

Expanse, 56 millim.

A male specimen from Haight's Place, Pauai, Luzon (7000 ft.), December 5th, 1912.

Deilemera conjuncta, sp. n.

♀. Head and thorax white faintly yellowish tinged, spotted with black; antennæ bipectinated, pectinations weak; abdomen yellowish, banded with black, bands interrupted below. Fore wings blackish with a broad creamy white fascia from costa to tornus, outer edge of the band serrated, inner edge sinuous with a narrow projection above middle to a creamy white stripe from base. Hind wings creamy white, terminal border blackish, inner edge of border wavy and deeply indented just below the middle and again before tornus. Fringes of all wings blackish, white towards tornus. Under side exactly as above.

Expanse, 54 millim.

A female specimen from Baguio, Benguet subprovince, Luzon (5000 ft.), November 3rd, 1912.

Allied to *D. galbanum*, Swinhoe, from Luzon.

Deilemera venata, sp. n.

Head and thorax creamy white, dotted with black; abdomen pale yellow, with black bands above, spotted with black on sides. Fore wings white, venation darkened; hind wings white, venation not darkened. Under side similar to upper side, but veins of fore wings blackish.

Expanse, 58 millim.

One example of each sex from Haight's Place, Pauai, Luzon (7000 ft.), November 14th, 1912.

Deilemera luzonensis, sp. n.

Head and thorax white, slightly yellow tinged, dotted with black; abdomen pale yellow banded above and spotted below with black.

Fore wings pale brown, a whitish streak from base below median nervure to a whitish spot at end of the cell, the streak expands outwardly and this portion is separated into spots by the veins. Hind-wings whitish, venation and terminal border pale brown. Under side similar to the upper side.

Expanse, ♂, 54 millim; ♀, 57 millim.

An example of each sex from Haight's Place, Pauai, Luzon (7000 ft.), December 1st, 1912.

Allied to *D. arctata*, Walk.

THE REARING OF LARVÆ.

WITH SPECIAL REFERENCE TO THE BRITISH LEPIDOPTERA.

BY C. RIPPON, M.A., F.E.S.

LET me acknowledge at once that the rearing of larvæ is a very wide subject, and cannot be exhaustively treated by any one individual, much less by one like myself, whose knowledge and experience are not to be compared with those of many other entomological students, the professional section in particular. These jottings, therefore, are only put forward to raise a greater interest in the matter, and, if possible, to induce others to amplify and correct the conclusions arrived at. The two chief reasons for my dealing with the subject at all are: first, that my entomological friends have frequently suggested that my experiments in larvæ rearing would be worth recording in consequence of the success that has attended several of my attempts to rear species which are generally considered difficult; secondly, that I have met so many entomologists—some, indeed, whose names are almost household words—who have complained of their lack of success in breeding, yet who treat the rearing of larvæ in the most casual manner, and do not seem to realise that the larvæ of different species require very different treatment, and that all, except the most robust, require constant care and attention, especially when kept in confined quarters. Even some authors of works on the collecting of Lepidoptera often describe but one cage, as if all larvæ should be treated alike; and if, perchance, two or three different cages are mentioned, it is seldom pointed out that larvæ of different habits require different housing, the impression left on the reader being that the different cages are only described to enable him to select the one he likes best or can most easily secure. Altogether there seems to be a tendency with the majority of entomologists to treat the practical details of larvæ rearing as beneath their attention, whereas they really are of the first importance, for a large number of bred specimens are essential to the formation of a collection of real scientific value, to say nothing of the enormous knowledge to be gained

as regards the habits of Lepidoptera in their early stages and the effect of various influences on the perfect insect. I do not suggest that all I have to say is absolutely new, and a great deal of it seems to me very obvious. But whether the points are old and obvious or new and obscure, I trust their record may possibly be useful in some quarters. I would, however, mention that I do not write from the point of view of one who makes a business of breeding Lepidoptera, but from that of the ordinary collector, who may or may not have even a garden, and is certainly unable to give his larvæ the natural surroundings and conditions which the professional can do with his enclosed bits of land, large garden-frame-like houses in which the food-plants are growing, covered trees and shrubs, &c.

PRE-HATCHING INFLUENCE ON STRENGTH OF LARVÆ.

Every now and then the most careful of breeders comes across a batch of larvæ which fails unaccountably. I am convinced that this is not always due to incorrect treatment. Many of our Lepidoptera lay their ova more or less in batches. Now while larvæ hatched from the earlier laid batches will flourish, those from the last batch, though treated identically the same, are often most difficult to rear. This suggests that fertilization weakens towards the end of laying. There is no doubt, too, that many moths need pairing more than once adequately to fertilize all the ova, as for instance, *Palimpsestis octogesima*. When I first bred this species I found an extraordinary number of the ova infertile, while of the hatched larvæ a very small proportion appeared strong enough to thrive. By subsequent experiment I found that the *octogesima* female would readily pair up a second or even a third time, and that the ova first laid produced strong and healthy larvæ. This may, perhaps, be one of the reasons why *octogesima* is not more abundant, for the perfect insect is comparatively inconspicuous, the food-plant is common, and the larvæ generally well hidden — points which should help the species to increase and multiply.

FRESH AIR.

That plenty of fresh air is required by many larvæ is undoubtedly true, but that is not due so much to the fact that each individual larva wants a lot of air, as to the fact that in confinement so many are frequently kept in a comparatively small space that an abundance of fresh air is needed to counteract the troubles that the overcrowding would otherwise cause. This is demonstrated by the ease with which one or two quite large larvæ can often be successfully reared in a tightly-fitting glass-topped metal box. It is obvious, therefore, that when larvæ are small in size or few in number, or both, fresh air is a minor consideration, and nothing like so important, in most cases, as

keeping the food fresh and the larvæ on their food. It is happy this is so, as it greatly simplifies the treatment of very small and newly-hatched larvæ. Considering that newly-hatched larvæ of all but the largest of the British Lepidoptera will easily walk through muslin, and that the tendency of most species is to scatter directly they hatch, it is obvious that it is necessary to have almost air-tight receptacles if large numbers are not to be lost. Then, again, newly-hatched larvæ generally require tender foliage which quickly wilts in the open, and the constant changing of the food of such young larvæ is almost impossible without loss. Now a glass-topped metal box of suitable size meets both these difficulties admirably. Kept tightly shut—I sometimes even use an elastic band round the join in the lid—leaves will keep sufficiently fresh for days, sometimes for over a week; and there is certainly no fear of the larvæ escaping. The necessity of moving the larvæ until they have at any rate changed their first skin is thus obviated. The main trouble to guard against in glass-topped metal boxes is mould; if the boxes are thoroughly cleaned and sterilized before use, and care is taken not to put in food the slightest bit damp, it will be a long time before mould appears. Another good thing is to have plenty of boxes, so that when it is necessary to change the food the larvæ and the fresh food can be put in a fresh box. How long young larvæ should be kept in such boxes of course depends on their rate of growth, their ultimate size, and the number in each box. Small Geometers can be fed right up by gradually increasing the size of the box used and putting fewer in each one; soft Noctuæ larvæ are best moved out of the boxes as soon as they get from $\frac{1}{4}$ -in. to $\frac{1}{3}$ -in. in size. When the larvæ are first hatched I believe in using the smallest box suitable, and putting in the food so that it touches the glass lid when the box is shut. My reason for this is that newly-hatched larvæ have a tendency to go to the highest point and stay there—doubtless due to their instinct to get to the tenderest leaves—and, further, they require to be kept close to their food, or many will die before they start feeding. After the first instar this is not so important, though the keeping of larvæ fairly in touch with their food is a point which should not be lost sight of in all stages of growth.

FRESH FOOD.

With the exception of the larvæ of a few species who delight in wilted leaves and others who revel in decaying matter, fresh food is most essential to the successful rearing of most larvæ and particularly of those newly hatched. When using the word "fresh" it is meant in its literal sense, *i. e.* in growing condition. Many larvæ, which feed on the foliage of hard-wood trees and shrubs and some of the stronger-growing hedgerow plants, will do well if the stems of their food are kept in water

almost as long as the leaves refrain from drooping; but for those which feed on more succulent growths the use of water to keep the foliage fresh should be distinctly limited, and in some cases it is better to risk the larvæ having frequently to feed on wilted leaves than to use water at all, while in all cases it is best to change the food frequently. Some breeders seem very much afraid of supplying larvæ with wet food, but in the great majority of cases, to spray the food in the evening is a great advantage, and foliage recently rained upon is not to be despised. I, of course, in this refer to open cages, for in air-tight boxes the food must be dry. Another point in connection with feeding is the selection of the food. Care should certainly be taken to select that which is likely to be most acceptable. For instance, it is courting trouble to give a newly-hatched larva, which feeds on newly-opened buds, an old hard leaf. Foliage covered with dust, soot, &c., should be avoided, while stunted, diseased sprays of leaves or those infested with other insect life should be religiously passed by. On the other hand, it is not wise to use food from trees whose foliage has apparently been left untouched by all wild larvæ. When there is much honeydew about, the thorough washing of all foliage required for food is necessary.

When rearing larvæ whose habits are unknown, it is advisable to give a little of all parts of the food-plant available—old leaves, young leaves, buds, flowers, seeds, &c.; observe which is preferred and feed accordingly: but the test should be repeated every now and then, for often a larva which in its early days likes flowers may later on prefer the old and mature leaves. Care, however, should be observed when larvæ which feed on leaves reach their last instar or so, not to give them an exclusive diet of young and tender foliage, whether they prefer it or not, otherwise disaster may overtake the brood. In the later stages mature leaves alone usually form a safer diet. Personally, I attach great importance to the selection of suitable leaves and sprays for feeding, and in many cases always picking the food from the same tree or plant for a certain batch of larvæ is a factor towards success. I experienced rather a curious example of this not long ago. I was fortunate enough to obtain a few ova of *Neuria reticulata*. Knowing that this species was supposed to be difficult to rear, I took special pains with the larvæ and gave them bits of *Polygonum* from several different plants, whose foliage varied considerably in appearance. The larvæ much preferred one plant to all the rest, and fed up on it successfully. I was so impressed with this preference that I sent specimens of each plant to a botanical friend, and he reported that they were all precisely the same species of *Polygonum aviculare*, and three, including the one chosen by the *reticulata*, were of the same subspecies; he could only account for the difference in the appearance of the foliage and the prefer-

ence of the larvæ by some difference in the soil in which they grew. Yet they all flourished within an area of some one hundred square yards. After the selection of the sort of food comes the question of the amount of food to be given. Speaking generally, it is best to give a batch of larvæ an amount of food which they can entirely consume in a certain limited period. However well ventilated the cage, even if it is entirely composed of perforated zinc or muslin, it does not do to cram it full; the spray of foliage should stand free as it does in nature. It is far better for the larvæ to starve for two or three hours occasionally than for their cage to be choked up with food. Indeed, the health of some of the more voracious larvæ, which eat night and day, is sometimes distinctly improved by their being kept without food for a short while. In this, however, like everything else, the special habits of the larvæ affect the treatment. For instance, those who use leaves for habitats require more food in proportion to their number than other kinds. I refer to such genera as *Palimpsestis* and *Asphalia*. With some of these each larva requires two leaves for its habitat, so that if twenty larvæ were in a cage, sprays bearing sixty leaves would have to be given to enable each larva to have even one leaf for food; and as soon as twenty leaves had gone, more food would have to be added. Moral: keep very few such larvæ in the same cage, and on no account wait for the food to be entirely consumed, but add fresh frequently. I am not at all sure that the bad reputation of *Teniocampa populeti* for cannibalism is not largely due to keeping so many in the same cage that the larvæ have not enough leaves for habitats, let alone food, and consequently consume each other.

(To be continued.)

NOTES ON A LIME TREE APHIS, *PACHYPAPPA REAUMURI*, KALTENBACH, NEW TO BRITAIN.

BY FRED V. THEOBALD, M.A.

(Concluded from p. 76.)

PROGENY OF THE FUNDATRIX.

ONLY one or two of them existed and unfortunately were left and became nymphæ. I thus append Del Guercio's description:—

“Yellowish brown, with four-jointed antennæ, rather longer than the whole body. Eyes red. Rostrum and feet well developed. Siphons quite distinct and black. The antennæ have the ‘nail’ the length of the fourth segment, and as the insect grows a fifth segment appears.”

This stage, only figured by Del Guercio in its first instar, is very marked, and very unlike the larva derived from the alate female.

NYMPH. (Fig. 2, B & E).

Length 2 to 2.8 mm. Yellowish to yellowish green and yellowish brown. Legs and wing pads, and sometimes the head, dark. Antennæ (fig. 2*b*) with the first two basal segments small, about equal in length; the third the longest, about equal to the fourth and fifth, which are about the same length; the sixth a little longer than the fifth, its "nail" short and blunt; a few hairs on all the segments,

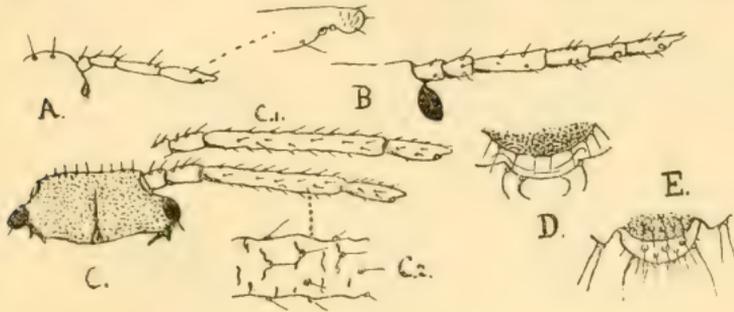


Fig. 2.—*Pachypappa reaumuri*, Kalt.

A. Head of larva from alate female; B. Head of nymph; C. Head of viviparous female; D. Cauda of viviparous female; E. Cauda of nymph.

and a single sub-apical sensorium on the fifth and sixth. Eyes large and dark. Rostrum yellow, dusky at the apex, reaching to the base of the third pair of legs. Apex of body with some long stiff hairs; cauda dark, hairy; anal plate pale, hairy; and a few hairs along the sides of the abdomen. Legs with minute hairs scattered on the tibiae and tarsi.

ALATE VIVIPAROUS FEMALE (Figs. 3 & 4).

Length 2.8 to 3 mm.; wing expanse 9 to 10 mm. Head, thorax, antennæ, and legs black. Abdomen yellow-green to dark green; cauda dusky to black. Antennæ not quite as long as the head and thorax (fig. 3*a*); the first two basal segments small, the second somewhat globular towards the apex; the third the longest, with eight to ten sensoria spreading across the segment; the fourth rather more than half the length of the third and about equal in length to the fifth, or slightly shorter, with one or two slit-like sensoria and one rounded one near the apex (fig. 3*a*, *a* 3 and *a* 4); the fifth with a large, irregular sensorium near the apex (*a* 2) and, according to Del Guercio, a narrow one near the middle; the sixth about as long as the fifth, with a short blunt nail, with a few terminal hairs (*a* 1) and a sub-apical sensorium, or now and then slightly larger than the fifth; all the segments pilose. Eyes large and red to black; stemmata (*d*, *d* 1) pale. Proboscis (fig. 3*b*) reaching past the base of the second pair of legs, almost to the third pair, thin, the last two segments dark; remainder pale, the apex being jet-black; apical segment longer and narrower than the penultimate; hairs on one side of the last two segments and all over the long following one. Cauda dusky, and anal plate dark and spinose (*c* and *c*1). Legs rather long and thin; tibiae and tarsi with fine hairs. The abdomen (when the insect is prepared in balsam) shows two lateral rows of dark spots, each with a small pale

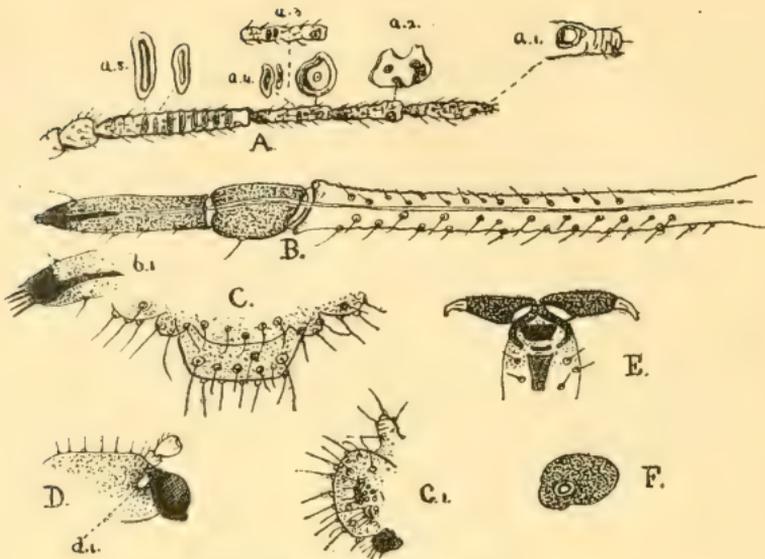


Fig. 3.—*Pachypappa reaumuri*, Kalt. (alate female).

A. Antennae of alate female; A¹. Further enlarged "nail"; A², A⁴, and A⁵. Further enlarged sensoria; A³. Another form of third antennal segment; B. Proboscis; b¹. Further enlarged apex; C. Cauda; C¹. Side view; D. Head; d¹. Stemmata; E. Ungues; F. Dark area at side of body.

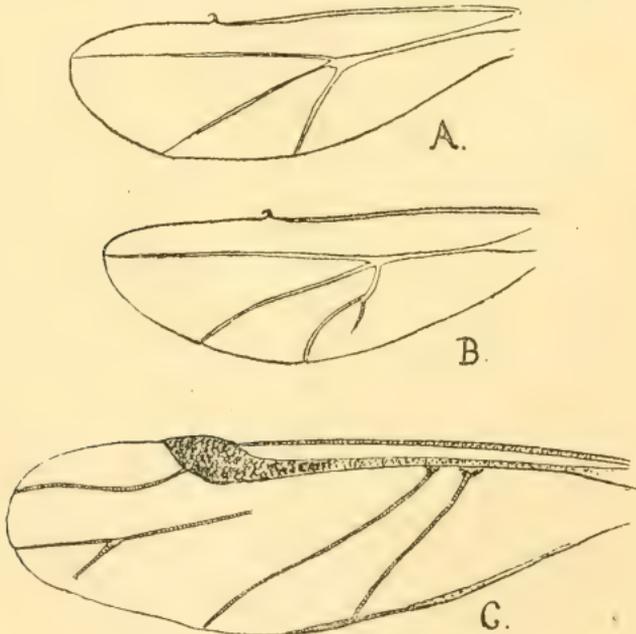


Fig. 4.—*Pachypappa reaumuri*, Kalt.

Wings of alate female: A. Hind wing; B. Abnormal form; C. Fore wing.

excentric spot (F). Lateral borders of the abdomen with a few fine hairs. Wings ample, smoky, with dark brown to black veins and dark rhomboidal stigma, the media reaching the edge of the wing, the cubitus often not reaching the edge of the wing; in the hind wings (fig. 4A) the radius, radial sector, and second anal arise close together and reach the edge of the wing normally as simple veins, but now and then the second anal is forked, the inner branch not reaching the wing border (B). This abnormality may often be seen in one wing and not in the opposite one.

LARVA FROM ALATE FEMALE. (Figs. 2A & 5).

Length on entering soil, .5 to .7 mm. Yellow to pale citron yellow. Antennæ (fig. 2A) of four segments, about half the length of the body; the first segment small; the second longer than the first, shorter than the third; the fourth a little longer than the third and slightly swollen, with a short blunt "nail" and sub-apical sensoria; a few pale fine hairs on all the segments. Eyes very small, composed of two dark red to black facets, and at the side two clear round areas (fig. 3a). Head rather narrow and long. Proboscis pallid, very slightly dusky at the apex, projecting far beyond the end of the body. Abdomen slightly swelling out apically and with a

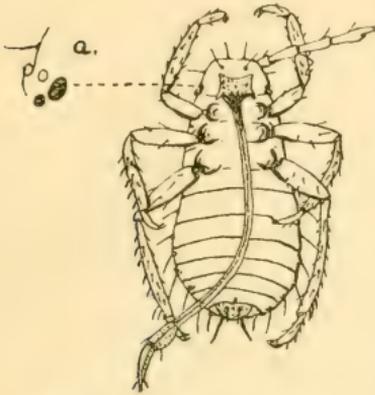


Fig. 5.—Larva from alate female
(*S. P. reaumuri*, Kalt.).

few long apical and lateral pale hairs. Legs pale, moderately long and thick. Anal plate dusky.

I do not enter here into its generic position, but have followed Del Guercio who, I think, is correct in retaining Koch's genus *Pachypappa*, and in placing this very interesting species in that genus. Its marked posterior wing venation may be of systematic value and so connect it with the type (*vesicalis*) of Koch's genus, but with this character must more surely go the marked sensorial character of the antennæ, and this marked character places *vesicalis*, *reaumuri*, and *corni* all very close together and yet far away from *Schizoneura ulmi*, *S. lanuginosa*, *S. fuliginosa*, and *S. lanigera*.

But the venation of the hind wings of *Pachypappa* differs from that of *Anæcia corni*, so they are placed in different genera. In one case I have seen and preserved an Aphid with the venation of *Schizoneura* on one side and true *Aphis* on the other, and in many cases in the same family all manner of venation within such wide limits that it seems to me one cannot rely on venation as of any value in this group of insects.

THE BUTTERFLIES OF THE BUCKS. CHILTERNs.

By H. ROWLAND-BROWN, M.A., F.E.S.

(Continued from p. 80.)

NYMPHALIDÆ.

25. *Dryas paphia*, Hb. I have not come across this species in any profusion; occasional specimens in the middle region, when brambles are in flower to attract. Professor Carlier includes it in his High Wycombe list. Mr. Spiller reports it from the west; scarce in 1914; and there are old records in the eastern districts from the neighbourhood of Drayton-Beauchamp and Halton.

Earliest date observed, August 3rd, 1899; latest, August 16th, 1906. Both these dates are obviously misleading as to time of emergence. Mr. Spiller records a specimen on June 10th, 1893, and another as late as September 17th, 1890 ('Entomologist,' xxiv. p. 3).

26. *Argynnis aglaia*, L. Undoubtedly the commonest of the down Fritillaries. The males often abundant where thistles are in flower. From the Wycombes to Drayton-Beauchamp, Aston-Clinton, and Halton. Mr. Spiller speaks of fifty counted in one morning on a hill-slope surrounded by woods as they successively turned at the top of the hill.

Earliest date observed, June 25th, 1914; latest, September 12th, 1907.

27. *A. adippe*, L. Much rarer, and more local than the preceding. Mr. Spiller says (*in litt.*) that it used to occur at Kingston Wood, "now turned into a pheasant farm, and the butterfly gone"; also formerly near Whiteleaf with *B. euphrosyne*. I have found it not uncommon in a certain dingle through which a wood path runs, and where some seasons there are lines of tall thistles. Professor Carlier reports it from High Wycombe; the Rev. H. H. Crewe from Aston-Clinton and Drayton-Beauchamp; the Rev. J. Greene from Halton.

Earliest seen, July 2nd, 1908, when the males were abundant; latest, September 12th, 1907—worn. In the extraordinarily hot spring of 1893 the Rev. F. A. Walker captured a specimen near Chalfont Road Station on June 8th ('Entomologist,' xxvi. p. 221).

28. *Brenthis euphrosyne*, L. This is another butterfly which escaped my notice for many years on the hills themselves, but Mr. Nander Hedges has informed me that it is locally common in the eastern Chilterns. I eventually found it in May, 1912, on the *adippe* ground, and also at Little Hampden the same day. I expect it is pretty well distributed in the enclosures on the south incline.

Earliest seen, May 30th, 1912; latest, "June 10th, 1914;

but known to occur a week later in previous years" (A. J. Spiller).

29. *B. selene*, Schiff. This is one of the Chiltern butterflies which has apparently been ousted from its former haunts in the eastern area. Mr. Peachell does not include it in his list (*in litt.*) of butterflies *not* taken in the High Wycombe district, so I conclude he met with it there before 1900; and Mr. Spiller reports "a few at Chinnor (just over the county border) formerly. Not seen this year, 1914." I have no personal knowledge of its appearance in the Chilterns; but it duly figures in the records of the Rev. H. H. Crewe for Drayton-Beauchamp and Aston-Clinton; and of the Rev. J. Greene for Halton. Probably haunts the southern slope woods, as it is reported from the neighbourhood of the Chalfonts.

30. *Melitea aurinia*, v. Rott. I was going to exclude this charming butterfly, so far as the Chilterns are concerned, from the number of species occurring there, when I received from Mr. Spiller welcome confirmation of its recent appearance well within the western extremity of the Bucks. hills. I have no intention of divulging the locality, as the species is already sufficiently rare. But at some previous time it must have enjoyed a wide range to the east, as both Drayton-Beauchamp and Halton are given as localities by the authorities quoted in Newman's 'British Butterflies.' Mr. Spiller remarks that the place chosen by the survivors in his direction is a puzzle, as they haunt the highest ground in the neighbourhood. The only locality communicated to me for *aurinia* anywhere within twenty miles is in a meadow by the side of the Chess River, in the county of Herts. I suspect the colony discovered by Mr. Spiller had been gradually driven from the low-lying ground by the encroachments of agriculture, or of sheep pasturage. But, as he points out, in the Alps *M. aurinia*, or rather its ancestral form var. *merope*, Prunner, climbs to the snow line.

[*M. athalia*, v. Rott. A Chiltern butterfly of old time recorded by the Rev. Joseph Greene from Halton, but Mr. Rothschild, who has a thorough knowledge of the locality as it is to-day, informs me that *athalia* has certainly disappeared, and that its chosen ground has been ploughed in. Mr. Spiller has searched the western ranges for it; I have spent many hours in likely-looking spots; but, until we can discover woods where *Melampyrum pratense* also survives, I fear that our efforts to restore the Heath Fritillary to the Chiltern list will be in vain. I am quite aware that other food-plants are given by the authorities, but I have observed abroad that, as a rule, *athalia* is really abundant—and it swarms in many places—chiefly where this particular plant flourishes.]

31. *Pyrameis cardui*, L. Common in *cardui* years, but other-

wise scarce. The best recent seasons for the species were 1906 and 1914, when it was abundant.

I have no early record of the immigrant appearances. Latest observed, October 1st, 1903.

32. *P. atalanta*, L. Always fairly common, affecting the *Eupatorium cannabinum* and scabious. It was in profusion one year upon a small plot of lucerne near the top of "a pass."

Earliest seen, *advena*, April 23rd, 1900; latest, October 9th, 1914, near Great Missenden. (In Middlesex to October 18th.)

33. *Vanessa io*, L. I have never found this species abundant; it was, however, fairly common in a small patch of lucerne, usually devoted to cereals, in August, 1909.

Earliest seen, after hibernation, April 20th, 1912; latest, May 23rd, 1904. Normal emergence, first seen, August 3rd, 1899; last seen, September 14th, 1908.

34. *Aglais urticae*, L. First seen, March 17th, 1906; latest, a second generation from larvæ found on nettles and bred under natural conditions. First moult, September 12th. All had pupated, September 28th. Imagines from October 12th to 20th, 1907, some very dark; all showing a disposition to hibernate immediately.

35. *Eugonia polychloros*, L. Very rare. I have never found it in the Chilterns, though there are plenty of elms in the villages skirting the Vale of Aylesbury. Mr. Spiller says he took one at sugar in 1893, and saw some others in the western district, that being a year of plenty elsewhere. Not observed by Mr. Peachell (1900) at High Wycombe. Reported from Drayton-Beauchamp by the Rev. H. H. Crewe.

(To be continued.)

NOTES AND OBSERVATIONS.

ENTOMOLOGISTS AT THE FRONT.—Speaking in the House of Commons on Thursday, April 22nd, Mr. H. J. Tennant, Under-Secretary of State for War, paid a high tribute to the splendid work of the Royal Army Medical Corps. All epidemic diseases such as measles or typhoid had been brought under control and localised, and special illnesses to which troops are particularly prone had been either prevented altogether, or treated at so early a stage that recovery had been effected in the shortest possible time. Proceeding to explain the precautions adopted against summer sickness, he continued:—"Now that the rigours of winter were giving way to what might be the intensity of summer heat, they were rather apprehensive of a plague of flies and insects, and they had sent out, in order to combat that evil, entomologists of world-wide reputation, who were now engaged in taking such precautionary and preliminary steps as were possible while these creatures were in the larva stage

At home bacteriologists all over the country had taken in hand individual cases of cerebro-spinal meningitis, which was a most dangerous disease and which might be a scourge to the ranks, and he hoped and believed that that difficulty had been successfully overcome."—H. R.-B.

THE COPULATION OF SCORPION-FLIES.—On May 25th, 1914, I received from Mr. D. H. Gotch (who was unfortunately killed in action a short time ago) a living pair of *Panorpa germanica*, obtained by him at Oxshott the day before. About 11.30 a.m. I placed them together in a glass-bottomed box, and within a few minutes pairing took place and continued throughout the day. In the evening live aphids were introduced into the box as food, but it was not until the Scorpion-flies were exposed to the light of a table-lamp that they became active enough to take nourishment. They then fed together, still *in coitu*, but by 9.30 p.m. they had separated. During pairing the insects stood at an acute angle to each other; but beyond the fact that the male was holding the female from below with his claw-like terminal appendages, very little could be observed of the copulatory position, as the bodies were well hidden by the wings. In the morning of May 26th it was seen that both specimens were in a moribund condition, and they were consequently killed. No trace of eggs could be found in the box.—HERBERT CAMPION; 58, Ranelagh Road, Ealing, March 29th, 1915.

LARVÆ OF *LYCENA CORYDON*.—On May 8th last year I found four young larvæ of *L. corydon* feeding on *Hippocrepis comosa* in Fleam Dyke, Cambs., a showery afternoon, and the grass very wet. On 31st of same month a great number of larvæ feeding, in pouring rain, in the Devil's Dyke: on both dates observations were made about 3 p.m., and therefore five hours or so before sunset. An examination of the same plants on June 4th revealed one or two larvæ concealed amongst the roots; the rest were invisible, nor had they pupated, as no pupæ were to be found, and some I took on the 31st did not pupate till June 17th. They evidently object to feeding in the sunshine. Nearly every larva I saw on the 31st was being "caressed" by three or four ants. Two larvæ of *Thecla betule* brought here on June 20th attracted a number of ants, which were busy caressing them for two days, as many as nine being counted on one larva: on the 22nd their attentions ceased, no doubt owing to the cessation of the skin secretions due to the forming of the pupal integument, as the larvæ pupated on 23th.—W. R. TAYLOR; 86, The Avenue, West Ealing, W.

BUTTERFLIES OF THE TAUNTON DISTRICT.—As a local record I think the following list of the butterflies of the Taunton district must be considered a good one. The district in question covers a radius of about ten miles from Taunton, and the number of species I have taken is forty-two; and if I include *V. antiopa* (seen by a friend of mine but missed) it is forty-three. I have seen a record of the capture of this insect within four miles of the town in 1877:—*P. brassicæ*, *rapæ*, *napi*, *E. cardamines*, *L. sinapis*, *C. edusa*, *G. rhamni*, *A. selene*, *euphrosyne*, *aglaia*, *adippe*, *paphia*, *M. aurinia*,

V. polychloros, *urticæ*, *io*, *atalanta*, *cardui*, *M. galatea*, *P. egeria*, *megæra*, *S. semele*, *E. ianira*, *tithonus*, *hyperanthes*, *C. pamphilus*, *T. betulæ*, *w.-album*, *quercus*, *rubi*, *P. phlæas*, *L. ægon*, *astrarche*, *icarus*, *corydon*, *argiolus*, *minima*, *N. lucina*, *S. malvæ*, *N. tages*, *H. thaumas*, *sylvanus*. It would be interesting to know if any other district of similar size can exceed this record.—W. B. BUTLER; Southgate, Wellington Road, Taunton.

GYNANDROMORPHOUS SMERINTHUS OCELLATUS × AMORPHA POPULI (HYBRIDUS, Steph.).—From the brood I obtained of this hybrid (mentioned in the 'Entomologist' of September last, p. 251) a gynandromorphous specimen, exactly halved, emerged on Feb. 9th; left side male, right side female. The left wings are pinkish, as in *ocellatus*, while the right wings are entirely grey. The eye-spots of *ocellatus* are well developed on both hind wings, as is also the red basal patch of *populi*. Right antenna like female *populi*, left like male *ocellatus*. Right half of body light grey, left half brownish grey. The thorax has the brown dorsal patch of *ocellatus*, but it stands up much higher and more tuft-like on the left (*ocellatus*) half—the right half looking exactly as if it had been sheared off. In many other respects the gynandrous character is apparent. It is a very curious though rather handsome-looking insect, and is quite perfect and well developed. As I imagine such an insect must be very rare, I thought it would be of interest to record it.—SIDNEY WHICHER; Westmead, Liss, Hants. (Plate VI., fig. 4.)

PYRAMEIS ATALANTA, ab.—I beg to enclose a photograph of an aberration of *Pyrameis atalanta*, which I had the good fortune to capture in my garden here in October, 1914. The red marginal band on the hind wings is pushed up as a symmetrical rounded wedge into the centre of the deep black-brown area, giving a striking and beautiful effect. The black spot corresponding to this part of the red band, instead of lying parallel to the edge of the hind wing, is carried up with the red wedge, and is at right angles to the direction of the other black spots. The fourth spot in the chain on the fore wings is distinctly pear-shaped. There is a very distinct white spot in the red band on the fore wings. The red band is divided in the centre by a black line. On the reverse surface of the fore wings is a fine series of arch-shaped blue lines extending from the fourth or pear-shaped white spot to the inferior angle of the wings. On the reverse surface of the hind wings is a long black line, flanked with pale mauve and corresponding with the wedge-shaped formation on the hind wings. Though I have bred a number of *P. atalanta*, and examined the butterflies in great quantities every autumn at ivy-bloom and fallen fruit, I have never come across any variety so marked and interesting as this.—G. E. J. CRALLAN; Gouray Lodge, Jersey, Channel Islands. (Plate VI., fig. 3.)

SMALL SIZE OF PYRAMEIS ATALANTA.—On September 13th, 1914, a specimen of *Pyrameis atalanta* emerged which was found to have a wing expansion of only two inches, the average size being quite two and a half inches at least.—E. REX. PHILLIPS; 64, Quantock Road, Windmill Hill, Bristol.

VANESSA ANTIOPA IN NORFOLK.—It may be of interest to record that on April 2nd a specimen of *V. antiopa* was taken at Holt, Norfolk, by Mr. Hanmer. One wing-tip was slightly damaged, but otherwise the specimen was in good condition.—J. P. HEYWORTH; Woodbrook, Alderley Edge, Cheshire.

PYRAMEIS ATALANTA IN APRIL.—On April 2nd last I saw a very fresh specimen of *P. atalanta*, which I imagine must have hibernated in this locality.—G. NOBBS; North Lodge, E. Cowes, Isle of Wight.

MOTHS CAPTURED BY LIGHT-TRAP AT RINGWOOD.—The following is a list of moths taken in my moth-trap here. It is 4 ft. square, lighted by two incandescent gas lamps of 75 c.-p. each, and overlooks an expanse (nearly a mile) of water-meadows (with river), beyond which is a thick belt of wood; beyond which again, but quite out of sight, is an expanse of heath:—*S. ligustri*, *S. populi*, *N. cucullatella*, *C. miniata*, *L. mesomella*, *L. lurideola*, *E. cribrum*, *E. jacobææ*, *A. caia*, *A. villica*, *S. fuliginosa*, *S. lubricipeda*, *S. menthrasti*, *S. urticæ*, *P. similis*, *D. pudibunda*, *T. cratægi*, *P. populi*, *B. neustria*, *O. pоторia*, *L. quercifolia*, *C. glaucata*, *D. furcula*, *P. palpina*, *L. camelina*, *N. dictæoides*, *N. ziczac*, *P. bucephala*, *B. perla*, *A. psi*, *A. megacephala*, *L. conigera*, *L. lithargyria*, *L. comma*, *L. impura*, *L. pallens*, *S. maritima* (two), *T. fulva*, *G. ochracea*, *H. nictitans*, *H. micacca*, *A. putris*, *A. strigula*, *X. lithoxylea*, *D. scabriuscula*, *C. graminis*, *L. testacea*, *L. cespitis*, *M. brassicæ*, *A. basilinea*, *A. didyma*, *M. arcuosa*, *G. trigammica*, *C. morpheus*, *C. alsines*, *C. taraxaci*, *C. ambigua*, *R. tenebrosa*, *A. vestigialis*, *A. puta*, *A. segetum*, *A. exclamationis*, *N. plecta*, *N. c.-nigrum*, *N. festiva*, *N. rubi*, *N. xanthographa*, *T. ianthina*, *T. orbona*, *T. pronuba*, *A. tragopogonis*, *A. pistacina*, *A. lunosa*, *A. litura*, *X. fulvago*, *X. flavago*, *X. circellaris*, *C. trapezina*, *C. affinis*, *D. cucubali*, *D. carophaga*, *A. nigra*, *S. cassinea*, *M. oxyacanthæ*, *P. meticulosa*, *H. oleracea*, *H. pisi*, *C. umbratica*, *H. tripartita*, *P. chrysis*, *P. festucæ*, *P. gamma*, *P. moneta*, *A. myrtilli*, *C. nupta*, *U. sambucata*, *E. apiciaria*, *R. luteolata*, *S. bilunaria*, *O. bidentata*, *C. elinguaris*, *E. alniaria*, *E. fuscantaria*, *E. quercinaria*, *E. erosaria*, *H. pennaria*, *A. betularia*, *C. lichenaria*, *B. repandata*, *B. gemmaria*, *A. marginepunctata*, *A. aversata*, *T. amataria*, *C. pusaria*, *M. notata*, *H. vauaria*, *S. belgiaria*, *A. ochrearia*, *A. grossulariata*, *P. hippocastanaria*, *H. defoliaria*, *C. brumata*, *O. dilutata*, *L. viridaria*, *E. albulata*, *L. viretata*, *T. obeliscata*, *T. firmata*, *M. sociata*, *M. fluctuata*, *C. ferrugata*, *C. unidentata*, *C. fluviata*, *P. tersata*, *P. vittata*, *C. siterata*, *C. prunata*, *C. testata*, *C. populata*, *C. associata*, *E. cervinata*, *E. palumbaria*, *E. bipunctaria*, *A. plagiata*, *C. spartiata*. It will be noticed that *cribrum*, *belgiaria*, *myrtilli*, *hippocastanaria*, and *strigula* have been attracted to the light through, or over (?), the intervening wood. The results given above are for six years' use between May and November. My experience is that the only consistently productive nights are when there is a thunderstorm. Some other most promising nights sometimes yield no result. I believe *S. maritima* has not been recorded hitherto from Hampshire.—C. E. NEWNHAM; Ringwood, September 14th, 1914.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—Annual Meeting.—*Wednesday, January 20th, 1915.*—Mr. G. T. Bethune-Baker, F.L.S., F.Z.S., President, in the chair.—Mr. R. W. Lloyd, one of the Auditors, read the Auditors' Report, which was adopted on the motion of Mr. E. B. Ashby, seconded by Mr. Tonge.—The Rev. G. Wheeler, one of the Secretaries, then read the Report of the Council, which was adopted on the motion of Mr. W. J. Lucas, seconded by Mr. Hugh Main.—No other names having been received in addition to those proposed by the Council as Officers and Council for 1915, these were declared by the President to be elected.—The President then delivered his Address, illustrated by the epidiascope, after which Mr. Merrifield proposed a vote of thanks to him, remarking on the patience and research needed for such a paper, and, while asking that it might be printed as a portion of the Proceedings, expressed a hope that the illustrations might also be reproduced. Dr. Jordan seconded the motion, which was carried unanimously.—The President, in replying, said that he was offering twelve plates to the Society in illustration of the Address.—Mr. Hy. J. Turner then proposed a vote of thanks to the Officers for their services, which was seconded by the Rev. F. D. Morice. The Treasurer and both Secretaries replied.—REV. G. WHEELER, *Hon. Sec.*

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*March 11th, 1915.*—Mr. A. E. Gibbs, F.L.S., Vice-President, in the chair.—Mr. Baumann exhibited a bred series of *Ephyra pendularia*, including a considerable percentage of ab. *subroseata*. They were a second generation from larvæ beaten in Surrey.—Mr. Gibbs, a specimen of the huge Noctuid *Thysania agrippina* from Costa Rica, where it sits on tree trunks, as does a *Eupithecia*.—Mr. Whicher, a remarkable gynandromorphous hybrid, *Smerinthus ocellatus* male \times *populi* female, in which the left side was male and the right side female.—Mr. Hy. J. Turner, a copy of an uncommon work, 'Illustrations of British Mycology,' by Mrs. Hussey, 1846, with ninety-two coloured plates, which he had recently bought cheap, as it was about to be torn up by the bookseller to dispose of the plates at a few pence each as "pretty pictures."—The rest of the evening was devoted to exhibitions under microscopes.—Mr. Adkin, the structure of the cocoon of *Dicranura vinula* and antennal structure in Lepidoptera.—Mr. Edward, a species of *Nycteribia*, the parasite of the Fishing-bat.—Mr. West (Ashted), androconia of *Pieris brassicæ*, a *Coccus* found on bananas, and *Hypoxylon coccineum*—a micro-fungus on wood.—Mr. Coxhead, a number of mites infesting a brazil-nut.—Mr. Ashdown, minute species of Coleoptera and Hemiptera.—Mr. Bunnett, larva of a Thrips which had been attacked by a micro-fungus.—Dr. Chapman, skins of the first and last stages of the larva of *Everes argiades*, with figures and illustrative notes on the same.—HY. J. TURNER, *Hon. Rep. Sec.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Meeting held at the Royal Institution, Colquitt Street, Liverpool, *January 18th, 1915*, Dr. J. Cotton, Vice-President, in the chair.—Mr. Wm.

Mansbridge read a paper entitled "Silverdale as a Collecting Ground." Having given a brief survey of the geology and flora of the district, the author enumerated a large number of local species of Lepidoptera generally rare in the North of England, but which had been recorded from this favoured area. Many of these, however, had not been reported for a couple of decades or longer, and members were urged to endeavour to confirm such records as *L. corydon*, *T. betulae*, *P. egeria*, *E. hyperanthes*, *L. minima*, *S. malva*, *S. anomala*, *A. marginepunctata*, *L. olivata*, and *E. taniata*, all of which had been recorded some thirty years ago. He also referred to the two field meetings which had been held at Silverdale—gatherings that had been greatly enjoyed by all who had attended. The author mentioned having taken a fine specimen of *Coccyx cosmophorana* on May 30th, 1914, in Gatebarrow Wood; also *Adela fibulella* and *Eupithecia constrictata*.—Mr. A. W. Hughes exhibited Lepidoptera from Eastham as follows: *Hybernia defoliaria*, *H. aurantiaria*, and a very long series of *Cheimatobia brumata*, the latter showing great variation from very pale to very dark brown, almost chocolate-coloured forms; the last were scarce, forming only three per cent. of the number captured. *H. aurantiaria* had not been recorded previously for the locality.—Mr. F. N. Pierce showed his extensive series of the genus *Cnephasia* (*Sciaphila*), containing all the British species except *wahlbomiana* and *abrasana*; with regard to these he stated that it was considered very doubtful whether they had any right to be included in the British Fauna, or even to be ranked as good species at all. The variation was remarkable in that almost every species showed both melanism and albinism, and it is only by a microscopic examination of the genitalia, which can easily be done without damaging the specimen, that the moth can be identified, especially when it approaches the extreme variation.

February 15th, 1915.—Dr. J. Cotton, Vice-President, in the chair.—The evening was devoted to a pocket-box exhibition of natural history objects.—Mr. F. N. Pierce contributed a selection of "insect habitations," which included portable cases characteristic of the Psychidæ, Coleophoridæ, and the Trichoptera; he also showed the cases of the Coleophoridæ under the microscope, and called attention to the character of the silk of which some of them were composed.—Mr. R. Wilding exhibited a number of Tortrices collected in the neighbourhood of West Derby, including series of the following: *Dictyopteryx holmiana*, *Catoptria cana*, *Orthotania striana*, and many of the common hedgeside species.—Dr. J. Cotton, a box of *Triphæna fimbria* and *Carsia paludata* from near St. Helens.—Mr. W. Mansbridge brought a specimen of the fungus *Polyporus betulinus*, which, when dried and cut into strips, he used for mounting Micro-Lepidoptera; also a series of *Mimæsioptilus bipunctidactylus*, cinnamon-coloured form, from the Crosby sandhills, and a short series of a melanochoic variation of *Ellopiæ prosapiaria*, bred from a Delamere female; he stated that, although not usually so dark as the present family, the species is considerably darker at Delamere Forest than in the South of England.—WM. MANSBRIDGE, Hon. Sec.

THE MANCHESTER ENTOMOLOGICAL SOCIETY.—January 6th, 1915.
—Mr. J. E. R. Allen showed *L. flavicinctata* from Co. Fermanagh

and Braemar; pale forms from the limestone rocks.—Mr. J. E. Cope exhibited *Anthra decemguttata* (?) from Stellenbosch, Cape Colony, October, 1914.—The retiring President, Mr. J. H. Watson, discussed "Some Interesting Points in Insect Anatomy." By means of the lantern microscope he illustrated his remarks with suitable slides.

February 3rd, 1915.—Mr. Mansbridge opened the evening with a discussion on experiments made with regard to the melanic form of *B. repandata*, illustrating with specimens and figures showing results obtained.—Mr. V. Coryton exhibited Lepidoptera taken at Delamere, &c.—Mr. W. Buckley, two specimens of *D. galii* from Cornwall.—Mr. Johnson, *T. gracilis*, showing rosy forms, from Scotland; paler forms (one with slight rosy flush), clay-coloured and greyish forms from Lancs. and Cheshire; also very deep red specimens from New Forest; also a short series of *T. variata* and *T. obeliscata* for comparison.—Mr. A. Binns showed *P. chrysitis*, *N. plecta*, *H. micacea*, *H. aurantiaria*, *H. defoliaria*, *A. plantaginis*, *A. grossulariata*, all taken locally (Manchester).—Mr. L. Nathan, *O. antiqua*, male and female, bred July, 1914, from Manchester ova; *Vespa vulgaris*, female, Moss Side, October, 1914; *T. obeliscata*, W. Didsbury, October, 1914.—Mr. J. H. Watson, living specimen of a new subspecies of *Philosamia cynthia* from Tsing-tau; also Diptera (Tachinids) infesting the Saturniid *Antherea roylei*, from Khasia Hills, Assam.—Mr. J. H. Shorrocks, photo-micrographs of dissections of common cockroach.—Mr. L. H. Suggitt, a selection of large Lamellicornia, including male *Dynastes*.

March 3rd, 1915.—Mr. Pierce, of Liverpool, read a most interesting and instructive paper entitled "The Genitalia of the Lepidoptera." The lecturer opened his subject by giving a short history of the work which has been done in this branch of our entomological science, and afterwards, by means of slides shown upon the screen of the genitalia of many Lepidoptera, demonstrated the practicability of determining genera and species by this method.

LONDON NATURAL HISTORY SOCIETY.—*January 5th, 1915.*—Mr. T. H. Archer, of 52, Elsenham Street, Southfields, and Mr. A. E. Hoop, of Southfields, were elected members of the Society.—Mr. C. H. Williams exhibited a long series of *Dianthæcia conspersa* from the Shetland Isles and a few specimens from Croydon.—Mr. L. B. Prout, the retiring President, read his presidential address.

January 19th, 1915.—The Rev. C. E. Raven, of Cambridge, was elected a member of the Society.—Mr. L. B. Prout exhibited two cabinet drawers containing a series of nearly all the British species of *Eupithecia*, including very variable *E. subfulvata* and its Scottish forms *cognata*, &c.; *E. pygmaea*, captured flying over a heap in the afternoon at Doncaster; melanic forms of *E. castigata*, *E. albipunctata*, *E. vulgata*, &c.—Mr. H. W. Wood, *E. castigata* and its melanic form ab. *obscurissima*, Prout; *E. innotata*, showing first and second brood usual forms, and some without the usual markings, also of both broods, from Durham; and ab. *fraxinata* from Middlesbrough; also larvæ of *Pieris brassicæ* taken in a garden at Southfields on January 17, several degrees of frost being registered that morning.—Mr. Bernard Cooper, a varied series of *Mimas tilia*, bred from a Lyndhurst female taken June, 1913.

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Length about 16 mm.; breadth about 5.5 mm.

Drawn by W. J. Lucas from cast-skin, Black Pond, Esher Common,
Surrey, July 18th, 1897.

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[No. 625

NOTES ON ODONATA FROM THE ENVIRONS OF CONSTANTINOPLE.

BY KENNETH J. MORTON, F.E.S.

ON several occasions, by the courtesy of Mr. Philip P. Graves, I received small collections of Odonata kindly made by him around Constantinople, taken on both the European and the Asiatic side of the Bosphorus and Sea of Marmora. Mr. Graves's valuable communications on the butterflies of the Near East are well known; but he had also developed a considerable interest in the dragonflies, and had promised a further consignment last autumn, from which I had hoped to give a more complete account of the Odonata occurring near Constantinople. The circumstances which prevented the fulfilment of this promise do not need explanation, and as the material already on hand is of sufficient interest I propose to deal with it now. A few quotations from Mr. Graves's notes are indicated by the initial letter G.

CALOPTERYGIDÆ.

Calopteryx virgo, Linné, race *festiva*, Brullé.—Female, Beikos Woods, Asiatic side, June 6th, 1914 (teneral); female, Belgrade Forest, European side, June 11th, 1914; male, Oakwood, Kartal, Asiatic side, May 17th, 1914 (sub-teneral).

C. splendens, Harris.—Male, Gyök-su, Asiatic side, May 27th, 1914 (seen June 30th on Riva River, Asiatic side, G.). The dark apical portion, starting 1-2 cells, beyond the nodus is regularly convex on its inner side; tip of wing very narrowly hyaline, in this respect resembling examples from Pavia, Italy. In Western examples of the race *xanthostoma* the inner margin of the dark apical portion is not so regularly convex, being usually more irregular in outline. The Constantinople male also recalls *C. amasina*, Bartenef, which, however, has the hyaline apex rather more extended.

AGRIONIDÆ-LESTINÆ.

Lestes viridis, Vanderl.—Male, Gyök-su, October 28th, 1913.

L. dryas, Kirby.—Female, Mavri, Asiatic side, May 30th, 1914; two males, Belgrade Forest, June 23rd, 1913.

AGRIONINÆ.

Platynemis pennipes, Pallas.—Two males, Gyök-su, end of May, 1913, May 24th, 1913; female, Asiatic side, June 19th, 1913, var. *lactea*; male and female, Erenkeui, seven miles from Constantinople, Asiatic side, May 11th, 1913, var. *lactea*.

Ischnura elegans, Vanderl.—Male, Gyök-su, July 10th, 1913.

Agrion scitulum, Ramb.—Female, Gyök-su, July 10th, 1913; two males and two females, Kartal, at cattle pond, May 17th, 1914 (pair); female, Belgrade Forest, end of June, 1913.

A. puella, Linné.—Male, European side, June 23rd, 1913; female, Gyök-su, May 16th, 1913.

ÆSCHNIDÆ-GOMPHINÆ.

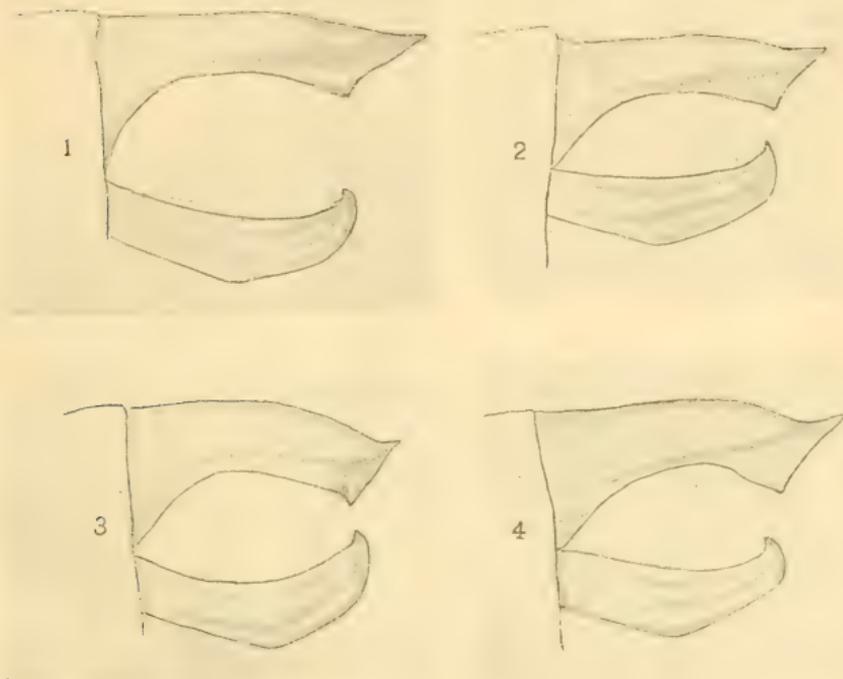
Gomphus schneiderii, Selys.—One male, Beikos, June 13th, 1913. This example demands a somewhat extended notice. The species was originally described by De Selys ('Revue des Odonates,' p. 292, 1850). Later he regarded it as a race of *G. vulgatissimus*, a view which has been adopted by Bartenef.

De Selys gives the following differences between *G. schneiderii* and *G. vulgatissimus*. In *G. schneiderii*:—

- (1) The size is smaller; the form more slender.
- (2) The black design of the front similar, but the black lines more slender; the lateral lobes of the lower lip in great part yellow externally (more so than in *vulgatissimus*).
- (3) The thorax beneath after the hind legs is almost all yellow (in *vulgatissimus* it is almost all black).
- (4) The anterior femora have, besides the pale yellow inner band which one sees ordinarily in *vulgatissimus*, a little line of the same colour at the base of the superior face, and a similar line on the intermediate femora.
- (5) The superior appendages are a little different. In *vulgatissimus* they are almost cylindrical and suddenly pointed at the extremity; in the species of Asia Minor they are more divaricate, cylindrical, but insensibly pointed; seen from the side they are truncate ventrad at a more oblique angle. The abdomen, it is stated, with a dorsal yellow line to seventh segment, but this character may be variable.

The typical examples were from Kellemisch, in Asia Minor, and I possess a short series from Amasia agreeing very well in most respects with the above. The abdomen, however, has in two specimens the yellow line to segment nine (and strongly marked thereon), while in another the yellow line on eight and nine is much reduced. In addition to the more slender aspect, the wings appear to be narrower than in *vulgatissimus*, there being only three series of cells in the fore wings between Cu 2 and the wing margin, a feature usually noticeable in *G. simillimus*.

The male from Beikos is rather remarkable. It has the narrow wings of *simillimus-schneiderii*, and traces of the yellow dorsal line on segments eight and nine; the median lines on the anterior part of the thorax are produced laterally as in *simillimus*. I hesitate to separate this example from those from Amasia, but it raises a doubt as to whether *schneiderii* is really to be closely associated with *vulgatissimus*, as proposed by De Selys and as Bartenef has done in his various writings.



PROFILE VIEW OF APPENDAGES.

1. *Gomphus schneiderii*, Constantinople. 2. *G. schneiderii*, Amasia, Asia Minor.
 3. *G. vulgatissimus*, near Zürich. 4. *G. simillimus*, Le Blanc, France.

The real connection seems rather to be with *G. simillimus*, and if I had been dealing with this Beikos example alone, I should have decided that it was a melanic Eastern race of *G. simillimus*, a view which receives support from Bartenef's record of *G. vulgatissimus vulgatissimus* and *G. vulgatissimus schneiderii* from the same locality in Montenegro ('Notice sur les Odonates du Montenegro,' Revue Russ. d'Entom. xii. 1912, No. i. p. 79). The appendages of the Beikos example agree with Bartenef's figure of *G. vulgatissimus schneiderii* (Arb. Lab. Zool. Kab. Univ. Warsaw, 1912, Odonata of Signakh and Telav

district of Tiflis Government, p. 23) which resembles *G. simillimus* in the structure of these appendages, and the Amasia examples show the same characteristics, but not in such a pronounced degree. The Beikos insect differs from those from Amasia as regards the black median lines on the front of the thorax, these in the former being as in *G. simillimus*, while in the Amasia specimens the resemblance is rather with *vulgatissimus*. The black condition of the legs of the Beikos insect, of which more material is to be desired, recalls *vulgatissimus*, while the black lines of the thorax and the structure of the appendages are closer to those of *simillimus*.

It may be useful to contrast a description of *G. simillimus* (after De Selys) with notes on the Beikos male:—

G. simillimus.

Front of head yellow with a single black transverse line on the front; lower lip yellow; occiput yellow, space round ocelli black. Back of head yellow with a large black spot behind the eyes prolonged towards their middle.

Prothorax black spotted with yellow.

Thorax yellow with six straight black lines rather thick upon the front; the two median contiguous a little broadened anteriorly and touching the prothorax by a little prolonged point; the antehumeral very close to the humeral,* the sides of the thorax have besides a black oblique posterior line and another intermediate, short, which branches towards the legs and forms a spot behind the posterior legs.

Interalar space yellow spotted with black.

Abdomen moderate, a little constricted from 3rd to 6th segments, increasing a little towards the extremity of which the sides are a little dilated and the under side concave.

The abdomen is black spotted with yellow thus:—

The arête and a great spot posteriorly in 1st segment; a dorsal spot with three lobes touching almost both ends of 2nd.

G. schneiderii (Beikos).

Frons yellow with a rather heavy black line between frons and nasus, with two rectangular black extensions on the latter; rhinarium, which has the anterior angles black, with blackish lines. Labrum with both margins heavily lined with black, and a median black virgule. Labium blackish. Behind the eyes black with a large yellow spot.

Prothorax black, anterior margin yellow, a large yellow rounded spot at each side and a small central twin spot.

Thorax yellow with six straight thick lines on the front, the two median contiguous a little broadened anteriorly and touching prothorax by a little prolonged point; the antehumeral and humeral close, separated by a space about equal or rather less than their breadth; on the side is a short black line which broadens out over the middle legs and joins the humeral, while another complete narrow line forks over the hind legs, the posterior branch forming a large black marking behind these legs.

Interalar space yellow spotted with black.

Abdomen black spotted with yellow thus:—

1st segment mostly yellow, a black marking on each side of dorsum; a dorsal spot with three lobes touching both ends of 2nd segment, central lobe much the largest.

* These almost touch in *G. vulgatissimus*.

G. simillimus.

3rd, 4th, 5th, 6th, 7th and 8th with a yellow ray composed of dorsal longitudinal narrow spots a little broader anteriorly, pointed behind, and not touching at all the posterior margin.

9th with a very large oval spot touching both ends.

10th with a small triangular posterior spot.

The anterior articulations of the three last segments, the oreillettes, all the back of the posterior genital lobe, the sides of the base, and of the end of the abdomen, and a lateral trilobed spot on the five intermediate segments, yellow.

Appendages as long as last segment. Superior black, a little separated at base, cylindrical, a little swollen; if viewed from above, terminating suddenly in a little very acute point; viewed in profile one sees a little before the point beneath something like a small projecting blunt tooth. Inferior appendage forked, yellow with black lateral branches not more widely apart than the superior.

Legs yellow; the femora with a triple black line, the tibiæ black inwardly, all the tarsi black.

Onychogomphus forcipatus, Linné.—Male, Gyök-su, May 24th, 1913; female, Riva-su, May 2nd, 1913. These show little tendency towards the meridional race. The male has, however, traces of a yellow dorsal line on the eighth segment; the ninth is yellow, posteriorly interrupted with black in the middle.

CORDULEGASTERINÆ.

Cordulegaster charpentieri, Kol.—Two males, Belgrade Forest, June 23rd, 1913, June 21st, 1914. These examples are very similar to a male given to me by Bartenef from Lagodechi in the Caucasus, the locality whence De Selys received a series which he referred first to his *C. pictus*, and later, I believe, to *C. charpentieri*, Kol. That these really represent *C. charpentieri*, Kol., seems to me not altogether beyond doubt. I hope to return to this point again.

ÆSCHNINÆ.

Brachytron hafniense, Müller.—Male and two females, Kutchük Tchekmedjé, on Sea of Marmora, European side, April 25th (Male, near lake, G.).

G. schneiderii (Beikos).

3rd, 4th, 5th, 6th and 7th with a yellow ray composed of dorsal longitudinal narrow spots, those on 6th and 7th especially a little narrower behind.

8th and 9th with much smaller and shorter markings.

10th all black above.

The anterior articulation of the three last segments, the oreillettes and sides of segment 2; a large basal lateral spot on segment 3; small basal spots on sides of segments 4, 5 and 6; a large irregular spot on 7; 8th and 9th with greater part of sides, and 8th, 9th and 10th ventrally, yellow.

Appendages black.

Compare the figures of the profile view.

Legs entirely black, with the exception of traces of yellow on anterior femora.

Calieschna microstigma, Schneider.—Male, Belgrade Forest, beginning of June, 1913; female, Beikos Woods, middle of June, 1913. (May 29th, 1914, the *Calieschna* is well out now in the woods. It is very fond of flying up and down wood paths, however shady and dark they are, G.)

Anax parthenope, Selys.—Female, Belgrade Forest, June 28th, 1914.

LIBELLULIDÆ—CORDULINÆ.

Somatochlora metallica, Vanderl.—Male, Belgrade Forest, June 23rd, 1913. (June 29th, 1914.—Common now in the woods, G.)

LIBELLULINÆ.

Orthetrum cancellatum, Linné.—Male (occurs end of June and beginning of July, Asiatic side, G.).

Libellula depressa, Linné.—Male, Gyök-su, June 19th, 1913; female, Sweet Waters of Asia, May 16th, 1913. (Everywhere, but usually in small numbers, G.)

Mr. Graves also mentions the following species, of which I have not seen specimens:—

Lestes barbarus, Fabr.—Erenkeui, on Sea of Marmora, June 8th, 1913.

Sympetrum meridionale, Selys.—End of June, 1913.

Crocothemis erythræa.—Fairly common on both sides of the Bosphorus, end of June and beginning of July.

Anax imperator, Leach. Not common; end of May, June, and July.

An *Erythromma* was observed commonly about the middle of July on the Gyök-su River.

BRITISH ODONATA IN 1914.

BY W. J. LUCAS, B.A., F.E.S.

(PLATE VIII.)

IN early seasons dragonflies may be expected to make their first appearance about April 20th, consequently, in so forward a spring as that of 1914 the presence of *Pyrrhosoma nymphula*, Sulz., on the wing by the 21st was not an exceptional occurrence. On that date I captured a female in the New Forest, and saw others which there was no reason to doubt belonged to the same species. On April 27th, in another part of the Forest, I took a female of *Brachytron pratense*, Müll., which species I had not

previously captured earlier than May 14th, although Mr. C. A. Briggs once met with it at Egham on April 29th.

Col. J. W. Yerbury gave me a teneral male of *Calopteryx virgo*, Linn., which he took at Shaugh Bridge on May 18th. He said that it was "in numbers on the banks of the Plym."

On May 20th I visited the Black Pond on Esher Common in Surrey, and there found on the wing *Cordulia anea*, Linn., and *Libellula quadrimaculata*, Linn. On May 31st I went in search of dragonflies along Oberwater and in its neighbourhood in the New Forest. *P. nymphula* was very common, and pairs were frequently flying connected *per collum*. A small plant of *Drosera intermedia* had caught a female by the end of the abdomen, and one leaf apparently was powerful enough to hold it a prisoner. *C. virgo* was fairly common, and pairs were sometimes seen connected *per collum*. Of *Agrion mercuriale*, Charp., I captured several females, but of males I caught none, though I probably saw just a single specimen. Presumably the females were earlier than the males. A few teneral examples of *Orthetrum cærulescens*, Fabr., were seen, and a female was captured. As I found nymph-skins of *Cordulegaster annulatus*, Latr., on *Myrica gale* this species must have been out, but I did not see imagines. I was specially on the look-out for *Gomphus vulgatissimus*, Linn., and *Ischnura pumilio*, Charp., but did not recognise either, nor could I find them in the Forest on June 22nd, nor yet again at the beginning of July. At the end of June, in addition to the species seen on May 31st, *Platynemis pennipes*, Pall., and *Pyrrosoma tenellum*, Vill., were on the wing. On June 20th in the New Forest a few full-coloured blue *O. cærulescens* were seen, and in close proximity to a very teneral specimen I secured a nymph-skin.

On June 14th Mr. W. H. Pearsall (Dalton-in-Furness) sent me a specimen of *C. virgo*, in connection with which he said:—"The flies were in some quantity, hovering—a most beautiful sight—over *Scirpus lacustris* in Rusland Pool, between Haverthwaite and Rusland in North Lancashire."

Mr. C. W. Bracken, in the early summer, took a pair of *P. nymphula* at Landrake on a creek of the Tamar (May 16th) and found *C. virgo* common on the River Plym (June 3rd), and *Enallagma cyathigerum*, Charp., male and female, on the upper courses of the Plym at the edge of the moor (June 29th).

From July 31st till September 12th I was in the New Forest where I met with *P. tenellum*, and its vars. *erythrogastrum* and *melanotum*; *E. cyathigerum*; *O. cærulescens*; *C. virgo*; *Sympetrum striolatum*, Charp.; *C. annulatus*; *A. mercuriale*; *Sympetrum scoticum*, Don; *P. pennipes*; *P. nymphula*; *Ischnura elegans*, Lind.; *Æschna cyanea*, Müll.; *Lestes sponsa*, Hans; *Æschna juncea*, Linn.; *Libellula depressa*, Linn.—fifteen species. So late

as August 18th *S. scoticum* and *S. striolatum** were seen in teneral condition, and the former was still emerging, if not the latter also. I brought away a nymph-skin of *S. scoticum*, and from that and others I have made the drawing and description of the nymph which accompany this paper. On August 19th in Pound Hill Inclosure I captured a nice female, *Æ. cyanea*, with greenish markings. When I removed it from the net it was headless. The head was, however, found clinging to the inside of the net. Apparently it was biting the net, and either could not or would not let go, and its body was dragged from its head. How slight is the connection, and how small must be the separate particles of food that can pass into the stomach! I was surprised at capturing a female *L. depressa* at Oberwater so late as August 29th. The specimen was in such good condition that it could not have been on the wing, one would think, since the beginning of the season. A male and a female of *C. virgo* were seen on August 31st, after I had lost sight of the species for several days. On September 2nd *P. tenellum* and *S. scoticum* were numerous, and I took a male *A. mercuriale*; *O. cærulescens* was in considerable numbers. On September 5th *S. striolatum* was very common in the bright sunshine during the afternoon in a ride near Woodfildley. During my stay in the Forest *C. annulatus* was again common. On September 7th near Holmsley *Æ. cyanea* and *Æ. juncea* were found to be rather common, and I captured of the former three males, and of the latter one male and two females. A male pounced down on a female, which I had not noticed on the surface of the vegetation in very shallow water. I succeeded in capturing both, and found them to be: one a male *Æ. cyanea* and the other a female *Æ. juncea*, and they evidently were intending to pair. Later, a male was seen to fly down to a female in a similar way; but this time I caught the female only—*Æ. juncea*. After this, two or three males kept flying to and from the spot, and their manner left no doubt that they were searching for the female. At last I captured one and found it to be *Æ. juncea*.

More than once I visited the pond where, in 1911, *Sympetrum fonscolombii*, Selys, occurred, and I think it may safely be said that none were present in 1914. Mr. Haines, however, was

* In continuation of the interesting notes supplied by Miss D. Molesworth (*vide* Entom. xlvii. p. 80), she adds, writing March 10th, 1914:—"Of the *Sympetrum* eggs, which I told you of as having hatched in less than three weeks last autumn, the largest, in a big aquarium, is now about 9 or 10 mm. long, while none of those of the same batch, in a small bottle, have reached 2 mm. in length. I feel almost certain that the smaller nymphs did not hatch till quite two months after the larger ones, for the latter ate all their relatives that I could see, and were nearly 3 mm. in length before I removed them to a bigger aquarium. I notice that a demoiselle nymph, which had lost two of its 'tails,' has now got two half-sized new ones by its last change of skin."

more fortunate, and he has sent me the following interesting note on that and other Dorset Odonata in 1914:—"On July 10th I found *Sympetrum fonscolombii* plentiful at the Wareham Pond where I had noticed it in previous years, and took seven males and one female, the latter *in copula*. The next day I found it in its other former locality on Knighton Heath. On July 13th the females were exceedingly abundant at the Wareham Pond, and I took another pair *in copula*, as I did also on July 18th. On July 20th I took another pair and a single female at Wareham, and I made a similar capture on Knighton Heath on the following day. A chief feature on July 18th was the number of *pairs* observable in the late afternoon. I believe the great numerical preponderance of the male is more apparent than real. The females are far more difficult to see and follow up than the males, unless they are *in copula*. They are more likely also to be passed over as belonging to another species. Females, too, shelter far more than the males amidst the growth in and around the water or on the heath near it. When single females are disturbed as they rest, they shoot up suddenly, almost unnoticeably, to a great height, and are generally lost to pursuit. When wading to just within striking distance of pairs I noticed the females repeatedly free themselves, or become freed, and mount out of reach in a similar way. The species delights in very hot, bright, calm days. In cloudy weather not a sign of the insect will there be. Even the most diligent hunting through the vegetable growth in and around the water will not dislodge a single specimen, however many there may be about. Wind is not so unfavourable as cloud. Indeed, the completeness and suddenness of appearance and disappearance of an abundance of specimens, for part of a day or for days together under favourable or unfavourable conditions respectively, would always make me hesitate to say that the species was absent, at its proper season, from its haunts here, though it might be quite unseen.

It seemed to me that, as with some genera of Ephemeroptera, the same female would quit one male and afterwards unite with another. The first union—*per collum*—always appeared to take place over the water. The pair would then make for land, where fecundation would be effected, during which time the pair often remained settled. This is *the* moment for an easy capture of both. If undisturbed, the pair fly again over the water, once more united *per collum* only, and the female oviposits. At first she is still attended by the male, but afterwards the process appears to be continued without his further attendance. The female continually dips the tip of her abdomen below the surface, letting fall an egg, or eggs, here and there quite at random in the shallows, where a sprinkling of rush stems grows from the sandy bottom.

By mid-June the species had not appeared, and not an

individual was to be seen after a week of August. I fancy all British-bred imagines are practically confined to July, and are at their zenith just before the middle of that month, except perhaps in such exceptional summers as that of 1911. On the wing *S. fonscolombii* looks larger than *S. striolatum*, and many examples are as large or larger. Two of my Wareham males were slightly, and one much, affected with the characteristic red mite; the rest were free from this parasite. On all the dates examples varied much, especially the females, as regards the glassiness or suffusion of the wings. There was scarcely a single *S. striolatum* at the Wareham Pond in July, but in August, when *S. fonscolombii* was over, it became commoner. This fact quite gave an idea of antagonism between the species. They were always more equal in numbers at Knighton. The more lovely and majestic species hovers more constantly, evenly, and calmly low down over the water than does *S. striolatum*, and basks on the bare, sandy margins of its chosen pond, more warily perhaps, but in the ostentatious manner of *Pyrameis atalanta*. I quite came to the conclusion that its apparent extreme wariness was in fact largely due to restlessness, and, on one occasion at least, a bad shot at the male needed only to be followed by a patient motionless crouching at the spot, in order to effect a capture over the very place where the former stroke was made. The beauty of this dragonfly, when it is in numbers, is unimaginable.

On May 20th at Morden on the fir-surrounded swamps as many *C. ænea*, *B. pratense*, *Libellula quadrimaculata*, and *L. fulva*, Müll., could be seen and taken as would satisfy the most ardent collector. Especially easy of capture were they towards the end of the afternoon. I can say the same of *Anax imperator*, Leach, at West Knighton Pond on June 19th (when I took six specimens, including one pair *in copula*, two males at once which were toying together, and two singly, in an incredibly short time), and of *Orthetrum cancellatum*, Linn., at East Lulworth Pond on June 24th and 27th. The females of both these species appeared far rarer than the males. In fact, all but one or two of the species (such as *Æschna mixta*, Latr.) mentioned in my list of Dorset Odonata (*vide* Entom. xlv. p. 201) have been very common here this season. But again I have not taken *A. mercuriale*, nor have I been able to add to that list any fresh species, save *S. fonscolombii*, which I must have overlooked in 1911. Incidentally, I might mention that on one or two occasions in favourable autumns I have seen a specimen of *S. striolatum* as late as the beginning of December at Galton, and of *Æ. cyanea* at the end of November at Owermoigne. Mr. Hermann Lea has assisted me much in my quest of the Odonata of Dorset."

DESCRIPTION OF NYMPH OF *S. scoticum*. (Plate VIII.)

General colour sepia, rather uniform in tint. Length, including anal appendages, about 16 mm., greatest breadth about 5.5 mm. Head transversely about 5 mm., less longitudinally, so that it appears somewhat narrow as compared with that of *S. flavolum*, for instance; surface fairly smooth, and colour nearly uniform. Eyes prominent and well forward, somewhat conical in shape, and situated at the fore corners of the head. Antennæ of seven segments, basal one globular, the next cylindrical, the rest hair-like. Labium (mask) tapering backwards and reaching at the hinge to about the insertion of the mid legs, narrow at hinge, spoon-shaped, covering the face; palpi subtriangular, margins nearly entire with about twenty-four short spines at fairly regular intervals; middle lobe produced in a very obtuse angle, also bearing short spines; mental setæ about fourteen in each comb, lateral about eleven in each comb; moveable hook rather short and slender. Prothorax collar-like, rather broad, margined behind with a ring of hairs. Mesothoracic spiracles large and conspicuous. Mesothorax and metathorax fairly smooth and rather uniform in colouring. Legs long and slender; mid and fore tibiæ hairy, hind ones rather spiny than hairy; femora ringed with a rather indistinct distal darker band; length of fore legs about 9 mm.; of mid legs about 11 mm.; of hind legs about 14.5 mm. Wing-cases about 5 mm. long. Abdomen practically unicolorous; short mid-dorsal spines on the distal margin of segments six and seven; short lateral spines on segment eight, and rather longer ones on segment nine; ninth segment truncated behind, tenth rather small. Anal appendages small, pointed, surrounded by hairs; upper one triangular; laterals shorter and more slender; lower ones slender and longer than the other three.

Material.—Nymph-skins obtained while the insects were emerging at Esher Common, Surrey, and in the New Forest.

[Though it cannot be claimed as belonging to the British fauna, I might mention that I received from Dr. R. N. Goodman an example of *Æschna affinis*, which he took on board ship in the North Sea on July 7th, 1914.]

28, Knight's Park, Kingston-on-Thames.

NOTES ON A FEW ICHNEUMONIDÆ FROM FIJI.

By CLAUDE MORLEY, F.Z.S., &c.

THE following species were contained in a small collection of insects from the west side of Viti-Levu, Fiji Islands, sent by Mr. R. Veitch to the Imperial Bureau of Entomology.

Henicospilus apicifumatus, sp. nov.

This species differs somewhat materially from *H. turneri*, Morl. ('Revision of the Ichneumonidæ,' i. pp. 49 and 51, 1912), in the darker flagellum, black ocellar region, immaculate anus, the lack of an apical alar corneous mark, the evidently more vertical (though

still distinctly antefurcal) lower basal nervure of the fore wing, the lower interception of the nervellus in the hind one, the shorter and broader brachial cell, the emission of the more bowed radial nervure much nearer the external cubital, but especially in the completely and distinctly subinfumate radial cell, which meets the subsinuate base of the radial nervure. Length, 15 mm. ♀.

The type is in the British Museum, together with a second specimen found during March, 1901, at Mackay, in Queensland.

Echthromorpha diversor, Morl.

Echthromorpha is an interesting and highly specialised genus, of wide distribution, ranging from St. Helena, through Africa, Mauritius, Ceylon, Assam, the Malay Archipelago, and Australia, to Fiji, whence both sexes of the present species, described as recently as 1913 ('Revision of the Ichneumonidæ,' ii. p. 47), from the Solomon Islands or New Hebrides have now been received. The female was hitherto unknown, but appears to differ only sexually from the male.

Paniscus testaceus, Grav.

One pair of this cosmopolitan species.

A NEW SPECIES, BELONGING TO THE LASIO-
CAMPIDÆ, FROM JAPAN.

BY A. E. WILEMAN, F.E.S.

Crinocraspeda (?) *miyakei*, sp. n.

Antennæ plumose. Termen of all wings crenulate, costa of hind wings incised near base and before apex. Fore wings greyish brown, tinged with reddish brown beyond the middle; postmedial line black, inwardly oblique, angled towards costa where it is outwardly edged with white; area within postmedial line clouded with dark brown; venation black before the postmedial and brown between the postmedial and the pale, diffuse and irregular, subterminal line; terminal line dark brown, crenulate, fringes paler. Hind wings greyish brown, tinged with reddish brown on the median area, a short black bar extending from before middle of the costa to below the cell; terminal line and fringes as on the fore wings. On the under side the postmedial line is somewhat broader and edged with paler throughout its length; the black bar on hind wings becomes a band extending to dorsum, and is slightly angled about middle.

Expanse, 44 millim.

A male specimen, in rather poor condition, received from Professor T. Miyake, of the Imperial Japanese Agricultural College, Komaba, Tokyo. It was captured by Mr. Shiromma on July 3rd, 1908.

The species is closely allied to *excisa*, Wileman, from Arizan, Formosa, which was doubtfully referred to the genus *Crinocraspeda*, Hampson ('Entomologist,' vol. xliii. p. 192).

THE BUTTERFLIES OF THE BUCKS. CHILTERNs.

By H. ROWLAND-BROWN, M.A., F.E.S.

(Concluded from p. 122.)

SATYRIDÆ.

36. *Pararge megæra*, L. Has become very scarce in the central region. Mr. Spiller reports it "quite gone from the North Chilterns."

Earliest seen, May 26th, 1900.

37. *P. egeria* var. *egerides*, Stgr. I have never found this butterfly as common in the beech woods of the central region as it is in the copses of the northern border of the county, where I have seen the spring brood swarming. But it seems to be well distributed from west to east—from the Wycombes to Wendover and away to Aston-Clinton. In my experience, however, it tends to disappear from the beech area. Professor Carlier includes *egeria* (i. e. *egerides*) in his High Wycombe list, and a little further east Mr. Spiller reports it common in 1914.

Earliest date seen, *gen. vern.*, May 11th, 1912, flying over and settling on dead beech leaves in sunlit openings; *gen. æst.*, first seen, July 2nd, 1908; last seen, September 12th, 1907. (October 3rd, 1914, A. J. Spiller.)

[*Hipparchia semele*, L. In Mr. Barrett's list of the butterflies of Buckinghamshire recorded in the 'Victoria County History,' there occurs the following passage (the italics are mine): "High Wycombe, and elsewhere, on rough chalky hillsides and open commons." I have sought diligently for the source from which this statement is taken, but without success. So far as I can ascertain, there is only one mention, and that a very doubtful one, of *semele* having occurred in the Chilterns; and I cannot believe that so careful a lepidopterist as Mr. Barrett would have made the statement quoted upon such slender evidence. In the 'Entomologist,' vol. vi. pp. 134 and 242 (1872), Dr. T. P. Lucas relates how one day in August, 1871, at Watlington (which is in Oxon., not Bucks.), he took one-third of the then recognized British butterflies. He does not mention *semele* among them on this occasion; but he says that he visited the same spot in 1872, where he met a gentleman (Mr. Spiller suggests it may have been the Rev. Mr. Bell, of Pyrton), who told him that he had taken *semele* that year, earlier in the season. If that, then, is the lonely authority on the subject, I fear it must be dismissed as insufficient. Neither my friends, nor I, who have scoured the chalk hills from end to end, have ever encountered the species. Mr. Peachell expressly excludes it from his MS. list for High Wycombe. Mr. N. C. Rothschild informs me that it is conspicuous only by its absence in the eastern Bucks. Chilterns. It would be highly interesting, therefore, to know whence Mr.

Barrett derived material for the record quoted. It may also be worth remark that as far back as the "fifties" Stainton gives no Bucks. localities, though Mr. South, in his 'Butterflies of the British Isles,' says that "it has long since been ascertained to occur in almost every county in England and Wales." That it should not favour the Chilterns is, therefore, astonishing.]

38. *Epinephele jurtina*, L. Always abundant throughout the summer.

Earliest seen, June 3rd, 1912; latest, September 27th, 1913.

39. *E. tithonus*, L. Generally distributed over the range.

Earliest seen, July 15th, 1889; latest, August 21st, 1913.

40. *Aphantopus hyperanthus*, L. I believe this butterfly is common on the foot hills in July, as I find plenty of wasted females in August. I have caught no aberrant forms, owing no doubt to my being absent at the normal time of flight.

Earliest seen, July 2nd, 1908; latest, August 21st, 1909.

41. *Cenonympha pamphilus*, L. Continuous from May to the end of September.

Earliest seen, May 2nd, 1912; latest, October 3rd, 1903.

42. *Melanargia galatea*, L. At the end of the nineteenth century it looked as if *M. galatea* had followed not a few of the reputed Chiltern butterflies to extermination. In the "sixties" it was reported well distributed in the eastern area. I have always hoped to re-discover it in these and other haunts once frequented; but though personally unsuccessful, having communicated a likely spot in the middle region to my correspondent, Mr. S. G. Castle Russell, I was delighted to receive a letter from him last year containing the much-desired news. Mr. Russell writes:—"On August 5th, 1913, I ascended high ground, and worked a very grassy slope on the right, the left side being wooded. About 200 yards further on the road dipped steeply, and on the right side the ground was fairly level, being the base of a shrub-sided hill, rather like Boxhill in appearance. On the other side of the road the ground sloped into a deep hole with woods at the end, and on this ground I saw two or three *galatea*. I noticed them particularly, because I remembered that in your article you had made remarks about their disappearance." At the western limit, in the neighbourhood of High Wycombe, Mr. Peachell reports that it occurs in several spots; but, as a rule, in small numbers. Mr. Spiller's account for 1914 is even more encouraging:—"Saw it in scores this summer on the Bucks. hills; very local, extending over five or six acres."

I have now come to the end of my Chiltern catalogue of butterflies. It is not as full in species as the bag of many a single day's collecting on the Continent. All the same, it will be seen that my correspondents and I have observed more than

two-thirds of the Rhopalocera of the United Kingdom within its limits; and when we include other butterflies known to inhabit the county, or observed in the past, the proportion becomes even more remarkable. In the woods that border on Northamptonshire, where also *Cyclopides palæmon* still exists, I have found *Leptidia sinapis* in plenty, and Mr. Kenneth Raynor includes it in his list of captures at Tingewick, on the Oxfordshire border (Ent. Record, vol. xxii. p. 45). I have alluded to the former occurrence of *Melitæa athalia*; and if *Euvanessa antiopa* is to maintain rank as native of Britain, it is reported from Gerrard's Cross ('Entomologist,' vol. xxxiv. p. 293). A hundred years ago Lewin recorded *Lycæna arion* at Cliveden; Black Park, Stoke Poges, now partly golf links, was a popular locality for *Limenitis sibylla*. In his day the Rev. H. Harpur Crewe watched *Apatura iris* soaring above the oaks of Claydon, and there is no reason why it should not fly there still. But *arion* is no more than a legend and, with the Bucks. *sibylla*, has long since passed to the Elysian Fields. Let us hope that the opening up of the Chiltern hills will not compel the disappearance of other and more authentic indigenous species to the same delectable meadows!

Harrow Weald, Middlesex: March, 1915.

NEW SPECIES OF NOCTUIDÆ FROM FORMOSA.

By A. E. WILEMAN, F.E.S.

Polia rantaizanensis, sp. n.

♀. Head and thorax grey-brown, mixed with darker; abdomen paler grey-brown. Fore wings grey-brown, freckled with darker; subbasal line pale inwardly edged with black, not extended below median nervure; antemedial line pale, outwardly edged with black, wavy, indented above median nervure and again before dorsum; a black bar from lower end of subbasal line to the antemedial line, and a black mark on dorsal area before the antemedial line; orbicular and reniform stigmata pale grey-brown, the former outlined in black, the latter outlined in whitish and edged with black; a black cloud between the stigmata; claviform stigma outlined in black; post-medial line pale, serrated, inwardly edged with black; veins 2-4 dotted with whitish just beyond the postmedial; three whitish dots on the costa beyond the postmedial; subterminal line pale, indistinct towards costa where it is inwardly edged with black, wavy towards dorsum; terminal lunules black; fringes grey-brown mixed with paler, browner at base. Hind wings pale brown suffused with fuscous; fringes grey-brown, paler at tips, browner at base. Under side whitish suffused with fuscous; all the wings have a blackish discoidal dot and a postmedial line.

Expanse, 46 millim.

Collection number, 1502.

Three females from Rantaizan, May, 1909. There are specimens in the British Museum, also from Rantaizan (Wileman). The whitish dots on veins 2-4 of fore wings are absent in some specimens.

Allied to *P. pannosa*, Moore.

Xylomania (?) *confusa*, sp. n.

♂. Head and thorax pale brown mixed with darker, antennæ fasciculate; abdomen pale brown. Fore wings pale brown, costa marked with darker and with black; antemedial shade blackish, indistinct, marked with black; postmedial line blackish inwardly oblique, elbowed beyond end of cell; orbicular of the ground colour outlined in black; reniform outlined in black, enclosing an interrupted white crescent and central dot, set in a blackish patch; apical area clouded with blackish and obliquely marked with whitish brown; some black streaks between the veins connected with black lunules on termen; fringes pale brown chequered with darker. Hind wings whitish clouded with dark greyish on terminal area, veins brownish, discoidal spot black; terminal line black, interrupted; fringes white, dark grey towards tips. Under side whitish; fore wings clouded with brownish on apical area, discoidal spot and short interrupted line beyond black; hind wings have black discoidal spot and transverse series of dots beyond.

♀. Similar to male, but the medial area of the fore wings clouded with blackish.

Expanse, 27 millim. ♂; 29 millim. ♀.

Collection number, 1838.

One example of each sex from Arizan, March, 1908.

Cirphis arizanensis, sp. n.

Head and thorax pale brown, the latter slightly pink tinged; abdomen paler brown, dorsal tuft darker brown. Fore wings pale brown with slight pink tinge, shaded with darker under median nervure and along vein 5; a white dot at the lower angle of cell, median nervure marked with white; subterminal line represented by linear black marks on the veins. Hind wings dark fuscous, fringes whitish brown. Under side fuscous, hind wings rather paler and with traces of dusky discoidal mark and postmedial line.

Expanse, 38 millim.

Collection number, 1837.

A male specimen from Arizan, June, 1908.

Cucullia (?) *taiwana*, sp. n.

Fore wings brown, suffused with darker and faintly tinged with reddish and powdered with white; venation marked with black, black streaks, marked with white, between the veins on terminal area; five white dots on the costa towards apex; orbicular and reniform stigma partly outlined in white; terminal line black; fringes grey, ochreous at base, chequered with white at ends of the veins.

Hind wings whitish banded with dusky beyond the black discoidal lunule, terminal line black; fringes grey, ochreous at base, whitish at tips. Under side whitish powdered with greyish brown on margins, transversely clouded with blackish beyond the middle on fore wings; a black discoidal lunule and dusky line beyond on hind wings.

Expanse, 37 millim.

Collection number, 1835.

A male specimen and two females from Arizan, March, 1908.

Elusa rufescens, sp. n.

♂. Antennæ contorted before middle, bipectinated beyond. Fore wings brown tinged with rufous especially on the medial area; antemedial and postmedial lines black, the first excurved below median nervure and angled before the dorsum, the latter wavy; reniform stigma outlined in ochreous representing the figure 8, preceded by an ochreous dot; subterminal line pale, a few black scales along its inner edge, almost straight from costa before apex to the dorsum; terminal line black, interrupted; fringes brown. Hind wings fuscous brown, terminal line pale; fringes pale, darker at base. Under side of fore wings pale brown on basal two thirds, tinged with rufous on costal area, suffused with fuscous on terminal third; postmedial line blackish, diffuse about middle: of hind wings pale brown, tinged with fuscous; discoidal lunule, and curved series of marks on the veins beyond, blackish.

♀. Similar but fore wings clouded with blackish on the disc and the markings are indistinct; the rufous tint is confined to a streak along the dorsal area.

Expanse, 21 millim. ♂; 23 millim. ♀.

Collection number, 545.

One male specimen and two females from Kanshirei. The male taken August 18th, 1905, and the females, August 29th, 1907, and March 5th, 1909.

Athetis confusa, sp. n.

♀. Fore wings brownish white, dusted with brown; antemedial line brown, almost straight; medial shade brown, indented about middle; a dark dot in the cell and a rather larger and darker dot at outer end of the cell; postmedial line brown, wavy, excurved round cell, incurved below cell, very indistinct; subterminal line brown, undulated, indistinct; line on termen pale brown, dotted with black, fringes of the ground colour. Hind wings brownish white, suffused with fuscous, discoidal dot blackish, terminal line as on the fore wings. Under side whitish brown, discoidal dot on hind wings black; all the wings have a blackish postmedial line, that on the fore wings only distinct towards the costa.

Expanse, 27 millim.

Collection number, 966.

A female specimen from Kanshirei, July 23rd, 1906.

Stictoptera (?) intermixta, sp. n.

Head and thorax dark brown mixed with reddish brown and paler; abdomen grey-brown, dorsal tuft darker. Fore wings reddish brown clouded and suffused with darker; the terminal half of the wing, except beyond the subterminal line and below vein 2, is whitish clouded with reddish brown; basal area outwardly limited by a curved white band traversed by a slender, wavy, black line; the veins on this area are black; antemedial line black, wavy; two black lines not extending to the dorsum beyond the antemedial; postmedial line black, wavy, double, originating in a black mark on the costa; subterminal line blackish, black on the costa, preceded by blackish clouds towards the dorsum; terminal lunules black; fringes dark grey brown, tips marked with paler between veins. Hind wings termen bluntly angled below apex; fuscous brown with traces of darker discoidal lunule and three transverse lines beyond. Under side dark fuscous, costa of fore wings marked with white beyond middle; two darker transverse lines on the hind wings.

Expanse, 42 millim.

Collection number, 1683.

A male from Arizan, May, 1908.

Eublemma terminimaculata, sp. n.

♂. Head chocolate brown, antennæ brown with paired bristles; thorax whitish, whiter in front; abdomen pale brown, whitish at base. Fore wings grey sprinkled with brown, faintly pink tinged; antemedial line faintly indicated by black points; postmedial line brownish, excurved round cell, incurved below cell, angled before dorsum, traces of a somewhat similar line just beyond; subterminal line represented by an irregular series of black chevrons; terminal line and fringes brown, the latter whitish at base. Hind wings whitish grey, brown sprinkled; traces of irregular black-sprinkled brownish lines beyond the middle; terminal line and fringes as on the fore wings. Under side fuscous, powdered with darker; dorsal area of fore wings paler; traces of dark medial band in the hind wings.

Expanse, 22 millim.

Collection number, 1041.

A male specimen from Kanshirei, April 21st, 1906.

Near *E. poliochroa*, Hampson.

Eublemma albipuncta, sp. n.

♀. Fore wings ochreous brown powdered with darker brown; a dark brown patch at base of the costa, outwardly edged with black; a dark edged white mark at outer end of the cell, apical half of costa dotted with ochreous; antemedial line black, highly sinuous; postmedial line black, wavy and outwardly oblique, preceded on the costa by a brownish spot; subterminal line dusky, indistinct; terminal line black, interrupted; fringes ochreous brown chequered with darker. Hind wings whitish, suffused with fuscous, except fringes. Under side of fore wings fuscous, costa dotted with ochreous towards apex;

of hind wings whitish suffused with fuscous, powdered with brown on the costal area, discoidal dot blackish.

Expanse, 18 millim.

Collection number, 1038.

Two females from Kanshirei, April 19th, 1906, and April 9th, 1908.

Seems to come nearest to *E. brunnea*, Hampson.

(To be continued.)

THE REARING OF LARVÆ.

BY C. RIPPON, M.A., F.E.S.

(Continued from p. 116.)

CAGES.

FOR the successful rearing of larvæ, especially when fairly large batches are being dealt with, nothing is more important than to provide accommodation suitable to their particular habits. I should not like to say that it would be impossible to construct a cage with such internal arrangements that it could be adapted for larvæ of every different sort of habit, but I have never yet seen one; besides, it would probably be such a costly article as to be out of the reach of the ordinary entomologist. If we consider for a moment the different habits of larvæ, it is easy to realize why they require different sorts of houses in confinement. Larvæ which feed by day on bushes and trees want plenty of light and cages which are high in proportion to their length and breadth, while larvæ which feed by night on low-growing vegetation do best in a dark cage which is quite shallow in proportion to its length and breadth. Then there are others whose habits are best served by the use of tall dark cages, and still others by shallow light cages. The sun-loving larvæ, too, want special provision, such as many of the Rhopalocera, several of the "Bombyces," the Cucullia, &c. For these a cage must be provided which, while admitting the sunlight freely, must not get unduly hot in the interior.

My attention was first drawn to the advantages of using different types of cages some years ago. At the time I was using, apart from sleeves, only one form for what I may call ordinary larvæ, which consisted of a fairly high superstructure of glass and perforated zinc imposed on a sort of wooden box. With this type of cage I bred many different species with considerable success, but failed unaccountably with others that were not supposed to be difficult; amongst my failures were certain low-feeding Noctuæ, with which a friend of mine had no difficulty at all, although he could not rear some tree-feeding Noctuæ, which I found most easy. I discovered that he used almost

exclusively shallow and rather dark receptacles only ventilated at the top. I experimented with a shallow box, and thereafter found little difficulty in rearing such low-feeding Noctuæ. Then there are the night-feeding spring larvæ, which hide during the day but feed on the foliage of bushes and trees after dark. For these a fairly dark upright cage with plenty of sand and moss at the bottom is the best possible treatment. My friend, Mr. G. B. Coney, has devised an ingenious way of treating a wooden lard-tub so that it forms an ideal house for rearing such larvæ, and also for hybernating certain kinds of Noctuæ and Geometers.

It comes to this that anyone who desires to breed a large number of different species successfully should possess a great variety of cages, so that he can choose the one most suitable to the habits and food-plant of the species to be dealt with. There are, of course, many excellent cages—from the glass-topped metal-box to the glass cylinder type—sold by the various dealers, which are useful for the larvæ of many species; but to get the necessary variety it is almost essential to have also a number home-made. As already mentioned, flower-pots and small wooden tubs are most useful, jam-jars and cake-tins are not to be despised, and box-cages of all sorts and descriptions can easily be constructed by anyone who can handle a saw and a hammer, for the refinements of the carpenter or the cabinet-maker are quite unnecessary for the construction of efficient larva cages. A flat wooden box some six inches or eight inches in depth will make a splendid home for many of the low-feeding Noctuæ, if some perforated zinc is let into two of the sides and a lid of the same material is also provided. My own favourite cage for bush and tree feeding larvæ is of my own design, and consists of three parts: a plain box without a lid for the bottom; on this is imposed a framework of wood with two sides fitted with glass and two with perforated zinc, with a lid of the latter.

In referring to these home-made cages, I do not in the least wish to depreciate the value of the cages sold by the dealers; for instance, glass-topped metal boxes are practically indispensable; but most of us entomologists are not millionaires, and therefore we cannot afford to buy more than a few cages, however good they are. And my point is that a breeder requires to have a large assortment ready to hand to be really successful. Another question to consider in relation to cages is the most suitable size. This, of course, depends on the number to be placed in each cage. Quite early in my experience of larva rearing I noticed the curious fact that with many species, whether I started with three hundred young larvæ or only sixty, if I kept them together throughout, the number which pupated was generally about the same—somewhere between thirty and fifty. I tried, therefore, dividing the larger batches into two or more colonies according to their number, and I soon found that

I got my thirty to fifty pupæ from each colony; so that in the case of, say, three hundred young larvæ, by dividing them into five or six separate batches, I got nearly five or six times the number of pupæ I obtained by keeping them all together, even when I used an unusually large cage. Here again, however, it is impossible to lay down any law applicable to all cases; one species may be fed up in batches of seventy so easily that ninety per cent. will pupate, while with another species the batches must not exceed ten to twenty to obtain the best results. All this points to the fact that it is better to have a large number of small to medium-sized cages than a few very big ones. At the same time, there should of course be some large cages for dealing with really large larvæ, and other cages so constructed that they will take a good-sized flower-pot for those species which require to be fed or hibernated on the growing plant. I might here point out that, apart from cannibalism, larvæ of different species should on no account be kept in the same cage, if it can be avoided. Not only are the pupæ results almost invariably poor, but it also militates against the breeder obtaining any useful information about the habits and the special treatment of the different kinds.

I am fully aware that after a beating expedition a collector often obtains a miscellaneous assortment of odd larvæ which he has not the time or space to deal with separately. In such a case the larvæ should be carefully gone through and separated into three, four, or more batches, only putting together those which appear likely to have the same habits. I have still to refer to one of the most useful methods of treating tree and bush feeding larvæ, especially in their intermediate stages—and that is the sleeve. It requires, however, to be used with considerable caution when employed out of doors, unless the user is prepared entirely to cover in the trees and bushes with small-meshed netting. All sorts of birds make sad havoc with sleeves, particularly if they are made of muslin; tiffany is better and stronger, but even with that the larvæ are not quite safe; and if by chance they are left out until one or two begin to spin up in the folds of the sleeve, the likelihood of a bird raid will be greatly increased. Double sleeving is a greater protection, but does not add to the health of the larvæ in wet weather. I do not by these remarks mean to suggest that sleeving is to be avoided. Anyone who has a suitable garden would be foolish not to employ outdoor sleeving to some extent, for it is about the only way to treat certain species successfully. I only wish to emphasize the fact that it is not safe to sleeve a batch of larvæ in the open and leave them without any attention or protection till the foliage in the sleeve is consumed. They should frequently be inspected and watched, and should promptly be removed to a suitable cage as soon as they appear to be ap-

proaching the full-fed stage. Indoor sleeving is a most successful method of treating almost any larvæ—whose food-plant will allow of it—between the period when they get too big for a glass-topped metal box and their last instar. It is hardly necessary to add that larvæ which spin webs are not suited to this treatment. When I refer to indoor sleeving, I mean the simple process of cutting a small branch of the food-plant so that it has a fairly long stem; then sleeving the larvæ on the branch as if it were still on the tree, and placing the stem in a bottle or vase of water indoors. The reason I have described this method is that, though I have used it myself very largely for years, I have never yet met an entomologist to whom it was not a new idea; yet it seems to me a very obvious treatment and extremely useful, especially when away from home. The sort of sleeves I use for this purpose are fine muslin bags made in a variety of sizes, and so rounded that there are no corners.

(To be continued.)

NOTES AND OBSERVATIONS.

EUCHLOË CARDAMINES AT REST.—Near Oxshott on May 15th last I noticed a male specimen of the orange-tip (*E. cardamines*) at rest, late in the afternoon, on the top of an unfurled frond of bracken. Apparently it had taken up its position there for the night. On the swollen knob at the apex of the frond it was remarkably well protected by assimilation to it in colouring and mottling. Some years ago I came across a parallel instance.—W. J. LUCAS; Kingston-on-Thames.

DEILEPHILA LIVORNICA IN DEVON.—Mr. A. O. Rowden, F.E.S., of Exeter, wrote to me on May 11th last, saying:—"I had a specimen of the striped hawk-moth (*D. livornica*) brought to me on Saturday last (May 8th). It came to light in a house at Pinhoe, near Exeter, on the evening of May 7th. Unfortunately in capturing it my friend considerably damaged it as a specimen, but I have set what remains of it as well as I was able."—W. J. LUCAS; Kingston-on-Thames.

DWARF PYRAMEIS ATALANTA.—With reference to the small-sized *Pyrameis atalanta* recorded (*antea*, p. 124) by Mr. E. Rex. Phillips, it may perhaps be of interest to note that I have a specimen which, set in the usual style, measures exactly one and three-quarter inches in expanse. It was taken at Tunbridge Wells in the autumn of 1914 by Mr. W. J. Pitt-Pitts.—E. D. MORGAN; 24, Queen's Road, Tunbridge Wells, Kent.

PYRAMEIS ATALANTA IN MARCH.—At noon on March 7th last, the day being brilliant and unusually warm, I saw, and for about ten minutes observed close by me, a magnificent specimen of *Pyrameis atalanta*. The condition of the insect was so superb that it was difficult to believe it could have hibernated. I should add (1) that

the locality was an open space here in Exeter known as Bury Meadow, and (2) that I am induced by a well-known lepidopterist to send you this record.—H. MAXWELL PRIDEAUX; 20, Pennsylvania Road, Exeter, May 16th, 1915.

RECENT LITERATURE.

A REVISION OF SOME SPECIES OF EUCHLOË.

A Preliminary Account of the Lepidopterous Fauna of Guelt-es-Stel, Central Algeria. By WALTER ROTHSCHILD, Ph.D., F.R.S.

IN the 'Novitates Zoologicae' (vol. xxi. pp. 299-357), October, 1914, there is an extremely interesting paper summing up the results of Lord Rothschild's investigation of the Central Algerian Lepidoptera. To collectors of palæartic insects, however, it has a wider interest than faunistic, for incidentally the author clears up a number of obscure points in the nomenclature of the genus *Euchloë*, and for the first time arranges and classifies the spring and summer emergences of the many forms hitherto included under the typical *Euchloë (Anthocharis) belia*, Cram. Lord Rothschild now proves that Cramer assigned without authority the name *belia* to the green and white Anthocharid of the South of Europe, because the *Papilio belia* of Linnaeus is really the Algerian *E. eupheno*, L., also a common Provençal insect in its European form *E. euphenoides*. The name *belia* falls therefore, and *ausonia*, Hübn. (1803) = *simplonia*, Freyer (1827)—"the alpine single-brooded subspecies"—becomes the name-type.

Lord Rothschild, adopting the trinomial form of nomenclature of the 'List of British Birds,' and dropping the "var." altogether, then proceeds to arrange the species into two groups: the first, the single-brooded; the second, the double-brooded; the whole comprising twelve geographical races, and the respective spring and summer emergences, some of them named for the first time.

This classification I reproduce, so far as it relates to European forms, as I think it will be of special value to many of us who have taken the butterfly, or received it from collectors in its several European areas of distribution. I observe Lord Rothschild maintains the generic *Euchloë* throughout both for the "orange-tips" and the green and white Anthocharids of other systematists:—

Group i.

- (1) *Euchloë ausonia*, Hübn. Alps, and E. Pyrenees.
- (2) *Euchloë ausonia oberthüri*, Verity. Western Pyrenees.

Group ii.

- (3) *Euchloë ausonia cramerii*, Butl.
 gen. vern. *cramerii*, Butl.
 gen. æst. *alhambra*, Ribbe. } Spain (and N. Algeria).
- (4) *Euchloë ausonia esperi*, Kirby.
 gen. vern. *kirbyi*, Rothsch.
 gen. æst. *esperii*, Kirby. } C., and E. France.

- (5) *Euchloë ausonia matutia*, Turati.
 gen. vern. *matutia*, Turati. } Riviera to Genoa.
 gen. æst. *turatii*, Rothsch. }
- (6) *Euchloë ausonia romana*, Calberla.
 gen. vern. *romana*, Calberla. } Tuscany, and C. Italy.
 gen. æst. *romanides*, Verity. }
- (7) *Euchloë ausonia kruegeri*, Turati. }
 gen. vern. *kruegeri*, Turati. } Sicily.
 gen. æst. *trinacriæ*, Turati. }
- (8) Asia Minor.
- (9) *Euchloë ausonia græca*, Staud.
 gen. vern. *græca*, Staud. } Greece, and Euxine.
 gen. æst. *maxima*, Verity. }
- (10) Jerusalem (Palestine).
- (11) Egypt.
- (12) C., and S. Algeria.

Passing to the next species, hitherto known as *E. (A.) pechi*, Stgr., attention is drawn to the fact that Mr. Verity rightly associates this so-called species with *E. tagis*, of which it is the North African form. M. Oberthür, when he wrote the letterpress of the last magnificent fascicule (No. x.) of the 'Lépidoptérologie Comparée,' evidently had not before him the result of Victor Faroult's breeding experiments summarized by Lord Rothschild, which proves that the larvæ and pupæ differ not at all from those of typical *E. tagis*. Mr. Verity figured *pechi* ('Rhopal. Palæarctica,' pl. xxxvi. fig. 59) from a male, now in my own collection, taken by Miss Fountaine in company with Mrs. Nicholl at El Kantara in March, 1902 (cp. 'Entomologist,' xxxix. p. 87). She remarks that in the backward season of 1904 it did not put in an appearance until April 6th. Lord Rothschild further observes, to support the conclusion that *pechi* and *tagis* are forms of one species that, both in his own collection and in the British Museum, there are Spanish and Portuguese examples differing very little from true *pechi*.

Meanwhile, it is interesting to note that Lord Rothschild disagrees with M. Oberthür as to the specific identity of *Pieris (Pontia) raphani*, as might be expected, maintaining it, with the southern desert form *albidice*, Obthr., for the Algerian form of the familiar *P. daplidice*.

In conclusion, may I venture to ask our magazine contributors who record *Euchloë ausonia* and its forms to employ the nomenclature as tabulated. Errors corrected upon the unimpeachable evidence and solid reasoning which distinguish the work before us should not be repeated, even though they be the result of a century of misunderstanding. As a book of reference, Staudinger's 'Catalog' will continue to have its uses; but as time goes on, and specialists overhaul the various genera of Palæarctic Lepidoptera, it is seen that Staudinger's work teems with mistakes, sometimes due to sheer carelessness, not seldom to a lack of intelligent appreciation of the work of non-German scientists.

H. ROWLAND-BROWN.

Harrow Weald, Middlesex: April, 1915.

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JULY, 1915.

[No. 626

A SWARM OF BUTTERFLIES IN SARAWAK.

By J. C. MOULTON, F.E.S.

(Curator of the Sarawak Museum.)

ON January 10th a great flight of butterflies passed over the Museum grounds here in Kuching. I noticed several in the grounds between 1 and 2 p.m., but did not take particular notice of them until after 3 p.m., when I saw they were very much more numerous.

Seven individuals were caught; they proved to be *Cirrochroa emalea*, Guér (long known as *bajadeta*, Moore), a pretty chestnut-brown Nymphaline, on the wing not unlike our High Brown Fritillary in England. They all flew in the same direction, viz. to the west-north-west, keeping fairly low, *i. e.* low enough to be impeded by belts of trees, houses, &c.; at one spot I counted, roughly, one hundred and eighty pass over a fifty-yard stretch of path in four minutes—3.20 to 3.24 p.m. They began about 1 p.m. and lasted till 4 p.m.; with them was an occasional pair of *Euplœa diocletianus lowi*, and once I saw a male *Papilio memnon* flying among them in the same direction, but I doubt if either species belonged to the swarm. Like myself, I expect they were out to see what was up!

The prevailing wind was N.N.W., but only very slight; the afternoon rather cloudy; the day generally somewhat cool after rain in the night.

My clerk told me they were not nearly so numerous this time as on a former occasion which the late Mr. Shelford describes.* The interesting points about his record are: (i) that his swarm was noticed over exactly the same spot; (ii) within two days of the present record, *i. e.* on January 12th, not the 10th, but twelve years ago; (iii) it was the same species; (iv) flying in the same direction; and (v) Mr. Shelford notes that the north-east monsoon that year, October, 1902–January, 1903, had been particularly mild, only 39.45 inches of rain, instead of the average of 75.17 inches, having fallen.

This last year—1914—has been similarly a remarkably dry year, only 110.06 inches having been recorded instead of the average 160 inches; this low record is mainly due to the ex-

* Journ. No. 39, Str. Br., Roy. Asiat. Soc. 1903, pp. 203–204.

ceptionally mild weather of the north-east monsoon, for only 29.2 inches fell in the last four months of the year instead of the average 55.5—a good parallel to that recorded by Shelford.

The year 1913, on the other hand, in Sarawak was nearly a record *wet* one, no less than 220.17 inches falling in Kuching.

This is the first time I have witnessed one of these extraordinary flights, which I had always pictured as a steady stream of butterflies pursuing an even course high over head and out of reach of earthly obstacles. But to me there was something almost uncanny in the way every single individual seemed blindly intent on going west. I watched them flying low over the cemetery, then suddenly they would find themselves brought up short by a belt of jungle; through it they went, in and out of trees, then out again for a short spell of plain sailing across the open grounds round the Museum; then another obstacle met them in the rather higher ground of the Residency gardens. A little further on a row of Chinese houses puzzled them; several flew into the verandahs, but that extraordinary sense of direction led them on. Shelford rather aptly describes them as like a heavy shower of falling leaves on a gusty autumn day in England. I imagine I did not see them in anything like the same quantity as he did, although to me the numbers were certainly astonishing.

Shelford's account differs from mine in one or two points. Thus he writes: "A bright westerly (*sic*)* wind was blowing at the time, and the butterflies flew before it all over the town of Kuching towards Mt. Matang in a continuous flood for about fifteen minutes, whilst stragglers followed up in ever-decreasing numbers for the rest of the day."

He goes on to observe that "the swarm, or some part of it, arrived at Mt. Matang (ten miles west of Kuching) towards evening, and streamed up to the summit. At Sadong (twenty miles east of Kuching) the same phenomenon was witnessed at the same time on the same day as in Kuching, but whether this was a separate swarm or merely one of enormous size sweeping over the whole area between Sadong and Kuching it is impossible to say."

This suggestion of Shelford raises the question whether these swarms were strictly local, *i. e.* moving from one place in Sarawak to another not very distant, or did we observe a portion of a bigger "international" migration, say from Borneo to Singapore (five hundred miles due west of Sarawak)? I have no literature at my disposal to quote chapter and verse for instances of butterfly swarms seen at sea or migrating long distances; Darwin

* He must have meant to write *easterly*, as he goes on to state the butterflies flew *before* it from Kuching towards Matang, which lies due *west* of Kuching.

records "vast numbers of butterflies, in bands or flocks of countless myriads, extended as far as the eye could range," when he was in the 'Beagle' some miles off the mouth of the Plata. Then there is Lyell's well-known account of *Vanessa cardui*, of which he writes*: "A vast swarm of this species, forming a column from ten to fifteen feet broad, was in 1826 observed in Switzerland, in the Canton de Vaud; they traversed the country with great rapidity from north to south, all flying onwards in regular order, close together, and not turning from their course on the approach of other objects."

If our Sarawak swarms were migrating to the mainland, we may presume they would interbreed with their *emalea* cousins there. I should state, by the way, that the geographical distribution of *Cirrochroa emalea*, Guér. is South Tenasserim, Malay Peninsula, Nias Island, Sumatra, Java, and Borneo. In each of these countries slightly different forms are found, which some writers (Fruhstorfer in Seitz's 'Macro-Lepidoptera of the World' is the latest) name as distinct subspecies. That from Java (*bajadeta*, Moore), and that from Nias (*lapaona*, Kheil), appear to be well-separated geographical races, but the forms occurring in the Malay Peninsula, Sumatra, and Borneo are scarcely separable; and Fruhstorfer's subspecific distinctions seem to rest on very variable characters; the white discal fascia on the hind wing below, for instance, is very variable in a Sarawak series before me. If these migrating swarms are not strictly local, but wider migrations (and perhaps not infrequent) between the three countries—the Malay Peninsula, Sumatra, and Borneo—then we must look with more suspicion than ever on these particular subspecific distinctions.

It has long been noticed that the fauna of these three countries, for which I propose the collective name Neomalaya, has a remarkable number of species in common compared with the fauna of the neighbouring island of Java, which shows a closer relationship in some ways to the fauna of Eastern India than it does to these three much nearer Malayan countries. The explanation of this is that Java has been separated as an island for a very much longer period, while the other three countries have formed one continuous land-mass at a more recent period. But, on the other hand, each of these three countries has been separate for a sufficiently long period to develop quite a respectable endemic fauna for itself; so that it is a little difficult sometimes to account for the similarity of individuals in the three countries on the geological explanation alone. Especially is this the case when everything points to the species being peculiarly liable to develop local but constant variations. I suggest that migration plays a bigger part than we are apt to remember in

* 'Principles of Geology,' vol. ii. p. 381 (12th edition 1875).

the formation of faunistic characters (and in the concealment of those we should expect to find).

Shelford notes that on the following day "another flighting was noticed in Kuching, but the numbers were infinitesimal compared to those flying on the 12th, and they did not attract the attention of many observers." On the present occasion similar swarms were noticed on the two succeeding days, all wending their way on the same west-north-westerly direction. Shelford further notes that out of eighteen specimens captured on January 12th, 1903, thirteen were males and only five females. On the third day of flighting this year (January 12th, 1915), we caught between forty and fifty, and the sexes were almost evenly divided. At the moment of writing (twelve days after) the species has not been noticeable in Kuching until this afternoon, when my wife called my attention to their presence again. As before, they were flying in similar numbers in the same direction. Shelford, on the other hand, states that in 1903, "a month after the swarm was observed, this species is quite the most common met with in and around Kuching, but now nearly all the specimens captured are females." Two other very similar species are not uncommon in Sarawak—*C. tyche*, Feld., and *C. malaya*, Feld.—and in flight I doubt if the three species could be distinguished. Of the fifty specimens captured on this occasion all were *C. emalea* except two, one of which was a male *C. tyche*, the other a male *C. malaya*. Some authors have regarded this last species as a dry-season form of *emalea*, but collecting in Sarawak does not support this, and I think *malaya* is quite a good species. The presence of these two strangers may be due to the same reason which drew the *Euplœa* and myself, namely, Curiosity!

There are two more Cirrochroas in Sarawak—*C. satellitia*, Butl. and *C. orissa*, Feld.—but both are more distinct and could be recognised on the wing. I saw none of them in this swarm.

The local Chinese regard the swarms as an evil portent, and they say that sickness will fall upon the land this year. It is true that cholera was bad in Sarawak in 1903, the year of Shelford's swarm, but in 1902 it was infinitely worse.

January 25th.—Fine morning and slight wind from the north; the flights of *C. emalea* noted yesterday afternoon continue again to-day, beginning at 11 a.m., just as numerous as before, and flying now, as I write (2.25 p.m.), in the same west-north-westerly direction.

I have anxiously looked out for any signs of attacks by birds, but have failed to see any. To a sporting insect-eater this profusion of butterflies should be tempting, though I expect they would take some catching.

Sarawak: January 25th, 1915.

BUTTERFLIES OF THE OXFORDSHIRE CHILTERNs.

By THE REV. J. W. BUSSEY BELL, M.A.

I HAVE been much interested by Mr. H. Rowland-Brown's articles in the 'Entomologist' on the "Butterflies of the Bucks. Chilterns." For the past five and twenty years, during which, up to August last, I was Vicar of Pyrton in the close neighbourhood of the Oxfordshire Chilterns, I have collected and carefully listed the Macro-Lepidoptera within a radius of five miles of my Vicarage. My best hunting-grounds for butterflies have been the gullies of the hills not many miles removed from the Buckinghamshire border. It occurs to me therefore that my notes of captures may be of some interest.

G. rhamni.—Abundant both before and after hibernation. The food-plant of *Rhamnus catharticus* is common on the scrub-covered portions of the hills.

C. edusa.—A few isolated specimens observed nearly every season. It was fairly common in clover fields in 1892, and again in 1900, in both which years specimens of *ab. helice* were observed.

C. hyale.—Also occurred in the district in 1892. I did not myself procure it, but an old pupil, now Dr. Clare Wiggins, F.E.S., took six in the neighbourhood of Watlington. In 1900 it was far more common along the foothills than *edusa*, and I took as many specimens as I wanted with ease. In the following year I observed three on different occasions, and in 1902 a solitary one. All these were in or after the month of August. I never encountered a first brood specimen.

P. brassicae, *P. rapae*, and *P. napi*.—All common in the district.

E. cardamines.—Common in all favourable springs. I think I note a preponderance of females about the hills.

M. galatea.—Twenty years ago the metropolis of the species appeared to be situated in one hillside field near the top of Watlington Hill, where they are still to be found in plenty, but from there they have spread for a mile or more along the slopes on either side where I never used to meet with them in early collecting days in the neighbourhood.

P. egeria var. *egerides*.—Common on the edges of the hillside beech woods.

P. megera.—Quite scarce along the hills, rather more common a mile away on the plain, but nowhere abundant in the district.

H. semele.—Very scarce indeed. I have not seen one since 1898, and the only local specimen I possess was caught and given to me by Dr. Wiggins many years ago.

E. tithonus.—Abundant along the hedgerows at foot of hills.

A. hyperanthus.—Common at edge of woods on hills.

C. pamphilus.—About the commonest of our hill butterflies.

P. cardui.—A few hibernated specimens and also autumn brood encountered most seasons, but I have never known it abundant, nor have I ever found the larva, though I have searched for it.

P. atalanta.—Usually common in gardens in autumn, and I have not unfrequently come across spring immigrants.

V. io.—Formerly quite a scarce insect, but grown more common of late years, broods of larvæ being now not infrequent on nettle patches by field path from Watlington to Pyrton.

E. antiopa.—I had the luck to capture a specimen in perfect condition on a post sugared for moths in my garden at Pyrton Vicarage on August 19th, 1900. The specimen is now in the University Museum at Oxford. There were, I think, about a dozen recorded captures in England that year.

E. polychloros.—A brood of larvæ stripped the branch of a wych elm overhanging my garden at the Vicarage some ten or twelve years ago (I have not the exact date). I was unfortunately away from home when they descended, but luckily found half a dozen of the pupæ on the wall of a neighbouring shed in the garden, which produced fine specimens. Since then I have on several occasions at rare intervals seen isolated specimens on the wing about the hills.

A. urticæ.—Common everywhere.

P. c-album.—September 23rd, 1897, a solitary individual visited the Vicarage garden. Unfortunately it departed while I was fetching my net, but not before I had inspected it at close quarters, sunning itself on a flower. I could not be mistaken in my identification, as I am quite familiar with the insect, which is common about my boyhood's home in Worcestershire. The wild hop grows in the hedges hereabouts.

D. paphia.—Common in favourable seasons, but not every year, in a gully. This gully, the gently sloping sides of which are clothed with oak scrub, flanked at the top by beech wood, is the most prolific ground in the neighbourhood both for insects and flowers.

A. adippe.—Common in the above locality. Contrary to Mr. Rowland-Brown's experience I find it far more abundant than *A. aglaia*, which occurs but sparingly there and in neighbouring parts of the hills.

B. selene and *B. euphrosyne*.—Both fairly common at Greenfield and other gullies on the hills.

I have never met with or heard of *M. aurinia* or *M. athalia* in the district.

H. lucina.—Fairly common in gully between Shirburn Wood and Pyrton Hill and other similar localities.

I have never met with *Z. betula*. As regards *Z. quercus* in the district, I have been surprised at its absence from Greenfield Scrub, which much resembles localities in other parts of England where I have found it abundantly.

T. w-album.—Up to three years ago I used to find this butterfly regularly about the second week in July in abundance in a particular spot in Greenfield Scrub. Acres of ground there are covered with a jungle of rose bay, *E. angustifolium*. At this particular spot a few dwarf wych elms grew by the path, on which the larvæ undoubtedly fed, the imagos sunning themselves on the flowers of the *Epilobium*. Some three or four years ago some miscreant cut down the elms, and the butterflies seem to have totally disappeared. I have seen a stray specimen or two in Pyrton Vicarage garden, and heard of them at a

place near Tetsworth, about four miles off. But the butterfly is certainly extremely local in its occurrence about here.

C. rubi.—Common about the edges of the hill woods.

C. phlœas.—Generally common.

C. argiolus.—Fairly common in most springs about holly trees and in gardens, also a few specimens at bramble of the second brood; unusually abundant last year (1914).

C. minimus.—Common in Watlington Gully above the chalk-pit. A few met with in other hill localities.

P. corydon.—Met with in profusion every year in Watlington Gully, and other like places about hills.

P. bellargus.—My experience of this butterfly is remarkable. For years I searched for it in vain. At length, in 1899, in looking over a box of insects caught by a son of the late Mr. R. Peel (then living in the house on Pyrton Hill which I now inhabit), I saw three unmistakable specimens. Eagerly enquiring place of capture, the boy said, "Why! they are all over the hill." (That was late in August.) Needless to say I kept my eyes open on my way home, and, sure enough, there were several *adonis* (*bellargus*) on the wing. Next day I came with a net and captured half a dozen. I could have taken more, but, finding them already somewhat worn, left them in the hope of a brood in the following year. Now a point to note is that I was in the habit of crossing that particular hill at least once a week in the ordinary course of my parish work, and had the parents of this autumn brood been there in the spring I do not think I could have failed to notice them. It appeared to be a clear case of an autumn migration. Naturally in the following year, 1900, I was on the alert. The butterfly occurred in fair numbers, both spring and autumn broods, in that locality and others distant a mile away. After 1900 it disappeared, and has never, to my knowledge, appeared again. Why it failed to establish itself permanently is a mystery to me, as its food-plant, *Hippocrepis comosa*, is fairly common in the places where the butterfly was taken, and, as our hills are not grazed by sheep or cattle, there would be no risk of destruction of the brood from that cause.

P. icarus.—Common everywhere.

P. medon.—Fairly common all over the hills.

I have not met with *P. ægon* in the district.

H. malvæ, *N. tages*, *A. flava*, *A. sylvanus*.—Common in the gullies. (I have not detected *lineola*.)

A. comma.—Sparingly taken in Watlington and Pyrton gullies. Appears to be rather local.

Pyrton Hill, Watlington, Oxon: May, 1915.

NEW SPECIES OF NOCTUIDÆ FROM FORMOSA.

BY A. E. WILEMAN, F.E.S.

Corgatha tornalis, sp. n.

♂. Head, thorax and abdomen pale reddish brown, the latter marked with blackish except on basal segments. Fore wings pale reddish brown, costa blackish on basal two-thirds, a white dot on the

costa beyond the middle; traces of a black antemedial line, only distinct towards dorsum; a large blackish blotch on tornal end of terminal area; postmedial line blackish inwardly edging the tornal blotch, represented by black dots on the veins towards costa; sub-terminal line blackish, only distinct between veins 4 and 6; terminal line black, crenulate, preceded by black dots between the veins; fringes reddish brown, marked with black between the veins. Hind wings reddish brown, a blackish tornal patch; terminal dots black. Under side rather paler than the upper side; all the wings have a black discoidal dot and transverse line beyond; the terminal area of fore wings clouded with blackish.

♀. Similar but transverse lines on the fore wings more distinct, and there is a blackish lunule on these wings.

Expanse, 24 millim. ♂; 26 millim. ♀.

Collection number, 980.

One example of each sex from Kanshirei; the male taken in July, 1906, and the female in August, 1907.

Near *C. castanea*, Hampson.

Erastroides limbata, sp. n.

♀. Head and thorax dark brown; abdomen whitish, mid segments tinged with brown. Fore wings brown, powdered with darker, and clouded with blackish on basal three-fourths; terminal fourth whitish, transversely clouded with blackish; postmedial line black marked with pale brown, turned in under cell thence wavy to dorsum, limiting the paler terminal area; terminal line black, indistinct except towards apex where it unites with a black spot. Hind wings fuscous grey, fringes preceded by a pale line. Under side fuscous; apex of the fore wings black, intersected by the veins and limited by a diffuse whitish line.

Expanse, 19 millim.

Collection number, 1277.

A female specimen from Kanshirei, April 9th, 1908.

Lithacodia viriditincta, sp. n.

♀. Head whitish, thorax (rubbed) apparently greenish; abdomen whitish, segments barred with greenish grey. Fore wings whitish, suffused with green, a black mark at base of the costa; antemedial line black, not continued to dorsum, forming the inner boundary of a large quadrate black patch on the medial area; orbicular stigma of the ground colour, united with a similar spot on the costa and with another below the cell, all these spots enclosed in black patch; reniform stigma of the ground colour but not well defined; post-medial line black, wavy, only distinct from costa to vein 3; sub-terminal line black, originating in a conspicuous spot on the costa, thickened about middle; terminal line black, interrupted at ends of the veins; fringes grey, brownish at base, traversed by darker grey. Hind wings greyish suffused with brassy yellow on terminal two-thirds; two dusky wavy lines beyond the middle, the inner one most distinct; terminal line black, interrupted at the veins; fringes as on the fore wings but somewhat paler. Under side whitey brown; fore

wings clouded with fuscous; hind wings have a dark discoidal spot and transverse line beyond.

Expanse, 30 millim.

Collection number, 1834.

A female specimen from Arizan, June, 1908.

Allied to *L. aurata*, Moore.

Lithacodia taiwana, sp. n.

♂. Fore wings pale brown, powdered with darker brown thickly on basal half and terminal fourth; costa marked with whitish brown; antemedial line dark brown, sinuous, indistinct; two pale-edged dark dots at outer end of the cell; postmedial line dark brown, outwardly pale edged, wavy, curved round cell, indistinct; terminal line black, dotted with pale brown at ends of the veins; fringes dark brown, paler mixed. Hind wings dark fuscous, terminal line pale brown; fringes greyish, darker at base. Under side of fore wings pale brown suffused with fuscous on the disc; of hind wings whitish brown, powdered with darker brown chiefly on the costal area.

♀. Fore wings less thickly powdered with dark brown; transverse lines more clearly defined, the antemedial inwardly pale edged; a dusky wavy line before the postmedial line.

Expanse, 19 millim. ♂; 23 millim. ♀

Collection number, 1030.

A male specimen from Kanshirei, June 10th, 1906. The female type, with two other specimens, all from Kanshirei (Wileman), is in the British Museum.

Bryophila (?) nigrescens, sp. n.

♀. Head and thorax blackish mixed with whitish; abdomen fuscous grey. Fore wings blackish, finely powdered with whitish especially on the terminal area; white dot on the costa towards apex; antemedial and postmedial lines black, wavy; the postmedial is interrupted and excurved beyond the cell; reniform stigma outlined by white dots; subterminal line represented by black dots, terminal dots black; fringes white mixed with dark grey. Hind wings blackish. Under side of fore wings brownish suffused with fuscous and clouded with blackish on terminal area; of hind wings whitish, sprinkled and suffused with fuscous; traces of a dusky transverse line beyond the middle.

Expanse, 28 millim.

Collection number, 1839.

A female from Rantaizan, May, 1909.

Chytonix costimacula, sp. n.

Head pale grey, collar dark brown; thorax and abdomen pale grey, the latter with a brown mixed dorsal tuft and some brown hairs in the anal tuft. Fore wings whitish suffused with greyish, basal patch black, indented on outer edge, connected along dorsal area to the postmedial line; a black spot about middle of costa; postmedial line black, outwardly oblique but indistinct towards the costa, sharply

bent inwards below vein 2 thence straight to dorsum one-third from tornus; terminal area clouded with dark greyish except towards tornus; fringes dark greyish, paler marked at ends of veins. Hind wings fuscous grey, paler on the basal area; discoidal spot blackish; fringes pale grey traversed by a darker line. Under side whitish powdered and clouded with fuscous; all the wings have a blackish postmedial line preceded by a blackish spot; on the fore wings the spot is costal and on the hind wings discoidal.

Expanse, 26 millim.

Collection number, 1404.

A male specimen from Kanshirei, April 19th, 1908.

Chytonix melanoleuca, sp. n.

Head and thorax whitish marked with brown; abdomen whitish powdered with brown. Fore wings whitish finely sprinkled with brownish atoms; a dark spot at base of the costa; antemedial and postmedial lines black, the former nearly straight but indistinct near costa, the latter wavy and incurved above dorsum; medial line black, wavy; antemedial line followed by a dusky patch on the costa which joins with a similar patch on the dorsum before postmedial line; a small dusky cloud at outer end of cell, a similar cloud on costa before apex, and another dusky cloud on termen between veins 4-5; terminal line blackish, interrupted. Hind wings whitish, finely sprinkled with brown; discoidal spot and terminal line black, the latter interrupted. Under side whitish suffused with fuscous on the fore wings; all wings have a black discoidal spot and an interrupted terminal line.

Expanse, 35 millim.

Collection number, 1877.

A male specimen, in poor condition, from Rantaizan, May 17th, 1909.

Allied to *C. nigribasalis*, Hampson.

Earias punctaria, sp. n.

♂. Head and thorax green inclining to yellow in front; abdomen whitish. Fore wings green, costal area to postmedial line inclining to yellowish; a reddish dot in the cell and two others beyond it—one above the cell the other below the cell; a reddish brown spot at outer extremity of the cell; postmedial line dark green, turned in towards costa and angled towards dorsum; subterminal line dark green, indented above the middle; terminal line dark green; fringes green, tips brownish, entirely brownish at apex. Hind wings whitish, tinged with yellowish at apical end of the fringes. Under side whitish, fore wings green tinged and with traces of reddish brown spot at outer extremity of the cell.

Expanse, 26 millim.

Collection number, 968.

A male specimen from Kanshirei, April 27th, 1908.

Near *E. angulifera*, Walk.

Zethes nigrilineata, sp. n.

♂. Head and thorax reddish brown, dusted with darker; abdomen greyish brown. Fore wings reddish brown, sprinkled with darker; antemedial line black, twice angled towards the costa, excurved towards dorsum, inwardly whitish edged on costa; post-medial line black, double, inwardly oblique, angled below costa; a large creamy white spot and four white dots on the costa beyond the postmedial line, the fourth dot at apex; subterminal line black, slender and wavy below middle, incurved and thicker towards apex; terminal dots black. Hind wings rather paler, inclining to ochreous brown; antemedial line black, appearing to be a continuation of the postmedial of the fore wings; a pale edged wavy black line just beyond. Under side pale brown, the fore wing clouded with fuscous; all the wings have two blackish traverse lines beyond the middle.

Expanse, 26 millim.

Collection number, 991.

A male specimen from Kanshirei, April 16th, 1906.

There are two specimens, also from Kanshirei (Wileman), in the British Museum.

Allied to *Z. ornata*, Leech.

Zethes (?) parallela, sp. n.

♂. Head and thorax brown, pink tinged; abdomen whitish dusted with grey brown above, except at the base and the segmental divisions; antennæ minutely ciliated. Fore wings pale brown dusted with darker and tinged with pink; antemedial and post-medial lines whitish, outwardly edged with dark brown, oblique, parallel; medial line pale, edged with dark brown, slender, zigzag; terminal dots black. Hind wings pale brown dusted with darker and faintly pink tinged; two outwardly dark edged pale lines beyond the middle, the first inwardly oblique, the other somewhat wavy and indistinct towards the costa; terminal dots black. Under side whitish brown; hind wings rather paler, with traces of a dusky discoidal mark and a line beyond.

Expanse, 28 millim.

Collection number, 1414.

A male specimen from Kanshirei, May 18th, 1908.

Egnasia inconspicua, sp. n.

♂. Head and thorax dark brown; abdomen pale brown, heavily dusted with dark brown above. Fore wings pale brown, inclining to ochreous, dusted and clouded with dark brown; costa dark purplish brown; dotted with ochreous towards apex; antemedial and post-medial lines dark purplish brown, wavy, angled below costa; post-medial line, which is outwardly edged with whitish, approaching antemedial line on dorsum; a patch of pale scales on dorsal area between the ante- and postmedial lines; subterminal line indicated by white dots on the veins, only distinct on 6 and 7; terminal line dark purplish brown, crenulate; fringes ochreous brown. Hind wings pale brown inclining to ochreous, suffused and clouded with

darker brown; traces of a diffuse, dusky, antemedial line; post-medial line, which appears to be a continuation of that on fore wings, dark purplish brown outwardly edged with whitish; faint traces of an ochreous subterminal line, with blackish marks on it towards dorsum; terminal line and fringes as on fore wings. Under side of fore wings ochreous freckled with brown; discoidal lunule whitish partly edged with dark brown, a clear ochreous spot below it; antemedial line brown, curved, diffuse; postmedial line dark brown outwardly edged with whitish, angled below costa; sub-terminal line indicated by white points on the veins; hind wings paler, antemedial and postmedial lines as above, discoidal mark pale united with antemedial.

♀. Head and thorax darker than in the male. Fore wings heavily suffused with deep brown almost blackish, the transverse lines are similar to these characters in male, but the angle of post-medial is more acute, the subterminal is more distinct, the scales of the patch on dorsal area are bluish white, and there is an ochreous spot above the patch; discoidal mark represented by two whitish dots. Hind wings suffused with deep brown and dusted with bluish white; transverse lines as in the male, but subterminal more distinct. Under side suffused with brown, markings as in the male.

Expanse, 26 millim. ♂; 34 millim. ♀.

Collection number, 535.

One example of each sex from Kanshirei, the male captured on August 17th, 1905, and the female on April 26th, 1908.

Allied to *E. castanea*, Moore.

THE REARING OF LARVÆ.

By C. RIPPON, M.A., F.E.S.

(Continued from p. 150.)

SPACE.

WHEN a number of larvæ are being reared, the question of what space should be allowed them depends on such a number of conditions that it is very difficult to generalise. As a starting point, let us say that for average Noctuæ larvæ of the size of *N. brunnea*, *N. triangulum*, or *Aplecta nebulosa* not less than 25 to 30 cubic inches per larva should be allowed when in their last skins, *i.e.* a cage measuring 16×7×10 in. would accommodate about thirty-five larvæ. This, of course, refers to a cage of wood, metal, or glass, well ventilated on sides and top with perforated zinc or other similar material. More larvæ of the same size could with safety be put in a muslin sleeve of the same capacity. Of course, large species require a great deal more room; the bigger hawks should be given quite sixty cubic inches per larva. Smaller larvæ, again, do not require anything

like so much space; indeed, I have bred through from ova to pupæ quite a number of the small Geometers in glass-topped metal boxes throughout. Only last year I was quite successful with a number of *Eulype hastata* larvæ so treated, about twelve to a $3\frac{1}{4}$ in. box. I do not suggest that that is the best sort of house for larvæ so large, but simply quote it to show what can be done in that direction. As already mentioned, it is most difficult to generalise as to space; the individual habits of larvæ of different species make so much difference. Gregarious larvæ, for instance, such as *Malacosoma neustria*, require little space—at any rate, until they separate. Also *Lymantria monacha* and *Dasychira pudibunda* and some others stand a great deal of crowding without hurt; whereas, on the other hand, soft fleshy larvæ, and particularly any species which tend to cannibalism, require a lot of room. Larvæ which are found in nature much separated, such as one to a plant, should be treated liberally in the matter of space; while larvæ which are found several together will generally stand more crowding. In dealing with larvæ whose habits are unknown it is always best to give as much room as can possibly be managed.

PUPATING MATERIAL.

The choice and condition of the pupating material most suitable to the species being bred is a matter of considerable importance. I have known some quite experienced entomologists who acted on the principle that ordinary garden mould was all that was required for any larvæ which went underground for pupation, and then complained that certain species were very difficult to get to pupate. Now garden mould varies enormously; mould from one garden might be nearly all clay, while that from another not half a mile away would be nearly all sand. Apart from that, however, some larvæ require quite a special type of material, while the majority do best in a light, fibrous, sandy sort, more analogous to pure leaf mould, and very different to the ordinary soil in any garden. Then, again, for convenience in manipulation the material should have nothing in it which could be mistaken for a cocoon, *i. e.* no lumps, stones, &c.; it should also be easily able to be moistened to any degree required, and, most important of all, should be free from any insect pests. Coconut fibre is an almost ideal substance in certain ways, especially when it can be used without treatment; but the worst of it is that it is liable to be infested with insect pests, and if raised to a high temperature to kill these it becomes tindery and is then apt to be very dusty when dry, and sloppy and unpleasant when moistened. Well-matured, soft, brown peat rubbed up fine, passed through a sieve, and mixed with a little fine silver sand, makes a compost that will suit quite nine-

tenths of burying larvæ. It can also be moistened easily, and to almost any degree, without becoming lumpy or sloppy. This moistening is a very important matter with many species; some larvæ, indeed, seem quite unable to go down in anything at all dry, simply crawling about and rolling on it till they shrivel up and die. For most species it is best to moisten the compost just enough so that when lightly pressed down a pencil can be pushed into it and withdrawn without the hole immediately filling up.

There are, of course, species which require the compost to be much wetter, such as *Noctua stigmatica*. The larva of this moth does not pupate for a long time after going down; and during this period the compost in which it has buried requires to be kept quite wet, otherwise the larva is liable to shrivel up and die. Then there are other species with which dryness seems necessary for real success, as with some of the *Cucullia*. It was a long time before I found out how it was that in breeding *C. lychnitis* I got such a small proportion of pupæ in comparison with the number of larvæ which went down. Thinking the matter out I realised that one of my best places for finding *lychnitis* larvæ in nature was a spot where at that time of year there was nothing but the driest of material to pupate in. I therefore decided to try these larvæ with something absolutely dry, and, as anything peaty would be dusty in that condition, I gave the next batch of *lychnitis* pure dry silver sand with admirable results, and have had no difficulty since in getting the larvæ to pupate.

Of course, there are other materials preferred by different species; I have known *Dasypolia templi* to pupate in a sloppy mess of chewed carrot, while others seem sometimes to prefer their own frass. Then there are the seashore larvæ that should be given sea-sand. In that connection I may mention what I believe to be a rather important point with reference to those larvæ which bury in a dry substance like sand, and make no appreciable cocoon, and that is, that the receptacle in which they have gone down should on no account be subsequently jarred or shaken. Once when on a visit to a friend who lived close to the sea, and was generally a successful breeder, he enlarged on how difficult he found it to breed *Agrotis ripæ*, and said that he had come to the conclusion that they went very deep for pupation. On that account he had tried drain-pipes full of sea-sand, but even they did not seem to be deep enough. Judging from where he kept his larvæ, I thought it possible that the real reason of his non-success was that his receptacles got jarred, so that the larva, not making anything more than a sort of pocket to rest in, was smothered by the sand falling in on it, when in its almost helpless state of resting prior to pupation. I therefore collected some *ripæ* larvæ, filled a large biscuit tin with

sea-sand, and when I got home (near the centre of England) I gave the larvæ about 8 in. of sand in an old lard bucket, and when they were finishing feeding placed it where it would not be moved or shaken. The next summer I bred quite a nice little lot of *ripæ*, and further found that some of the pupæ were not more than two or three inches below the surface. Of course my success in this instance may have been due to some other cause, and, not living near the sea, I have not had much opportunity of experimenting frequently with seashore larvæ; but judging from experiences with other larvæ of similar habits, I think the success was largely attributable to the absence of shaking.

While speaking of receptacles for pupating, it may be mentioned that, though metal may be used, those constructed of rough wood are infinitely preferable, except for wood-eating larvæ and one or two species who seem to like stone or earthenware to pupate on. The size and depth of the receptacles are again dependent largely on the species to be treated. About three or four inches deep are sufficient for the majority of burying larvæ, but for some of the large hawks and certain fastidious things such as *Apocheima hispidaria*, the compost should be much deeper. I lost a nice lot of the last-named once through giving them too shallow a pan and allowing too many to pupate in it. I believe only about ten to fifteen per cent. of the larvæ succeeded in turning properly into pupæ. As to size of receptacle, it is far better to have a number fairly small, and let only a few larvæ go down in each than one large one, and expect a lot of larvæ to go down in it. One reason is that generally the majority of a batch of larvæ unaccountably prefer one end or corner of a pupating box; consequently, if a large number are allowed to pupate in the same box, however large it may be, those which descend last will disturb those already down, with bad results as to the number of pupæ obtained.

For larvæ which spin up on the surface of the ground there is nothing to equal natural moss (sterilized) pressed down gently on to the surface of a layer of the peaty compost already described. For those which spin up in dead leaves it is obvious what should be supplied, while larvæ which spin above ground usually do not require anything special, but will make their cocoons on the food-plant or cage. With such species as *Arctia caja*, however, it is advisable to give a handful or two of wood-wool, so that the majority may spin up in that instead of making a general mess of the top and sides of the cage. The *Dicranura* require the bark of the trees they feed on to make the best job of their cocoons, but ornamental cork is not a bad substitute, while the wood feeders, one or two species of *Acronycta*, and a few others demand special treatment, such as hollow sticks, rotten wood, and the like.

TEMPERATURE AND QUICKNESS OF DEVELOPMENT.

All breeders of Lepidoptera naturally aim not only at obtaining a high proportion of imagines to the number of larvæ, but also at obtaining fine richly coloured specimens. No doubt a large variety of factors conduce to the production of such imagines, but one of the greatest is, I believe, quickness of development in the larval stage. Of course, the average life of larvæ of different species varies enormously, some taking years to come to maturity and others weeks only; so that in speaking of quickness of development I only mean it to refer to the usual length of life of the larva under consideration. Suppose, for example, we have a larva whose average life is three months; it will usually produce a far finer imago, if it comes to maturity in ten weeks, than if it drags on for three and a half months. Other things being equal, the quicker, within certain limits, larvæ can be fed up without interfering materially with their cycles, the larger will be the proportion to pupate and the finer the resulting imagines. This I have found to be particularly the case with larvæ that feed up in the spring or early summer.

Now, if there is one thing that has more influence than another on quickness of development it is temperature. I do not mean by that that the greater the heat the better will be the results. The temperature wants to be consistent with that prevailing under the best conditions at the time of year when the larvæ naturally feed; and, above all, it should be regular. I have frequently obtained quite remarkable results by feeding up certain spring larvæ in a temperature of fifty-five to sixty degrees kept up regularly day and night in April and May. This sort of treatment has one disadvantage, and that is that the imagines may appear two or three weeks or more before their proper time; but against this can be set very many advantages. The larvæ seem very much less liable to ailments: they feed heartily and steadily, there is practically no loss in changing skins or pupation, and the imagines are large and handsome. I have found this use of a steady, fairly warm temperature of the greatest help in rearing larvæ hatched in the spring from ova which were laid the previous summer or autumn, and have by its means bred without any difficulty several species which pass the winter as ova and are considered difficult, if not impossible, to get through successfully in confinement.

Perhaps this effect of a regular temperature is one of the chief reasons why some species vary so enormously in their abundance in different years. If the temperature during the months the larvæ are feeding is unusually warm and steady for that period of the year, then the next emergence of the species will be unusually abundant. It will be noticed that I refer to the temperature being warm, not hot. Great heat and drought

have quite a contrary effect; the larvæ may feed up very quickly, but the imagines are frequently small and stunted. This may very likely be due to the fact that great heat dries up foliage and makes it much less succulent, besides making it more difficult for the larvæ to eat, so that the latter cannot consume enough to keep pace with their rate of development; and what they do consume has very little moisture in it—a commodity most essential to a larva's well-being.

HYBERNATING LARVÆ.

The successful hybernation of larvæ is, in my opinion, the most difficult part of larva rearing, and there are comparatively few species that a breeder can bring through the winter, unless he has the use of a garden of fairly large dimensions. The majority of hybernating larvæ require to be on or near their food-plant to live through the winter, and there is little doubt that many larvæ feed far more during hybernation than many persons suppose. Low-feeding larvæ may be successfully treated in a cage in which is placed a flower-pot planted with what they feed on. I would, however, suggest that whatever the plant may be that the larvæ fancy, a little grass should also be put in the pot, for I have found that quite a number of species which never touch grass at other times will frequently nibble it during the winter months.

Tree- and bush-feeding larvæ are best hybernated in sleeves on their special food-plant. The best position to place the larvæ in for the winter is not necessarily the warmest corner of the garden. In fact, if the cages are protected from rain and the sleeves from birds, the colder the position the better, provided it is not too exposed to north and east winds. In hybernation, like everything else, however, the special habits of the species being dealt with must be considered. I would add one point, and that is, that if the cages are entirely protected from rain, the flower-pots inside should be regularly watered, and that it is well to introduce into the cages something besides the food-plant for the larvæ to rest on. Of course, there are some larvæ that eat nothing during their hybernation, and can be kept through the winter in any suitable cage or box in which is placed a little sterilized moss or wood-wool.

(To be continued.)

NOTES AND OBSERVATIONS.

VANESSA ANTIOPA IN KENT.—While fishing for trout on a stream here about a week ago I saw and captured a specimen of *Vanessa antiopa*. It was a hybernated specimen, of course, and was considerably damaged. I have never seen a specimen of this butterfly

in England. Perhaps you would let me hear if other specimens have been taken this spring. Instead of being a rich cream colour as with Continental specimens I have taken, the edging of the wings was a greyish white. This is usual with the English specimens, I believe?—W. H. SMITH; The Mill, Marden, Kent, Whit-Monday, 1915.

BUTTERFLIES OF THE STROUD DISTRICT.—With regard to Mr. Butler's observation on the butterflies of the Taunton district in the May 'Entomologist' (p. 123) I may say the record of the neighbourhood of Stroud within quite as restricted an area is superior, in fact amounts to forty-five species, *viz.* the whole list, including *V. antiopa*, given by him minus *T. betulae* and *L. ægon*, but plus *C. hyale*, *G. c-album*, *L. arion* and *H. comma*.—W. B. DAVIS; 3, Rosebank Villas, Churchfield Road, Stroud, Glos.

LEUCOPHASIA SINAPIS.—While collecting in Herefordshire at Whitsuntide, Mr. S. G. C. Russell and I each took a specimen of *L. sinapis* with light brown, instead of black, tips to fore wings. Is not this form very unusual?—F. PENNINGTON; Reform Club, S.W., June 9th, 1915.

SEMIOTHISA LITURATA (ab. NIGROFULVATA) IN WESTMORLAND.—I have to record the capture of a specimen of the above in a pine-wood near Kendal on June 20th, 1915.—FRANK LITTLEWOOD; 22, Highgate, Kendal.

DOUBLE COCOONS.—On p. 44 of the 'Entomologist' for February, 1915, Mr. Hayward invited information regarding instances in which two larvæ had formed a single cocoon in common. As I had an unusually large cocoon of *Dasychira pudibunda* remaining out of a large number, and as emergence was overdue, I cut it open to-day and discovered an empty pupa case and a dead female moth and a living pupa of another female within the cocoon, which had no partition.—H. M. PARISH; Cross Oak Road, Berkhamsted, Herts., May 5th, 1915.

DREPANA CULTRARIA.—I first noticed this moth flying about, high up, on the sunny border of a beech wood near Tring Station on May 8th, and captured three specimens which descended. On the succeeding days I found this moth abundant in a beech wood here, flying about close to the ground, rarely out of reach, at midday, when there was sunshine, until the cold, wet weather set in on the 13th. Since then I have only seen three. Among many captured, not one was of the female sex. I did not see this species at all last year.—H. M. PARISH, May 25th, 1915.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—Wednesday, February 3rd, 1915.—The Hon. N. Charles Rothschild, M.A., F.L.S., F.Z.S., President, in the chair.—Mr. Adam Charles Smith, of Horton, Mornington Road, Woodford Green, was elected a Fellow of the Society.—

The President announced that he had appointed Mr. G. T. Bethune-Baker, Mr. E. Ernest Green, and Dr. G. B. Longstaff to act as Vice-Presidents for the current session.—Mr. E. B. Ashby exhibited some Ruraliids from Southern Europe, including specimens from Digne, Le Vernet, and La Granja—Mr. E. E. Green, specimens of the giant glow-worm of Ceylon (*Lamprophorus tenebrosus*), and its male—a large firefly.—Dr. H. Eltringham, an instrument made to his instructions by the Cambridge Scientific Instrument Company for cutting paraffin blocks perfectly square preparatory to placing them on the microtome.—Mr. Lupton communicated notes on the life-history of *Agrotis lucerneae* at Torquay.—Prof. Poulton exhibited specimens of the Australian Buprestid “fire-beetle,” *Merimna atrata*, Lap. & Gory, and read notes; also the Australian Buprestid beetles *Stigmodera conspicillata*, White, and *S. cyanura*, Hope, and proved them to be female and male of the same species—*S. conspicillata*. Prof. Poulton said that he had recently received notes upon the habits of the African ant *Megaponera foetens*, F., and its raids upon termites, from three different observers.—Mr. Talbot exhibited, on behalf of Mr. J. J. Joicey, a number of new forms of Lepidoptera from Biak, the largest of the Schouten Islands to the north of New Guinea.—The Hon. Walter Rothschild, F.R.S., exhibited a series of the four geographical races of *Cocytia durvillei*, Bois., and *Eucocytia meeki*, Rothschild & Jord.—The following paper was read: “New Butterflies and a Moth from Biak,” by J. J. Joicey, F.L.S., F.E.S., and A. Noakes, F.E.S.

Wednesday, March 3rd, 1915.—Mr. G. T. Bethune-Baker, F.L.S., F.Z.S., Vice-President, in the chair.—Prof. Wm. Blaxland Benham, M.A., D.Sc., University of Otago, Dunedin, New Zealand, was elected a Fellow of the Society.—Mr. P. A. Buxton exhibited a short series of *Brenthis pales* and *B. arsilache* from Lesjevoerk and Surendal, Central Norway, the former having been taken at an altitude of 3000 ft. to 4000 ft., the latter from 1000 ft. to 3000 ft.—Dr. Cockayne, (1) Gynandromorphous *Agriades coridon*, from Royston. August, 1914. (2) Gynandromorphous hybrid *harrisoni* (*Ithysia zonaria* male × *Lycia hirtaria* female), bred in April, 1912, by Mr. Worsley-Wood.—Mr. J. Platt Barrett, a series of *E. damone* from Mt. Etna, commenting on their lack of variation. Also a series of *E. cardamines* var. *turritis*, remarking on their small size.—Comm. Walker, on behalf of Mr. Adams, (a) A magnificent series of varieties of *Polygonia c-album*, including several strongly suffused examples, from the Forest of Dean. (b) Two specimens of *Araschnia levana*, gen. aest. *prorsa*, from the same locality, taken in 1914. (c) A gynandromorphous *Urbicola comma*, right side female, left side male, from Box Hill. (d) A very fine melanic aberration of *Dryas paphia* female, from S. Wales.—Mr. F. W. Edwards, two species of apterous Diptera, one belonging to the *Borboridae*, the other to the *Ephydriidae*, both collected in the Falkland Islands by Dr. Malcolm Cameron, Fleet Surgeon of H.M.S. ‘Cornwall,’ on December 7, the day before the naval battle. Both appeared to be new to science, and probably represented new genera.—Mr. L. W. Newman, a living pupa of *Pyrameis atalanta*, and read notes on the copulation of *P. atalanta*

in October, and the hibernating of the species in the pupal stage.—Prof. Poulton, a portion of a large family of *Acræa encedon*, L., bred at Durban from a known female parent by Mr. E. E. Platt. Prof. Poulton described the hibernation of vast numbers of *Musca corvina* in the cistern-loft of St. Helen's Cottage, St. Helen's, Isle of Wight.—The following paper was read as a basis for a discussion on mimicry: "The Mimetic Theory—'A Crucial Test,'" by Colonel N. Manders, F.Z.S., F.E.S. A most important reply was made by Mr. C. F. M. Swynnerton, which he has embodied in the following paper: "A Brief Preliminary Statement of a few of the Results of Five Years' Special Testing of the Theories of Mimicry." Several Fellows took part in the discussion.

Wednesday, March 17th, 1915.—The Hon. N. C. Rothschild, M.A., F.L.S., F.Z.S., President, in the chair.—Prof. Poulton, a female Asilid, *Promachus* sp., captured with its prey, a male *Delias descombesi*, Boisd., August 18th, 1914, at Takdah (5000 ft.), Sikkim, by Major T. D. Broughton. Prof. Poulton, the specimen of the African Hesperid butterfly *Platzia cerynica*, Hew., referred to in the following note written December 26th, 1914, by Dr. G. D. H. Carpenter, from Kakindu, about thirty miles west of the Victoria Nyanza and 500 ft. above it: "I send you a skipper of much interest. It came to light one night [December 23rd] about 9 p.m., and behaved much like a moth; the large white patch on the antenna was *extremely* conspicuous and really *glistened* in the light, almost as if it were phosphorescent." Prof. Poulton said that the species was usually diurnal.—Comm. J. J. Walker exhibited, on behalf of Mr. F. C. Woodforde, bred specimens of *Zonosoma pendularia*, L., var. *subroseata*, Woodforde, and var. *subochreata*, Woodforde, with the type-form of the species for comparison.—Mr. W. C. Crawley, drawings in various species of ants of two kinds of organs in the funiculi of antennæ. They are often, if not always, in the living insects filled with air, and may possibly be connected with the sense of hearing. He also exhibited several drawings of the genital armatures of male ants.—Mr. H. Willoughby Ellis, two teratological specimens of Coleoptera, viz. a male specimen of *Carabus nemoralis*, Mull., and a specimen of the dark variety of *Campylus linearis*, L.—Mr. Champion exhibited, on behalf of Mr. W. West, of Greenwich, specimens of *Bruchus chinensis*, L. (*pectinicornis*, L.), found in lentils in a London warehouse, also a male found at large at Dartford.—Dr. F. A. Dixey made a communication on the nuptial flight of butterflies.

Wednesday, April 7th, 1915.—Dr. G. B. Longstaff, M.A., M.D., Vice-President, in the chair.—At the unanimous request of the Council, the Chairman proposed that a letter should be written to the President, on behalf of the Society, offering condolences on the sudden death of his father, the late Lord Rothschild. The resolution was unanimously passed, the whole meeting rising in their places.—Mr. William Carr, B.Sc., Station Road, Bentham, Lancaster, and Dr. A. Eland Shaw, Samarai, British New Guinea, were elected Fellows of the Society.—The Rev. G. Wheeler exhibited a box of Algerian butterflies, of species treated of by Mons. Ch. Oberthür in the recently published Fascicule X. of his 'Lépidoptéro-

logie Comparée'; many of the species were exhibited for the first time in England.—Mr. O. E. Janson, a new species of *Caelorrhina* (family *Cetoniidae*), in which the cephalic male armature usual in this genus was entirely absent, and to which he had given the name *mutica*.—Mr. H. Willoughby Ellis, a British variety of the Pentatomid bug *Palomena prasina*, L., differing from the type in its larger size and dark olive colour. Taken on ivy at Torquay, May 25th, 1907.—Mr. E. B. Ashby, several species of North American Papilios.—Mr. H. St. J. Donisthorpe, a chart of the names applied to the genital armature of male ants, and read notes.—The Rev. F. D. Morice, a series of lantern-slides to show the structure of the male genital armature and the ventral segments adjoining it in various groups of Aculeate Hymenoptera.—The following paper was read: "Hymenopterous Parasites bred from the Pupæ of *Chortophila brassicæ*, Bouché, and *Acidia heraclei*, L.," by J. T. Wadsworth, Research Assistant, Dept. of Entomology, University of Manchester; communicated by Dr. A. D. Imms, D.Sc., B.A., F.L.S., F.E.S.—REV. G. WHEELER, *Hon. Sec.*

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*March 25th*, 1915.—The President in the chair.—The evening was specially devoted to an exhibition and discussion of *Aphantopus hyperanthus*, contributed to by Messrs. Frohawk, R. Adkin, Bright, B. Adkin, Edwards, Dennis, Turner, Curwen, Ashdown, Gibbs and Leeds; ab. *arete*, ab. *vidua*, ab. *ocellatus*, ab. *lancolata*, ab. *minor*, var. *bieti*, ab. *cæca*, ab. *obsoleta*, with numerous other forms, were shown.—Mr. Bright showed a fine *Argynnis aglaia* with numerous coalesced blotches of black, a *Polyommatus icarus* with extremely light ground on the under side, and a male *Agriades coridon* of the form *suavis*, in which red scaling was developed, adjoining the eye-spots of the hind wings upper side.

April 8th, 1915.—Mr. W. J. Kaye, F.E.S., in the chair.—Mr. Edwards, the seasonally dimorphic forms of *Papilio ajax* from North America.—Mr. Schmassman, specimens of *Papilio homerus* from Jamaica, with a female having male coloration, and the rare Pierid, *Hebomoia repstorffii*, from the Andamans.—Dr. Dixey, F.R.S., read a paper on "Seasonal Dimorphism," and gave many lantern and other illustrations with his remarks.

April 22nd, 1915.—Mr. A. E. Gibbs, F.L.S., F.E.S., Vice-President, in the chair.—Mr. T. B. Foster, of Addiscombe, was elected a member.—The evening was devoted to an exhibition of Orders other than Lepidoptera.—The Hon. Curator, Mr. West, exhibited eight drawers of the Society's reference collections which had recently been re-arranged, and included the drawer containing the Diptera given by Mr. H. W. Andrews.—Mr. West also exhibited four drawers of his own collection of Coleoptera, including British examples of *Calosoma sycophanta*, *Carabus auratus*; a series of *Micraspis 16-punctata*, *Dityseus circumcinctus*, females with smooth male-like clytra, and a series of forms of *Notiophilus 4-punctatus*.—Mr. Ashdown, a series of aberrations of the earwig *Forficula auricularia*, mostly with aberrant size and form of forceps.—Mr. W. J. Kaye, numerous large and conspicuous insects obtained by him in South America and

Trinidad, Coleoptera, Phasmids, a Mygale, *Cordiceps*, &c.—Mr. B. Adkin, examples of *Chermes pini*, the pine aphid, on Scots pine.—Mr. Main, an example of the Neuropteran *Nemoptera coa*, brought from Cintra by Mr. Bowman, and living larvæ of the firefly *Luciola italica*.—Mr. R. Adkin, the nests of wasps found rolled up in bales of tobacco from the Levant.—Mr. Platt Barrett, various conspicuous insects from Sicily and South Africa, mantis, ant-lion, locusts, &c.

May 13th.—Mr. A. E. Tonge, F.E.S., Vice-President, in the chair.—Mr. Leeds exhibited aberrations of *Polyommatus icarus*, including ab. *obsoleta*, an asymmetrical specimen near *obsoleta*, a chocolate banded under side, and a female streaked with blue; of *Agriades thetis*, including a female without orange in margin and bluish clouded, males with aberrant eye-spots below, &c.; of *A. coridon*, including dark suffused below, slaty suffused below, females with khaki streaks above, and ab. *semisyngrapha*; of *Cænonympha pamphilus*, including dark suffused below, and an under side with additional spotting; of *Pararge ægeria*, the British form *egerides*, and Cornish forms much like the S. European form *ægeria*; of *Pieris brassica*, a female with a pale blue tinge throughout.—Mr. Adkin, a short series of the hybrid *Biston hirtaria* ♂ × *Nyssia lapponaria* ♀, and gave notes on the mixture of the two specific series of characteristics.—Mr. Moore, *Manduca atropos* from S. Africa.—Mr. Curwen, long series of *Polyommatus eros* and *Latiiorina orbitulus* from Saas Grund and the Grisons respectively.—Mr. B. S. Williams, larvæ of *Odezia atrata* on *Cytisus*, and a very varied series of *Xanthorhœ fluctuata*, with ab. *neapolisata* from Finchley.—Mr. Cowham, cases of the large Psychid *Oeketicus platensis*, examples of the Neotropical *Colias*, *C. lesbia*, a large and conspicuously marked "skipper" *Pyrrophypa* sp., and an Arctiid, *Epanthera* sp.—Mr. Barrett, a large number of Lepidoptera mainly from Sicily, and read notes on the variation; they included *Thais polyxena*, *Pontia daplidice*, *Anthocharis belia*, *Euchloë cardamines*, with their racial, seasonal, and aberrational forms.—Mr. Dennis, photographs of the ant *Formica pratensis*, a species closely allied to *F. rufa*.—Mr. Stallman, a *Tæniocampa gothica* female with right hind wing reproducing the markings of the fore wing on the upper side, from Holmwood.—Mr. B. Adkin, Lepidoptera from Loch Lomond, dark suffused *Brenthis selene* and *Diacrisia sannio*, a white suffused under side of *Cænonympha pamphilus*, &c.—Mr. A. Sich read a paper, "Notes on *Tortrix viridana*," on which a short discussion took place.

May 27th.—Mr. B. H. Smith, B.A., F.E.S., President, in the chair.—Mr. Sich exhibited ova of *Tortrix viridana* laid in pairs on the bark of an oak, and cases of *Solenobia*, presumably *S. lichenella*, from Barnes.—Mr. Moore, Lepidoptera from near Johannesburg, Transvaal, including *Hypolimnas misippus*, *Precis sesamus*, *Colias clecta* and var. *aurivillius* (comparable to *C. edusa* and var. *helice* of Europe), *Papilio demodocus*, *Pyrameis cardui* (the small Æthiopian race), *Hippotion celerio* and *Basiothia media*, a small green Sphingid.—Mr. B. S. Williams, larvæ of *Xylophasia scolopacina* from Finchley, and a series of *Tricopteryx (Lobophora) polyommata* from Yeovil.—

Mr. Lachlan Gibb, on behalf of Mr. H. M. Simms, a fine suffused aberration of *Pyrameis huntera* from near Montreal, an ab. *bellus* of *Bithys quereës* from near Barmouth, and an aberration of *Phaëtra (Acronieta) menyanthidis*, in which the orbicular stigmata were absent, from near Sheffield.—Mr. Priske, an example of the Tenebrionid Coleopteron, *Morica planata*, from Gibraltar.—Mr. Bunnett read a short paper, "The Maple Aphis," illustrated with drawings and lantern slides.—HY. J. TURNER, *Hon. Rep. Sec.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—*March 15th, 1915.*—Dr. J. Cotton, Vice-President, in the chair.—Dr. A. Randell Jackson, M.D., M.Sc., Westcote, Hoole Road, Chester, was elected a member of the Society.—Mr. Leonard West, M.I.M.E., read a paper entitled "A short Account of Some Neuroptera." The paper was fully illustrated by lantern slides of the principal species of the various orders; these were treated in a way specially designed to enlist the interest of the young entomologist, the metamorphoses and general economy of the Stone-flies, May-flies, and Caddis-flies being ably described by the author. At the close of the paper Mr. West also showed a number of beautiful slides of river scenery as examples of the breeding-places of the insects, and as showing the loveliness of the country the student would become familiar with in pursuit of these comparatively little-known creatures.—WM. MANSBRIDGE, *Hon. Sec.*

THE MANCHESTER ENTOMOLOGICAL SOCIETY.—*April 7th, 1915.*—The Secretary showed, for Mr. J. Ray Hardy, the two Longicorns *Dendrobium* and *Acanthinodera*.—Mr. Watson's "Notes on Parnassias" was an interesting account of an interesting genus. He dealt at length with the geographical distribution of the various species and varieties, drawing attention to the fact that evidence would seem to indicate that these insects apparently prefer cold rather than warm regions. His paper was illustrated with numerous and beautiful specimens—J. E. COPE, *Hon. Sec. (pro tem)*.

LONDON NATURAL HISTORY SOCIETY.—*February 2nd, 1915.*—Annual Exhibition.—Dr. Cockayne exhibited an extreme specimen of *Rumicia phleas* ab. *cleus* from Berkhamsted, 1911 (a very hot season); a specimen of *Agriades coridon* ab. *semisyngrapha*, Tutt, from Royston, showing additional blue scales on inner margin of left fore wing (a gynandromorph); also a photograph of the specimen in which the gynandromorphic characters were clearly shown.—Mr. C. P. Pickett, long series of *Agriades coridon* from Royston, the result of four years' collecting, including males and females with under side markings, obsolete ab. *inequalis*, Tutt, and certain gynandromorphic females with one side smaller than the other, the small side having scattered blue scales; a specimen in which the male element was on the larger side, and a female unequal on the two sides, the lunules larger and brighter on the right side, which was also of the ab. *parisiensis* form beneath.—Mr. H. B. Williams, *Mimas tiliæ*, and some of its commoner aberrations, including ab. *centripuncta*, Clark, and a long series of

Amorpha populi, including two gynandromorphs bred from one brood in 1914; also a drawer of under side forms of *Polyommatus icarus*, including ab. *obsoleta*, Clark, ab. *antico-striata*, Tutt, and others.—Mr. H. W. Wood, *Larentia flavicinctata*, type from Rannoch, and a remarkable light race from Ireland; three yellow abs. of *Brephos parthenias* from Surrey; *Nonagria neurica* and its abs. *fusca* and *rufescens* from East Sussex; *Acidalia immorata*, bred as a third brood from Lewes, October, 1913; *Sterrrha contiguaria* and a melanic form, and a drawer of *Mellinea ocellaris* and all its known British varietal forms, including abs. *lineago* Gn. and *intermedia*; also the allied species *fulvago*, L., *gilvago*, Esp., and *gilvago* ab. *suffusa*; also drawings by Mr. Backlade of the differentiated parts of the genitalia (penis with cornuti) of the allied species *ocellaris*, *gilvago*, and *fulvago*.—Mr. J. Riches, a series of *Abraxas grossulariata* bred from wild North London larvæ from 1905 to 1913, including abs. *nigrosparsata* and *deleta* (*lacticolor*), and one approaching *varleyata*; also, on behalf of Mr. Dewey, of Eastbourne, three *Chelonia caja*, with yellowish-orange hind wings, and two *Arctia villica* with confluent markings, all bred in 1914; and nine *Brenthis euphrosyne* with confluent markings, taken in Abbots Wood in 1913 and 1914.—Mr. G. T. Porritt, *Abraxas grossulariata* ab. *nigrocostata* (a magnificent form), and five extreme ab. *nigrosparsata*, bred from wild Huddersfield larvæ in 1914; also an extraordinary small second brood specimen bred from a wild larva.—Mr. L. W. Newman, series of *Callimorpha dominula* and its ab. *rossica* from Kent; of *Thecla pruni*, bred 1914, from Hants; and of *Pieris napi* from Ireland, including strongly-marked and yellow females (second brood).—Mr. A. W. Mera, series of *Canonympha davus* and *C. pamphilus*, the latter including a female with a patch of upper side coloration containing an eye-spot on the under side of the left hind wing; also the British Acidaliids, including melanic forms of *cambricata* and *incanaria*.—Mr. R. G. Benton, a specimen of *Crymodes exulis* ab. *assimilis*, taken at sugar at Braemar.—Mr. W. E. King, a long and varied series of *Hybernia defoliaria* from Epping Forest, including a fine melanic male.—Mr. V. E. Shaw, a series of *Cyaniris argiolus*, bred 1914, from Sandown (Isle of Wight) larvæ; a long series of *Eupithecia extensaria*, bred May, 1914, from Norfolk larvæ; and specimens of *Salebria semirubella* and its ab. *sanguinella*, from Dover, 1914.—Mr. H. T. Payne, two drawers of Leucaniids, including *Nonagria cannae*, *N. arundinis*, and ab. *fraterna*, *N. sparganii*, *Tapinostola bondii*, *Leucania vitellina*, and *L. brevilinea*.—Mr. A. W. Buckstone, a specimen of *Brenthis selene*, with black markings obsolescent, from Guildford; *Thecla quercus* ab. *bellus* from Oxshott; a specimen of *Euchelia jacobææ* with hind wings smoky black and transparent, from Oxshott; a fine obsolescent under side of *Polyommatus icarus* from Sevenoaks, and several smoky females of *Bupalus piniaria*, bred from Oxshott.

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[No. 627

THE BEE-GENUS *NOMIA* IN THE PHILIPPINE ISLANDS.

By T. D. A. COCKERELL.

A SERIES of *Nomia* from the Philippines, received from Professor C. F. Baker, greatly enlarges our knowledge of the genus as represented in that archipelago, and also makes it possible to correct some misconceptions. Some of the species had previously been examined by Dr. H. Friese, whose identifications were transmitted to me. Dr. Friese has very kindly permitted me to describe certain Philippine bees to which he had given manuscript names.

Nomia iridescens, Smith.

P. Princesa, Palawan (Baker 3847). This is a male, known from other Philippine species by the unarmed postscutellum, the brilliant green and purple abdominal bands, and the practically unmodified hind legs. The first five segments are banded, as in Singapore males.

Nomia thoracica, Smith.

Los Banos, Luzon (Baker 311). A female, determined as *thoracica* by Friese, but small for that species, and possibly representing a distinguishable insular race. This is doubtless the insect which Ashmead described as *stantoni*, from a male; it is perhaps to be called *N. thoracica stantoni*. The abdomen has four white tegumentary bands, and the thorax above is covered with dense fulvous moss-like pubescence.

Nomia incerta, Gribodo.

P. Princesa, Palawan (female, Baker 3849; male, Baker 3846); also from Los Banos, Luzon (female), and Tacloban, Leyte (male, Baker 3851, 3852). This is the species described by Ashmead as the male of *N. quadrifasciata* (Ashm.), but that name must be restricted to the supposed female, which is evidently a male of a different species, and is described first and more fully than the insect regarded as its male. Dr. Friese had identified it as *N. elliotii*, Smith, but it has no green band on the first abdominal segment in either sex, whereas this band is

present in *elliottii*. A female, compared with one of Smith's cotypes of *elliottii*, is somewhat smaller, and has the first two abdominal segments more shining and strongly punctured. The general structure and the colour of the bands (brilliant yellowish green shot with vermillion) are quite the same. Gribodo's description of *N. incerta*, from Java and the Sulu Islands, evidently applies to our species.

Nomia elongata, Friese.

Males; Los Banos, Luzon (Baker 6). Determined by Friese, who described the species from Java. This is close to the Australian *N. pseudoceratina*, Ckll. Smith described two species of the same type, with clavate abdomen, from the Malay region: *N. ceratina* from Sarawak, and *N. clavata* from Gilolo. Just at present I am not able to say how *N. elongata* can be distinguished from *ceratina* and *clavata*; they are at least very closely allied. *N. clavata* may perhaps be separated by the more highly-coloured tarsi.

Nomia elongatula, n. sp.

Males; Los Banos, Luzon (Baker 3850). A small species with clavate abdomen, like *N. elongata*, but smaller (length 6.5-7 mm.), with the stigma clearer red and the apex of wings less distinctly infuscated. The knees are bright ferruginous, and the flagellum is red beneath, these parts being only very obscurely reddish in *elongata*. The really decisive character, however, is found in the fifth ventral abdominal segment, which has a pair of bright red spots, each bearing a pair of black tubercles, the posterior of which is compound. *N. elongata* has not this character.

Nomia takauensis philippinensis, Friese, n. subsp.

Both sexes from Los Banos (Baker 312). *N. takauensis* was described from Formosa, only the male being known. The mesonotum in true *takauensis* has the hair almost felt-like; in the Philippine insect the hair is thin, exposing the finely punctured surface. The legs appear to be darker in the Philippine form. The female differs in the usual sexual characters; the first four abdominal segments have apical ochreous hair-bands, while the fifth is densely margined with soot-coloured hair. The head is broad, and the flagellum very short. Hair on outer side of hind tibiae white.

Nomia palavanica, n. sp.

♀. Length 7 mm. or slightly more; similar to *N. takauensis philippinensis*, but differing as follows: stigma much larger, pale amber, not dusky; head shorter, being transversely oval; apical half of mandibles red; mesothorax more closely punctured; hair on and about scutellum not bright fulvous; hind margins of abdominal segments castaneous, with weaker hair-bands, hair on apical margin of fifth wholly light; first abdominal segment not so broad; anterior and middle knees bright ferruginous. The stigma is larger and

yellower than that of *N. elongatula*, but I think the two species are allied, and the male of *N. palavanica* will be found to have a clavate abdomen.

The following key will facilitate the separation of the Philippine *Nomia* :—

- | | | | |
|--|-----------|--|----|
| Abdomen pale red (Sulu Islands) | | <i>dimidiata</i> , Vachal. | |
| Abdomen not red | | | 1. |
| 1. Antennæ and legs entirely dull ferruginous; female | | | |
| 12.5 mm. long (Palawan) | | <i>philippina</i> , Vachal. | |
| Antennæ and legs otherwise coloured | | | 2. |
| 2. Postscutellum bidentate or bispinose | | | 3. |
| Postscutellum unarmed | | | 4. |
| 3. Male with hind tibiæ, except a large black spot behind, | | | |
| and hind basitarsi, yellowish | | <i>quadrifasciata</i> (Ashm.). | |
| Male with hind tibiæ, except apical process, and hind | | | |
| basitarsi, black | | <i>incerta</i> , Grib. | |
| 4. Abdomen with tegumentary bands, but covered with hair | | | 5. |
| Abdomen with hair-bands, or, if these are weak, hind | | | |
| margins not white or green | | | 6. |
| 5. Abdominal bands white | | <i>thoracica stantoni</i> (Ashm.). | |
| Abdominal bands green and purple | | <i>iridescens</i> , Smith. | |
| 6. Abdomen clavate (males) | | | 7. |
| Abdomen not clavate | | | 8. |
| 7. Fifth ventral segment of abdomen with two red spots | | | |
| bearing black prominences | | <i>elongatula</i> , Ckll. | |
| Fifth ventral not thus; larger species | | <i>elongata</i> , Friese. | |
| 8. Head transversely oval; stigma pale amber | | <i>palavanica</i> , Ckll. | |
| Head longer; stigma smaller, dusky; abdomen not cla- | | | |
| vate in male | | <i>takauensis philippinensis</i> , Friese. | |

BRITISH NEUROPTERA IN 1914.

By W. J. LUCAS, B.A., F.E.S.

BESIDES a capture of the rarity *Drepanopteryx phalenoides*, Linn., but little of interest has come to my notice with regard to the Neuroptera in 1914. The first species seen was *Hemerobius stigma*, Steph., which was on the wing in the New Forest on March 2nd. On March 8th I took a dark specimen on the wing at Esher Common, Surrey; on March 15th it was fairly common there. This appears to be our earliest species, and it is usually possible to obtain it by beating the Scotch firs throughout the winter—at any rate in the south of England.

On the date last mentioned (March 15th) a visit was paid to Esher Common with Mr. C. B. Williams specially to search for larvæ and pupæ of *Raphidia*, and a fair number of both were obtained. They were met with chiefly in the layers of the bark of the decaying stumps of Scotch firs left in the ground when the

trees were cut down. All, I believe, were found near the periphery of the stumps, and were living apparently under quite damp conditions, which was scarcely the case where Mr. G. T. Lyle and myself found them in the New Forest in 1913 (*vide* Entom. vol. xlvii. p. 190). All appeared to be *R. maculicollis*, Steph.; some of the larvæ were quite small. During the search a number of *Campodea*, presumably *C. staphylinus*, were found. Mr. D. Sharp gave me a male *R. maculicollis*, taken in the New Forest in April.

Sialis lutaria, Linn., was first noticed on April 19th, near Brockenhurst, in the New Forest.

Hemerobius humuli, Linn., was taken on May 17th on the North Downs near the Silent Pool in Surrey; while *H. lutescens*, Fabr. (or possibly *H. humuli*), and *H. micans*, Oliv., were met with in the New Forest on August 19th.

Of the genus *Chrysopa*, *C. flava*, Scop., was taken at Littleworth Common, Surrey, on June 17th; *C. ventralis*, Curt., in the New Forest on May 30th and 31st; *C. prasina*, Ramb., in the New Forest on August 16th; *C. perla*, Linn., in the New Forest on May 31st and June 22nd, as well as on the North Downs in Surrey, near Albury, on June 27th; *C. vulgaris*, Sch., at Duck Hole Bog, in the New Forest, on September 2nd. Mr. Lyle sent me a living example of the last from the New Forest, swept from heather, on September 19th, when a good number were about. A damaged example of the genus from the New Forest in August appears to be *C. alba*, Linn. Mr. G. T. Porritt says that in some seasons *C. tenella*, Sch., is abundant in his garden, but in 1914 he saw two only, although constantly on the look-out for them.

Panorpa communis, Linn., was noticed in the New Forest—a male, July 4th–5th, a female on June 22nd.

On October 25th Mr. E. A. C. Stowell sent me a specimen of the scarce Neuropteran *Drepanopteryx phalenooides*, Linn. He found it sitting very quietly on the glass of a street lamp in the outskirts of Bexhill, between 10 o'clock and 10.30, about three-quarters of a mile from the sea on the road to Pevensey. There were some new houses near and a piece of waste ground covered with gorse, briars, small willows, &c.—a field abandoned for building purposes; the soil was clay. As Mr. Stowell did not recognise it at first, the night of capture was not noted; but it was in the last week of July or the first fortnight of August, during a "dead season" at the lamps, the summer things being over and the autumn ones not begun. Mr. Stowell says:—"The one who named it *Drepanopteryx phalenooides* hit it exactly. *Drepana* is the hook-tip genus of moths, and *phalenooides* means, I take it, 'moth-like.' It is *exactly* like *Drepana falcata*, and 'By the flickering moonbeam's misty light and the lantern dimly burning' I took it for that species. I soon found there

was something wrong; but I had never before seen a 'fly' with a moth-pattern on its wings. Previously I had looked upon Neuroptera with a sort of benevolent neutrality only. When alive, it sat with its wings like a very steep roof, after the manner of the caddis-flies." The insect was exhibited by me at the meeting of the Entomological Society on December 2nd, 1914, when Messrs. H. J. Turner and O. E. Janson told me that they each possessed a specimen; but that belonging to the former is without data, while Mr. Janson is not at the present time able to put his hand upon the latter.*

Writing the next day, Mr. E. A. Butler said:—"As far as I know, this is the second specimen from the Hastings district. The first was one that I took when a boy, somewhere about the



Drepanopteryx phalaenoides, Linn. ($\times 3$). W. J. Lucas photo.
(The head is a little damaged.)

late 'fifties' or early 'sixties' at Hastings. Of course I did not know what it was when I took it, and it was some years before I found out the name of it. About thirty years ago I shewed Mr. McLachlan all that was left of the specimen—the right fore wing—and he confirmed the identification of the insect. Even this relic seems to have now disappeared, as I cannot find it anywhere. I am sorry to be unable to give the exact date of the capture." In the Ent. Mo. Mag. vol. xxi. pp. 54 *et seq.* Mr. K. J. Morton has collected much information with regard to this insect and its occurrence in Britain.

Kingston-on-Thames, July, 1914.

* I hear now that this specimen of *D. phalaenoides*, believed to be unrecorded, was given by Mr. Janson to Mr. C. A. Briggs. It is labelled:—"From the cabinet of F. Walker, Lanarkshire." It is mounted on a rather heavy pin, and is in poor condition.

ADDITIONS TO THE LIST OF KENT APHIDIDÆ.

BY FRED. V. THEOBALD, M.A.

THE following aphides were found in Kent in 1914–1915, and are additions to the lists I have already published in this Journal. Besides those mentioned here, I have a handsome new species of *Macrosiphum* found swarming on red valerian (*Centhranthus ruber*) on the chalk cliffs at Margate and at Wye; a new *Macrosiphum* on red lamium (*Lamium purpureum*), and a new *Rhizobius* on the roots of spruce (*Picea sitchensis*).

Macrosiphum fragariæ, Koch.—This very fine green mealy species with black head, legs, and long thin outwardly curved cornicles, was found at Wye, June 30th, 1914, on leaves and stalks of the strawberry, and on the valerian (*Centhranthus ruber*); alate females were just appearing. They occurred in company with *Macrosiphum centhranthus*, nov. sp.

Macrosiphoniella chrysanthemi, Del Guercio.—Alate and apterous females in the end of September, and on to December both out of doors and under glass on cultivated chrysanthemums at Wye and Maidstone, doing a considerable amount of damage.

Aphis urticaria, Kaltenbach.—Abundant on nettles, Wye, June 7th, 1914, and June 21st, 1915, and swarming on wall pellitory (*Parietaria officinalis*) May to October, both apterous and alate females, somewhat smaller than those on the nettles in June and July, 1912–1914.

Aphis adjuncta, Walker.—Littlestone and on Romney Marsh, June 14th, 1914, on the flower heads of the hound's-tongue (*Cynoglossum officinale*); many apterous females. This marked, very small yellow species does not seem to have been recorded since it was described.

Aphis infuscata, Koch.—Romney Marsh, June 14th, 1914, on *Prunus spinosus*—alate and apterous females, curling up the small leaves, some of which were pale yellow and pink.

Aphis helichrysi, Kaltenbach.—Bearsted, June 13th, 1914, alate and apteræ swarming in the flower heads of the yarrow (*Achillea millefolium*).

Aphis anthrisci, Kaltenbach.—On flower stalks and blossoms of *Anthriscus*, sp., Wye, July 8th, 1914. This species was much attended by ants, which swarmed over the two colonies I found, and yet they did not appear to be producing much "honey dew."

Aphis sedi, Kaltenbach.—On the yellow sedum or wall pepper (*Sedum acre*) at Littlestone, June 14th, 1914, and Wye, July 17th, 1914; two alate females, and two apteræ. Apparently very rare in this district of England, as I have frequently searched for it and only managed to get three specimens at Littlestone and one at Wye last year.

Aphis chrysanthemi, Walker.—Clustering on the flower stalks

of the ox-eye daisy (*Chrysanthemum leucanthemum*) at Wye, July 4th, 1914, on the banks of the railway, and July 20th, 1914, on a cultivated species in my garden. In both cases alatae, nymphæ and apteræ in great numbers, and much deforming the cultivated plants.

Aphis scabiosæ, Kalténbach.—Two large colonies of this aphid were found on June 21st in King's Wood, near Wye. They consisted mainly of apteræ, but a few alate females. The colonies were not on the apex of the plants, as is usual, but half up the stems. I have not yet examined these insects microscopically, so cannot say for certain if they are the same as the *Aphis urticaria* of Kalténbach, but they have a strong general resemblance.

Aphis galii, Kalténbach.—On galium or maywort (*Galium cruciata*). Apteræ only at Wye, June 9th, 1914, and again in June, 1915, on the same plant in King's Wood, Wye.

Callipterus platani, Kalténbach.—This insect was described by Kalténbach as a *Lachnus*. I know of no records since the original description. I found it on the young sycamores in the small forest nursery of the Agricultural College at Wye on July 29th, 1914, and in much greater abundance on August 30th, 1914, when a few alatae were found. This insect was largely attended by the ant *Lasius fuliginosus*.

Chaitophorus betulæ, Buckton.—On birches at Cranbrook, July 3rd, 1914.

Pachypappa reaumuri, Kalténbach.—This very marked and apparently scarce insect, described by Kalténbach under the genus *Schizoneura*, occurred on lime trees (*Tilia*, spp.) at Bearsted in June, 1914 (*vide* 'Entomologist,' April and May, 1915).

Pemphigus piccæ, Hartig.—I find an old preparation of this species found at Wye in 1905 in my collection taken on the roots of spruce (*Picea excelsa*), and again in 1915 on the roots of the Sitka spruce in April. It seems also to attack the roots of various *Pinus*, and one specimen I have from the roots of *Larix* is so similar I feel they must be the same.

Prociphilus nidificus, Loew.—Forming very marked leaf gall tufts on the ash at Wye, July 7th, 1914. Some years ago a photograph of the "leaf-tufts" formed by this aphid were given me from a specimen taken at Wye. The only other British specimens I have seen were sent me by Dr. MacDougall from Scotland in 1914.

Prociphilus bumeliæ, Schrank.—I find I have some apteræ of this species taken on the leaf stalks of the ash as far back as 1908. I had previously taken this and the former species to be the same. They are quite distinct.

Lachnus fasciatus, Burmeister.—Common on the spruce (*Picea excelsa*) at Wye, May to July, 1904-1914; Tunbridge

Wells, June, 1914; Westwell, July 4th, 1914; Canterbury, June 14th, 1912.

Rhizobius pini, Burmeister.—A white aphid at the roots of various *Pinus* was found in 1914 and 1915 in March, and April and on into May, which comes very near Hartig's *Pemphigus piceæ*. I feel sure that this is *Rhizobius pini* of Burmeister, the antennæ being shorter than in *Pemphigus piceæ*, Hartig.

On spruce roots I have also found a bright green aphid covered with white wool, which is evidently an undescribed species of *Rhizobius*. It was doing considerable damage to some nursery plants at Wye during the winter 1914-1915, the ground, when the spruce were lifted, being quite white from the quantity of woolly substance they had secreted. This will shortly be described under the specific name *viridis*.

FOUR NEW ENCYRTIDS FROM SICILY AND THE PHILIPPINES.

BY A. A. GIRAULT.

1. *Paraleptomastix abnormis*, n. sp.

Female.—Length, 1.00 mm.

Differs from the description of the genotype in being like species of *Leptomastix*, except that the postmarginal vein is elongate, a third longer than the slender stigmal, and over thrice the length of the marginal, the latter barely twice longer than wide.

Golden yellow—often dusky yellow—marked with dusky black as follows: Distal half to two-thirds of the abdomen, bulb of scape, cephalic aspect of the last two pairs of coxæ; funicles 1 and 2, club, proximal two-thirds of pedicel above, a conspicuous streak along the dorsal scape for its entire length, dorso-lateral edge; and frequently the entire disk of pronotum and scutum. Rest of antennæ pallid dusky, the scape, abdomen, pedicel, pro- and mesopleurum silvery. Propodeum blackish except laterad of the spiracle. Venation dusky. Apex of caudal wing and a longitudinal oblique streak opposite the submarginal vein, dusky. Fore wing conspicuously trifasciate, the first cross-stripe smallest, incomplete, obliqued caudo-proximad from before the bend of the submarginal vein; the second is complete, broader caudad, from the postmarginal vein; the third is largest, across just before the apex, not very broad, divided at middle narrowly and obscurely by a less dusky streak. Pedicel somewhat longer than wide at apex, somewhat shorter than funicle 1, which is two and a-half times longer than wide; funicles 3 and following each being somewhat longer than 1. Club joints subequal to the pedicel. Head densely scaly punctate. Axillæ with a short carina between them. Scrobes distinct, not joined above. Dorsal thorax with a short silvery pubescence.

The male is about the same, but the third or distal stripe of the

fore wing may be nearly absent, usually distinct. The scape is more compressed, the pedicel barely longer than wide, the club solid, the flagellar joints (excluding the pedicel) all somewhat longer and with scattered, rather long hairs, the funicle joints shorter than the club.

Described from a series of specimens reared from *Pseudococcus citri*. Sicily. Calif. State Insectary. 700 xv. H. S. Smith.

Types.—Catalogue No. 19409, U.S.N.M.; a female and a male on slides; two paratype females on tags.

2. *Epidinocarsis pseudococi*, n. sp.

Female.—Length, 1.50 mm.

Dull orange-yellow, the wings hyaline and like *Blastothrix yuccæ*, Coquillett, but the apex of funicle 1 is white, and the head is entirely yellow except the occiput (vertex dusky in the other species); also over the distal half of the pedicel is white, funicle 6 is barely longer than wide (longer in *yuccæ*, where only the distal fourth of the pedicel is white); the funicle joints are all somewhat shorter, the stigmal vein is straighter, longer than the marginal, the postmarginal subobsolete (in *yuccæ* the stigmal vein is more curved, shorter, subequal to the marginal, the postmarginal distinct, acuminate, somewhat shorter than the stigmal); the hairless line in *yuccæ* is much less definitely limited. Also in *yuccæ* the axillæ are joined with a carina between them; here they are separated for some little distance (but may be occasionally as in *yuccæ*). Also in this species only the median line of the scutellum is black (all in *yuccæ* except lateral and apical margins). Scrobes distinct, rather long.

The male is smaller and all black, except base of scape and the legs (except coxæ). In the male the marginal vein is subquadrate, the head flatter, the antennæ 9-jointed, the scape's dilation not great, the pedicel globular; flagellum dusky white except pedicel; funicle 1 nearly thrice longer than wide, shorter than the club, the flagellum with rather thick, scraggly hairs. Axillæ joined.

Described from three males and eight females, reared from *Pseudococcus citri*. Sicily, 1913, H. J. Quayle.

Types.—Catalogue No. 19410, U.S.N.M.; four females on tags, a female and a male head on a slide. Four of the females are paratypes.

3. *Neanastatus orientalis*, n. sp.

Female.—Length, 3.00 mm. The head is lenticular in this genus.

Dark metallic purple, the fore wings deeply infuscated from a little beyond the base of the hairless line distad to apex (deepest under the stigmal and postmarginal veins). Abdomen with a yellowish-white cinctus at base. Head, pronotum except all margins narrowly, antennæ and legs (except the hind legs) golden yellow; proximal joint of hind tarsi white, rest black. Distal four tarsal joints of middle legs black. Mandibles tridentate. Funicle elongate, slender, over twice the length of the not long pedicel, narrowed at proximal third; funicle 2 somewhat shorter, four times longer than wide; 5 slightly longer than wide. Club subequal in length to

funicle 1. In my table to the Australian species runs to *maximicornis*, but differs in coloration. Body scaly. Hind tibial spur black.

From one female on a tag in U.S.N.M., labelled "Manila, P. I. Robt. Brown."

Type.—Catalogue No. 19411, U.S.N.M.; the above specimen plus a slide with the head, pair of wings, and hind tibiæ.

4. *Neanastatus philippinensis*, n. sp.

Female.—Differs from the preceding in having the body (excluding appendages) entirely dark purple, except the band about the abdomen and the following: The proximal two joints of the hind tarsi are white; all of middle tarsi are yellow, like the first two pairs of legs; the antennæ are purple, and the infuscation of the fore wing is more accented under the distal venation. Head scaly.

From one female taken with the preceding.

Type.—Catalogue No. 19412, U.S.N.M.; the fore-described female on a tag.

THE REARING OF LARVÆ.

BY C. RIPPON, M.A., F.E.S.

(Concluded from p. 169.)

QUITE a number of species which hibernate as larvæ in nature can be made in confinement to feed straight up, pupate and emerge about Christmas or early in the New Year. The two necessary factors are warmth and suitable food. Some larvæ, such as those of *Triphana fimbria*, will cheerfully accommodate themselves to cabbage leaves when the more usual food-plants are not obtainable; while potatoes, carrots, &c., are often useful as food substitutes during the cold weather. A suitable temperature is of course all-important, and it should on no account be allowed to drop very low even for a short period. One really cold night will start some larvæ hibernating, and nothing will then induce them to resume feeding. This forcing through of hibernating larvæ is only possible with certain species; others, whether kept warm or not, utterly refuse to go on feeding after a certain period of the autumn. With many hibernating larvæ it is not particularly difficult to bring them through the winter; but the problem is how to prevent them dying off when hibernation is over, which they often persist in doing, despite being supplied with the most tempting portions of their food-plant. When the latter is available sufficiently early, I have found that the best plan is to bring the larvæ into a warm, steady temperature about a month or more before they thoroughly wake up under natural conditions. I often begin to bring in hibernating larvæ in February with most excellent

results. This bringing in early applies equally well to some larvæ which hibernate full-fed, such as *Macrothylacia rubi*. I have certainly done best with that species when I have brought the larvæ into the warm in January. The reason why larvæ do better under this treatment may be that during the last few weeks of hibernation, under normal conditions, the warmer days wake the larvæ up, but before they get sufficiently wide-awake to feed properly, the cold night comes and makes them dormant again; this constant waking up without adequate feeding weakens them to such an extent that, when they do come properly out of hibernation, the usual drawbacks of rearing in confinement finish off all but the most robust. By bringing the larvæ in early and feeding in a steady warm (not hot) temperature, this weakening period is cut out and the larvæ are strong and healthy.

How soon it is desirable to bring the larvæ in (they should of course have at least two or three months of winter weather out of doors) depends largely on the food-plant. I have brought *Coremia quadrifasciaria* in as early as late January, but their food can be obtained at any time. To bring in larvæ only a week before they would thoroughly awake out of doors is an advantage, and this can often be easily managed even with larvæ which feed on trees or bushes. Suppose white thorn is the food-plant; then directly the buds swell and begin to show green, a small branch or two can be cut and placed in a vase of water in the warm. In a few days the foliage will be right out—perhaps ten days or a fortnight before it is out in nature. Some other deciduous trees and shrubs are amenable to the same treatment, and the breeder is thus enabled to bring in larvæ which feed on them ten days or more before they would out of doors be able to start feeding in earnest.

TREATMENT OF PUPÆ.

I have seen it stated in quite a number of works on the British Lepidoptera that the pupæ of burying larvæ should not be dug up, and that cocoons should not be interfered with. In the great majority of cases I would unhesitatingly advise the very opposite. In confinement many spinning larvæ will make their cocoons one on top of the other in such a way that if left in position the imagines could never get out of those at the bottom, while with those that bury I have already pointed out how one end or corner of the pupating box will be patronised by the majority of the larvæ. Then, again, despite the greatest care, insect pests may get established in the pupating material; and if the pupæ are left in it for months they may all be destroyed long before the perfect insects are ready to emerge. Another point about taking out the pupæ is that they are then much easier to handle and look after and to place, so that they

get the full benefit of the damp atmosphere which is so necessary to most species just before emergence. When in addition to this it is realized that the removal of the pupæ, if carefully done, does them no harm, and adds to the percentage of emergences, there seems no tangible reason left for leaving pupæ *in situ*.

I do not by all this mean that every cocoon should be opened and the pupa removed. As long as the cocoons are fairly substantial, there is no object to be gained by doing more than separating the cocoons one from the other, and removing the loose outer web if there is one. Indeed, from the difficulty of doing so without injury, it is unwise to attempt to remove pupæ from very tough cocoons, such as those made by the *Dicranura*. The old adage that the exception proves the rule was never better exemplified than in the treatment of Lepidoptera; and in connection with this question of the removal of pupæ or cocoons, there are some species whose pupæ *must* be left in the situation chosen by the larvæ. The species in which this is so necessary are generally those in which the pupa pushes itself partly out of its hiding-place just before the perfect insect is due to emerge, as, for example, in the *Sesias*. Then, again, many of the butterflies, and some species who spin above ground, require the pupæ to be suspended in some way, owing to the fact that their imagines prefer to hang from the pupa cases or cocoons while drying their wings. Care must be taken, in the removing of pupæ or burying larvæ and those which spin up on the surface of the ground, that they are properly formed and hard. Different species vary greatly in the time that elapses between going down and forming the pupa. With the generality of burying larvæ about a fortnight or three weeks is ample; but there are several species which rest as larvæ for a long time. The most notable of these are the *Xanthias* and *Xantholeuca croceago*, which do not change to pupæ till about a month before the imago is due to appear. To interfere with such species during the period of rest is generally fatal.

When dealing with larvæ whose period of rest is unknown, the receptacle in which they have gone down should be left untouched for a fortnight, then the compost in one corner should be gently removed till one of the insects is found; if it is a thoroughly hard pupa, the lot may be turned out with safety; if, on the other hand, it is still a larva, leave it, slightly exposed if possible, so that it can be inspected every few days. In this way the period of rest can be found out, and, at any rate, the breeder does not endanger the whole brood. The chief thing in keeping bare pupæ over any length of time is to prevent them coming into contact with anything that will block up their spiracles. They should never be allowed to lie on, or in, any dusty material such as dry earth. Bare pupæ and cocoons can

quite easily be kept during the winter piled into and shut up in chip or glass-topped boxes exposed to outdoor temperature.

About a month or more before the time arrives for the emergence of the perfect insect, the pupæ and cocoons should be spread out in shallow pans or boxes, the bare pupæ between two layers of sterilized moss, and placed in a cage or large well-ventilated box with rough sides and top. The atmosphere in this box should be kept decidedly damp, or many cripples will be bred, especially amongst the Geometers. The pupæ of many species do not all emerge the first year, a provision of Nature which has doubtless saved many an insect from extinction; but this class of pupæ does not seem to call for any special treatment, unless it be extra care in making sure a pupa is really dead before throwing it away.

IN CONCLUSION.

It will doubtless be noted that in the course of these jottings very little detailed description is given of such matters as exactly how to build a cage or how to obtain a desired condition—such, for instance, as the dampness in a pupa box. This sort of description has been purposely omitted, because its insertion would have unduly extended these notes, which are long enough already, and would have tended to distract the reader's attention from the main points, which are to reason out the why and wherefore of success and failure in the rearing of larvæ, and how the would-be successful breeder must vary the treatment according to the habits and peculiarities of the different species. There are several obvious ways of keeping pupæ in a damp atmosphere, and a description of exactly how I do it seems to me unnecessary. For somewhat the same reasons I have made no attempt to give the special treatment required for each individual species. A great deal of information on that subject can be got from many excellent works, such as Buckler's 'Larvæ,' Tutt's 'Practical Hints,' and that recently-published and useful 'Text Book' by L. W. Newman and H. A. Leeds.

Before concluding, however, it would perhaps be as well if I gave some indication of what I mean by such expressions as "considerable success," "excellent results," &c. To get through to the pupal state anything over sixty per cent. of larvæ bred from the egg I should consider a successful result; though I have got through eighty per cent. or more with smallish batches not exceeding one hundred, even with such things as *Catocala sponsa* and *C. lychnitis*. The latter, though, have generally been from small larvæ. The last time I bred them I got eighty-nine cocoons out of ninety-three larvæ, most of which were less than $\frac{1}{2}$ in. in length when collected. As to the emergence of imagines, I should consider it a bad result if less than seventy per cent. of the pupæ failed to produce perfect

specimens. To illustrate this, I may mention that some time ago I kept a careful record of all the winter pupæ I happened to have that year. In no less than six different species every pupa hatched, and in no case did less than eighty-four per cent. emerge. With one exception the percentage of perfect specimens varied between seventy-three and one hundred. The one exception was a batch of *Teniocampa miniosa*, in which, though 90 per cent. hatched, only 63 per cent. were perfect, there being an unusual number of cripples, owing chiefly to the fact that the imagines came out with a rush a little before I expected them, and disturbed each other through being in too small a box.

Finally, I would point out that in the rearing of larvæ more than in almost any other scientific investigation, it is dangerous to place too much reliance on single experiments. Under certain circumstances, and particularly in the case of small numbers—twenty or under—it is sometimes possible to get through a single batch of larvæ without any of the treatment that is otherwise found to be specially required by the species dealt with. Single experiments, of course, have their value, but it is only by repeatedly rearing the larvæ of the same species, or of those closely related, that it is possible to make dependable deductions as to what factors conduce to the greatest success. Some entomologists, indeed, seem to be much too easily satisfied, and are apt to say that a certain species is quite easy to breed because they have once got a few through, without considering either the size of the imagines or their number in proportion to the original number of larvæ. To start with, say, two hundred larvæ and only get about twenty somewhat undersized imagines I should consider a failure, and only useful as a help in indicating what sort of drastic alterations in treatment would be needed at the next attempt.

GARDEN NOTES.

BY CLAUDE MORLEY, F.Z.S.

(Continued from 1914, p. 218.)

8. *The Flight of an Homopteron*.—The only time I have seen *Acocephalus nervosus*, Schr., on the wing was August 14th, when one flew across the east lawn in a curve round a cypress tree, and then at a considerable pace, though not fast (for an insect), and in a straight line—resembling the flight of the *Aphodii*—for some twelve yards, at about four and a half feet above the ground. At the time the air was calm and warm, with an extremely slight southerly breeze. That the vision of this species is not very keen while on the wing may be conjectured from the

fact that its career ended with a dash into a spider's web upon a rose bush.

9. *A Parasitic (?) Ephydrid Fly*.—My attention was attracted by a small insect on a dead willow trunk, which was walking about fairly fast and poking its nose into borings of the beetle *Ptilinus pectinicornis* (probably now tenanted by the Aculeate, *Trypoxylon attenuatum*). Once after such investigation she reversed, poked her tail into the mouth of the horizontal hole, and jerked it two or three times as though ovipositing. She then passed on to other holes, occasionally stopping to sharply jerk up her closed wings together; a movement very different to the vibration of the Ortalidæ. That the interest in these holes was quite definite is evidenced by the direct manner in which she walked from one to another, as well as by the fact that I twice frightened her away, and she at once returned and settled with no hesitancy, before I secured her. All on a summer-like day, April 23rd. Mr. Collin says the species is *Discocerina plumosa*, Fln., and that it is uncommon; it had every appearance of a Eurytomid Chalcid in its manner of investigation.

10. *Food-plants of Weevils*.—A fact of interest to rose-growers was noted on June 8th. I discovered *Anthonomus rubi* with its proboscis deeply embedded in an unexpanded bud of a small "Hiawatha" rambler rose, upon which it was certainly feeding, and so destroying the flower. This beetle more generally frequents flowers than is usually supposed; here I took it sucking *Matricaria inodora* in the middle of last August. Mr. Jennings has recently (Ent. Mo. Mag. 1915, p. 168) discussed the food of *Liophlæus nubilus*, without referring to my direct evidence brought forward in the fourth of these Notes, where the "Ground Elder" is *Ægopodium podagraria*; I suspect that his specimens from umbellifers were simply sucking the stylopods.

The *Hilara* of the third note is *H. monedula*, a new species, which will be described in Collin's forthcoming volume upon the British Empidæ.

(To be continued.)

NEW SPECIES OF NOCTUIDÆ FROM FORMOSA.

By A. E. WILEMAN, F.E.S.

Hypætra bipartita, sp. n.

♀. Fore wings pale brown rufous tinged on basal two-thirds and greyish brown on terminal third; a black line or dot on costa near base; antemedial line indicated by three black spots, one on the costa and small linear below it, one below median nervure; post-medial line black, double, thickened on costa, sinuous; stigmata indistinct; the greyish terminal area inwardly limited by the post-

medial line is traversed by the black, undulated subterminal line; terminal dots black, fringes grey-brown. Hind wings greyish brown with traces of a dusky medial line and bands beyond. Under side fuscous; all wings have a dusky line beyond the middle.

Expanse, 48 millim.

Collection number, 939.

A female specimen from Kanshirei (1000 ft.), April 30th, 1908.

Near *H. noctuoides*, Guen.

Ogasa costimacula, sp. n.

♂. Head and thorax whitish brown, the latter freckled with darker brown; abdomen pale brown, edges of segments whitish. Fore wings whitish brown, sprinkled with darker brown; three black-brown spots on the costa, the first at base, the third about middle and somewhat triangular; five black dots on costa between third spot and the apex; antemedial and postmedial lines faintly indicated by blackish points; a black oblique streak from just above middle of postmedial line towards third costal spot; a large black-brown triangular patch, traversed by a pale brown curved line, on terminal area below apex; terminal dots black, white centred in triangular patch; fringes whitish brown freckled with darker, blackish brown at triangular patch. Hind wings whitish brown, suffused with fuscous chiefly on terminal area; traces of a dusky discoidal lunule and curved line beyond; fringes whitish brown. Under side of fore wings whitish brown, suffused on the disc with fuscous, and freckled with brown on the costal area; discoidal lunule and postmedial line blackish; fringes marked with blackish towards apex: of hind wings whitish brown, freckled with brown on costal area; discoidal dot and irregular dentate line beyond blackish; terminal line black, interrupted.

Expanse, 26 millim.

Collection number, 981.

A male specimen from Kanshirei, June 17th, 1906. A specimen also from Kanshirei (Wileman) is in the British Museum.

Near *O. retracta*, Hampson.

Avitta taiwana, sp. n.

♂. Head and thorax dark brown; abdomen pale brown, darker above. Fore wings dark brown tinged with violet-grey in certain lights; a black dot in the cell and one at the outer end of the cell; medial line black irregular, indistinct: postmedial line black, inwardly oblique except towards costa where it turns in; subterminal line black, undulated, preceded by a bluntly serrated line; fringes brown, ochreous at the base. Hind wings black-brown, fringes ochreous at base. Under side pale brown suffused with fuscous, chiefly on fore wings, all the wings have a dusky postmedial line and the hind wings a black discoidal lunule.

Expanse, 42 millim.

Collection number, 1896.

One example of each sex from Arizan (7300 ft.), March 3rd, 1908.

Allied to *A. puncta*, Wileman, from Japan.

Adrapsa angulata, sp. n.

♂. Head white, brownish in front; antennæ serrate, with paired bristles; thorax white, patagia tipped with ochreous brown; abdomen white, ochreous tinged, barred with brown above. Fore wings white finely, dusted with ochreous brown except on terminal area; sub-basal line brown, broad and straight; antemedial line brown, broad, expanding above and below median nervure, nearer subbasal on dorsum than on costa; postmedial line ochreous brown, excurved round cell, slightly angled before dorsum; discoidal lunule ochreous brown; subterminal line brown, broad, slightly angled below costa and more strongly below middle, patches of brown scales beyond each angle extending to termen; lower portion of area between post-medial and subterminal lines filled in with ochreous brown; terminal line pale ochreous brown, diffuse; fringes white, marked with black at ends of the veins. Hind wings white with thin transverse brown lines, the first line broad and almost straight, the second outwardly bent about middle, the third broad and outwardly angled below middle; terminal line and fringes as on the fore wings. Under side similar to above but the discoidal spot of fore wings is black.

Expanse, 33 millim.

Collection number, 1462.

A male specimen from Arizan (7300 ft.), August 22nd, 1908.
Near *A. reticulata*, Leech.

Mastigophorus nigrisigna, sp. n.

♂. Head and thorax grey-brown freckled with darker, abdomen grey-brown. Fore wings grey-brown powdered with darker; a black dot in the cell, and a black lunule at outer end of the cell, each outlined in ochreous; antemedial line blackish indented below costa, excurved from cell to dorsum; postmedial line pale but indistinct, slightly incurved towards dorsum; subterminal line whitish, sinuous, clouded with blackish on inner side; terminal line black, interrupted; fringes pale ochreous at base. Hind wings grey-brown suffused with darker; an oblique dusky line before the middle, and an irregular dusky band beyond the middle; terminal line black, interrupted; fringes pale grey, pale ochreous at base. Under side rather paler than above; all wings have black discoidal lunule and line beyond, that on fore wing is almost parallel with termen and is pale edged on costa, that on hind wing is followed by another less distinct line.

Expanse, 30 millim.

Collection number, 1016.

Two males, Kanshirei, June 19th, 1906, and August 11th, 1908.

Near *M. signata*, Butler.

ENTOM.—AUGUST, 1915.

R

Mastigophorus punctilinea, sp. n.

♂. Third point of palpi with tuft of reddish brown hair. Head and thorax pale brown, abdomen paler. Fore wings pale brown, clouded and suffused with darker; a black irregular spot at outer end of the cell, and a black dot in the cell; antemedial line blackish, sinuous, interrupted; medial shade dusky; postmedial line blackish, interrupted and marked with white on veins, inwardly edged with blackish on the costal end; terminal dots black, between veins. Hind wings pale brown suffused with dark fuscous, deeply on terminal area; discal lunule and serrated lines beyond black; subterminal series of white points on veins more or less connected by a dusky line. Under side pale brown, terminal area sprinkled with darker brown; all the wings have a black discoidal mark and two dusky irregular lines beyond, the outer line marked with white.

Expanse, 34 millim.

Collection number, 1464.

A rather worn male from Kanshirei, taken August 26th, 1907.
Allied to *M. signata*, Butler.

Nodaria (?) *insipidalis*, sp. n.

♂. Head and thorax pale brown, abdomen rather whiter; antennæ fasciculate, distorted at one-third from base. Fore wings pale brown, sprinkled with darker; a blackish but indistinct discoidal mark, and traces of a blackish subterminal line only distinct towards apex; black dots between the veins on termen, fringes greyish brown. Hind wings whitish, sprinkled with brown towards tornus, traces of a diffuse blackish line towards tornus; terminal line black, interrupted; fringes grey, brown tinged. Under side whitish, flecked with brown, brown tinged on margin, all wings have black discoidal spot and subterminal line, the line on fore wings only distinct towards apex, and on hind wings is interrupted and most distinct towards tornus.

Expanse, 37 millim.

Collection number, 1739.

A male from Rantaizan (7500 ft.), May, 1909.
Comes nearest to *N. perdentalis*, Hampson.

Lysimelia (?) *bilineata*, sp. n.

♂. Antennæ fuscous brown, darkened at base, ciliated. Head and collar fuscous brown; thorax fuscous brown, mixed with whitish behind; abdomen pale fuscous brown, whitish at base. Fore wings fuscous brown with a diffuse whitish streak along costal area from middle of the base of the wing to the apex; postmedial and subterminal lines white, inwardly shaded with dark brown, almost parallel; fringes fuscous brown, preceded by a whitish line. Hind wings pale fuscous brown, inclining to brown on the costal area; subterminal line white, outwardly diffuse, inwardly shaded with dark brown; fringes as on fore wings but paler. Under side brown, dorsal area of all the wings whitish.

Expanse, 30 millim. ♂; 26 millim. ♀.

Collection numbers, 995 ♀ and 1421 ♂.

One example of each sex from Kanshirei; the male obtained July 21st, 1908, and the female, July 23rd, 1906.

Two examples (one from Ceylon, the other from Travancore) in the British Museum seem to be males of this species.

Catada terminalis, sp. n.

♂. Head and thorax whitish brown, collar darker brown; palpi whitish brown, tips of second and third joints black; abdomen whitish brown, terminal segments marked with darker brown. Fore wings whitish brown, finely powdered with darker; costa dotted with black and streaked with dark brown on two-thirds; a black dot near base of dorsum; antemedial line brown, wavy, not distinct towards costa; a black dot in the cell and another at outer end of the cell; postmedial line brown, elbowed above middle, inwardly shaded with brownish between cell and dorsum; three black marks on terminal area—one at apex and two about middle, the latter connected by dark brown scales; terminal dots black, not clear towards dorsum; fringes pale interrupted by blackish marks at apex and about middle. Hind wings whitish brown clouded with darker brown and sprinkled with black atoms on the terminal half; discoidal spot black, geminate, set in a brownish band which has irregular blackish edges; black chain-like markings on termen; fringes pale, marked with dark brown about middle. Under side whitish brown mottled with darker; all wings have black discoidal spot; fringes whitish, dark marked about middle.

Expanse, 14 millim.

Collection number, 1093.

A male specimen from Kanshirei, June 10th, 1906. There is a specimen also from Kanshirei (Wileman) in the British Museum.

Near *C. nigripuncta*, Hampson.

Pilipectus taiwanus, sp. n.

♀. Fore wings brown, reddish tinged on basal and tornal areas, faintly striated with white, veins paler; antemedial line white, sinuous, only distinct on the dorsal area where it is inwardly edged with dark brown mixed with reddish; the dorsal area enclosed by antemedial line is suffused with violet-grey; postmedial line white, interrupted, only distinct on costal area where it is outwardly inclined; discoidal spot white set in an almost round patch which is suffused with violet-grey and edged with dark brown; terminal lunules black, edged inwardly with white between middle and tornus; fringes grey, white at base and tips. Hind wings pale ochreous brown suffused with fuscous brown, fringes paler. Under side pale ochreous brown, discal area of fore wings clouded with fuscous, discoidal mark whitish; traces of a dusky postmedial band on hind wings.

Expanse, 38 millim.

Collection number, 1856.

A female specimen from Rantaizan, May 20th, 1909.

Allied to *P. cyclopiis*, Hampson.

Hypena indistincta, sp. n.

♂. Antennæ bipectinated, branches very slender; second joint of palpi long, third short upturned tip pale. Fore wings pale brown, reddish tinged, obscurely mottled with blackish brown; postmedial line blackish, oblique, indistinct towards costa; subterminal and terminal lines indicated by white dots, the terminal most distinct; discoidal mark and spot in the cell dark brown. Hind wings fuscous, discoidal dot blackish. Under side whitish, the disc of fore wings and costal area of hind wings fuscous.

Expanse, 23 millim.

Collection number, 1452.

A male specimen from Rantaizan, March 21st, 1907.

Naarda ochronota, sp. n.

♂. Antennæ serrate on inside, pectinate on outer. Fore wings greyish brown heavily powdered and suffused with blackish; reniform stigma ochreous, a black dot at lower end; orbicular stigma ochreous, punctiform; traces of postmedial line towards dorsum, very indistinct: subterminal line whitish, sinuous, a white dot at costal end, terminal line black, fringes dark grey, paler at base. Hind wings greyish brown powdered with blackish; traces of wavy black transverse lines on medial area. Under side whitish powdered with brown and suffused with blackish on terminal area of fore wings; all the wings have a black discoidal dot and wavy line beyond.

Expanse, 22 millim.

Collection number, 1328.

A male specimen from Kanshirei, April 18th, 1908. One male, also from Kanshirei (Wileman), in the British Museum.

Allied to *N. symethusalis*, Walk.

(To be continued.)

NOTES AND OBSERVATIONS.

THE BUTTERFLIES OF THE TAUNTON DISTRICT.—Mr. W. B. Butler in the May number asks whether his extensive list of the butterflies to be found in the Taunton district can be exceeded in a district with similar limits—ten miles from a centre. Some years ago, whatever it may be now, the butterflies of the Marlborough district, with a similar radius, comprised all those mentioned by Mr. Butler with the exception of *L. ægon*, and in addition *C. hyale*, *E. antiopa* (once), *G. c-album* (not resident), *A. iris*, *L. sibylla*, and *II. comma*. Of these, *iris* and *sibylla* have not occurred, I believe, for some years, and *sinapis* is no doubt extinct, unless it has turned up again since I last visited my old hunting-grounds about ten years ago. It is interesting to note that *T. w-album* was first recorded in, I think, 1873, and became fairly common for some years, but has now become rare. *M. aurinia* disappeared about 1865, and did not occur again until about 1883, when a few stragglers appeared; now in one locality at least it is fairly common. I cannot account for the disappearance of *A. iris*, except that in one of its two localities

the fallows have been cut down. I think the horrible summer of 1879 had much to do with its extermination, and also that of *L. sibylla*.—N. MANDERS, Colonel, A.M.S.; The Dardanelles, June 4th, 1915.

HIBERNATED EXAMPLES OF *VANESSA ANTIOPA*.—The capture last May of a specimen of *V. antiopa*, as recorded by Mr. W. H. Smith in the 'Entomologist,' p. 169, is of considerable interest, as hibernated specimens of the species are but very rarely met with in this country. The paleness of the colouring of the marginal bands alluded to is entirely due to fading of the yellow pigment. As most of the examples taken in Britain have been more or less worn, the borders are usually pale in colour; but individuals with straw-yellow borders have from time to time been captured. In my series of ten British caught specimens two possess yellow borders: one of these was taken by myself at Chatham on August 22nd, 1888; the other captured in August, 1901, at Rayleigh, Essex. I may add that my series contains two hibernated examples, one taken from the trunk of a birch tree near Box Hill, Surrey, on April 17th, 1881; the second one is of much interest, and which I have been fortunate in securing quite recently. It was taken as long ago as February 8th, 1869, by a gamekeeper named Matthew Barrone in a plantation near Castle Eden, Durham, as "it crept out from amongst some grass by the side of a fire," as recorded by Mr. Frederic Raine in the 'Entomologist,' vol. iv. 1869, p. 250. Mr. Raine informed me many years ago of this particular *antiopa* (but could not remember when or where he recorded the fact), as he obtained it from the gamekeeper and afterwards gave it to the Newcastle Museum.—F. W. FROHAWK; July, 1915.

THE FOOD-PLANT OF THE LARVA OF *HYRIA MURICATA*.—As Barrett states ('Lepidoptera of the British Islands,' vol. vii. p. 329), the food-plant of the larva of this insect in a wild state is apparently unknown both in England and on the Continent. Mr. W. Holland, who has recently been collecting for me in a locality where this insect is very abundant, tells me that he is certain the larva feeds on the Marsh Cinquefoil (*Potentilla palustris*). Although Mr. Holland did not find any larvae, nor did he observe females depositing on this plant, he tells me that the insect only occurred among it, and was not present in those portions of the marsh where the plant did not grow.—N. CHARLES ROTHSCHILD; Arundel House, Kensington Palace Gardens, W.

LIMENITIS SIBYLLA AT WORCESTER.—As I was walking along the Severn quay at Worcester, and immediately below the cathedral wall on Sunday, July 25th, I was surprised to see an example of this butterfly settle on a plant close to the water's edge. It seemed to have descended from the college garden; but I think the appearance of the insect right in the city is worthy of note, especially as Newman's comment on Stainton's "Worcester" as a locality is—"my entomological correspondent at Worcester, who has taken the utmost pains to supply me with information, does not confirm this report."—H. ROWLAND-BROWN; Harrow Weald, July 26th, 1915.

HIBERNATION OF PERONEA SPONSANA, Fab.—In view of the fact that this is a late autumnal species, the congeners of which are known to hibernate, it is somewhat remarkable that no observations concerning its occurrence in the spring should, so far as I am aware, have been placed upon record. Barrett states (Brit. Lepidop. vol. 10, p. 237):—"On the wing from July to October, apparently without hibernating." It may be of interest therefore to record the capture of three rather worn specimens of this species on May 25th. They were beaten from beech at Ranmore Common, Surrey. I may add that from Scotland I have records of this moth coming to light in November.—R. MELDOLA; 6, Brunswick Square, W.C., July 6th, 1915.

MELANARGIA GALATEA IN THE CHILTERNs.—*A propos* of my remarks about this species (*antea*, p. 142), I am pleased to say that this year I have had the pleasure of taking *M. galatea* for the first time in my experience in this region, at a spot about midway between Wendover and High Wycombe. On July 4th I was walking over a piece of grassy down which I have long suspected as a possible haunt of the species, when a lately emerged female suddenly rose from under my feet. Unfortunately the sky had become overcast, and though I quested the locality for an hour I did not see another example. *Argynnis aglaia* was commoner (all males) than I have ever seen it hereabouts; but there were no *A. adippe*. *Aglaia* does not seem to require hot sunshine to stimulate activity.—H. ROWLAND-BROWN; Harrow Weald, July 5th, 1915.

USE OF A FUNGUS IN ENTOMOLOGY.—A reference to the use of the birch-tree fungus (*Polyporus betulinus*) in mounting Micro-Lepidoptera appears in the May number of the current issue of the 'Entomologist,' p. 127. It reminds me of the first "butterfly-cabinet" I ever saw—more than sixty years ago—and it did credit to the amateur who made it and filled it with specimens, chiefly local. The drawers, made of white deal, were neither papered nor corked. Instead of the latter, narrow strips of this dried fungus—cork-like and snowy-white—were glued to the bottoms. The difficulty of arranging the strips so as to suit the different sizes of insects was, with a little forethought, easily got over; and I have no recollection that my old friend was ever troubled with mites. This fungus, when dried and cut into strips of the required thickness, was often used in those days as razor strops.—J. ARKLE; Chester.

AN INTERESTING VARIETY OF ARCTIA CAIA FROM SALTLEY DISTRICT.—I should like to record a variety of this insect which was brought to me by a friend of mine on July 6th. The specimen is a female, the upper wings being of uniform chocolate colour without a trace of white, the under wings being of the same colour, thickly fringed with tawny-coloured hair on the inner edges, the usual black spots being present on the under wings, showing up clearly on the chocolate. The body is absolutely normal, being of a red colour with black bars, the hair on the thorax being chocolate as usual. Unfortunately, as too often happens in the case of "varieties," the under wings are slightly undeveloped, the right wing, when pinned out, being about seven-eighths the usual size, and the left wing about

five-eighths; altogether it is the nearest approach I have seen recorded up to the present of a melanic specimen of this variable species, although the Sattley district is fairly well known for producing varieties.—J. H. GRANT; Birmingham.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—June 10th.—Mr. A. E. Gibbs, F.L.S., Vice-President, in the chair.—Dr. Chapman exhibited a living specimen of *Polyommatus escheri*, bred from ova from Gavarnie, Pyrenees. It was of the form *rondoui*.—Mr. Hy. J. Turner, the whole of the coloured plates of the ten volumes of Herbst's 'Natarsystem,' Coleoptera, 1783-1804, which he had bought for a few shillings from a street barrow.—Mr. B. S. Williams, aberrations of *Selenia bilunaria* (*illunaria*), a very strongly marked female and a smoky male: larvæ of *Anticlea badiata*; and aberrations of *Agrotis nigricans*, a red-brown form from Wicken, and a black form from St. Anne's. He also reported that he had heard *Hylophila prasinana* make a distinct, peculiar buzzing noise when in flight at night as it came to his lantern light.—Mr. Dennis, photographs with the stereoscope of *Hispida atra* and *Formica pratensis*, with sprays of laburnum and spiræa.—Mr. J. P. Barrett, a living specimen of *Strymon pruni*, which had emerged on June 10th. It was considered an early date.—Mr. Dunster, a series of *Brenthis euphrosyne*, taken in Bucks in May.—Mr. Bunnett, examples of *Mygale aviculare*, with photos of the same.—Mr. B. Adkin, series of local forms and aberrations of *Ruralis betulæ* and *Pachygastris trifolii*, and read notes on the exhibit. Of the former species he showed a unique aberration with an orange border to all the wings and much orange suffusion.

June 24th.—Mr. B. H. Smith, B.A., F.E.S., President, in the chair.—Mr. Fagg, of Lewisham, was elected a member.—Mr. Edwards, for Mr. Dawson, exhibited several remarkable aberrations of European butterflies, including *Polyommatus icarus*, with elongated marginal markings on under side; *Melitæa dictynna*, with under side fore wings, all markings blurred, and hind wing markings extensively radiated, the upper side almost wholly black suffused; a melanic *Brenthis pales*, a zanthic form of *Epinephele jurtina*; *Polyommatus hylas*, with very pale marginal area on under side, and *Melitæa didyma*, with radiated under sides. He also showed nests of the humble-bee, *Bombus lapidarius*, with imagines from Worcestershire.—Mr. West (Greenwich), the principal species of Coleoptera taken by him in late May and early June in the New Forest, including *Leptura scutellata*, *Mesosa nubila*, *Clytus arietis*, *Grammoptera præusta*, *Elater sanguinolentus*, *E. miniatus*, *Agrilus viridis*, *Colydium elongatum*, *Aphodius niger*, &c.—Messrs. B. Adkin, R. Adkin, Hy. J. Turner, A. E. Gibbs, and Cowham, series and specimens of *Lasiocampa quercus*, and Mr. B. Adkin subsequently read a paper on the species.—Mr. Gibbs, a male with complete female coloration.—Mr. Cowham, a female from Epsom, which was two years in pupa

and had emerged in May. It was of the var. *callunæ*. Another example had the discoidal on the left fore wing duplicated.

July 8th.—The President in the chair.—Mr. G. B. Pearson, Russell Square, W., was elected a member.—There was a special exhibition of *Malacosoma neustria*, *M. castrensis*, and *Cosmotriche potatoaria* by Messrs. B. Adkin, R. Adkin, S. Edwards, A. E. Gibbs, Leeds, Sperring, and Brooks, which included series of numerous local races and many aberrations. Mr. B. Adkin then read a series of notes on the variation attainable in the three species.—Mr. B. S. Williams exhibited a bred series of *Bupalus piniaria* from Leith Hill.—Mr. West (Ashtead), examples of *Triana psi* and *T. tridens*, and asked if members could point out definite markings whereby the imagines could be correctly distinguished.

LONDON NATURAL HISTORY SOCIETY.—*February 16th, 1915.*—Mr. W. E. King exhibited a series of under sides of *Hipparchia hyperanthus*, including one ab. *lanceolata* and several ab. *cæca*.—Mr. J. A. Simes, some Spanish butterflies, including *Thais rumina*, *Euchloë euphenoides*, *Zegris eupheme* var. *meridionalis*, *Charaxes jasius*, *Dryas pandora*, *Melanargia syllius*, *M. ines*, and *M. lachesis*, *Agriades thersites*, *Nomiades cyllarus*, *Lycæna hylas* var. *nivescens*, *Cænonympha iphioides* and *C. dorus*, *Plebeius zephyrus* var. *hispanica*, and var. *lyciolas*.—Mr. A. J. Willsdon, *Dasycompa rubiginea* from Bournemouth, Hereford, and Torquay, the Bournemouth specimens being lighter than the Hereford ones and the Torquay more reddish; also a fine variety from Torquay.—Mr. J. A. Simes read a paper entitled 'A Month amongst Spanish Butterflies.'

OBITUARY.

WILLIAM HOWLETT.

There died on June 8th one of the oldest naturalists of Suffolk. For many years Howlett had been a barber and taxidermist in Newmarket High Street, to whom the district brought all sorts of natural history objects to be named, and he was locally widely known; but for the last thirteen years he had retired to a cottage in Barton Mills, some ten miles away and always a favourite hunting-ground of his. He had been captain of the old Newmarket fire brigade, as well as for long an official of the Lark Angling Society and the Barton Mills Conservative Association. Besides these diverse interests, he was especially interested in the animals, birds, fishes, and butterflies of the district, in the habits of which he was, as a self-educated man, laudably proficient. We well remember him at the Barton 'Bull' in the old days when Mr. Howes was host in 1899, before the hotel was renovated for motorists (a new wing was added last winter), and here he actually expired of heat apoplexy, while in search of stamps to forward natural history or piscatorial articles to the 'Bury Free Press,' to which and one or two London papers he contributed. Few knew the Suffolk Breek and Chalk Vertebrate Fauna better than Howlett.

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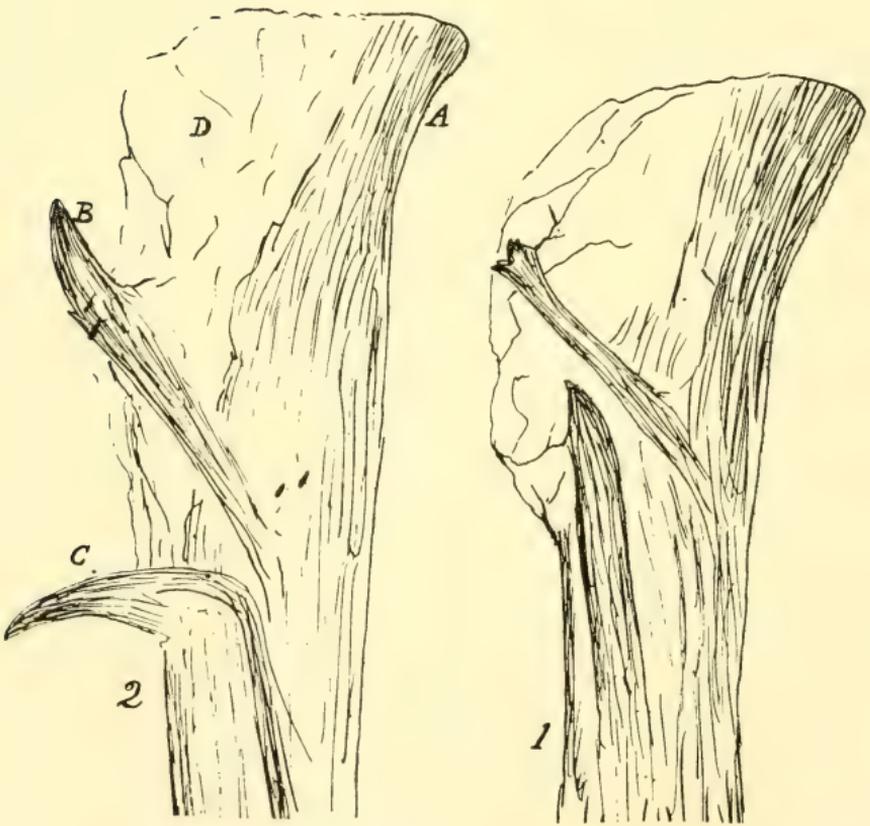
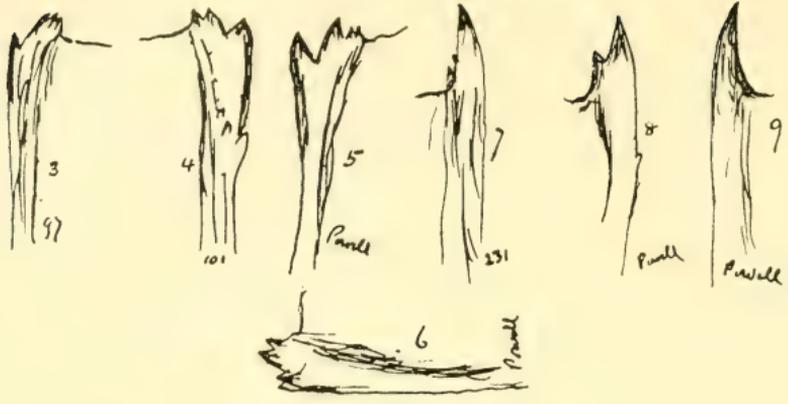
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CAMERA SKETCHES OF PORTIONS OF *ÆDEAGUS* OF *Thecla ilicis*,
T. æsculi, AND *T. spini*.



Fig. 1.



Fig. 2.

Photos E. M. Montgomery.



Fig. 3.—*Cænopachys hartigii* (Ratz.), male.

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SOME REMARKS ON *THECLA ÆSCULI*, HB., CHIEFLY IN THE SOUTH OF FRANCE.

BY H. ROWLAND-BROWN, M.A., F.E.S.

(PLATES IX. AND X.)

IF successful this year (1915) in rearing the two Theclids with which this paper is principally associated, I had hoped to write a life-history of both species from personal observations, assisted by those of my correspondents Mr. Harold Powell, of Hyères, and Mr. Charles Morris, of Le Cannet. Unfortunately the war has put an end to all foreign travel for the time being, even if opportunity served to bring the matter to a definite conclusion. The following notes were already put together before August, 1914; and Mr. Rayward, to whom Mr. W. G. Sheldon kindly communicated some of my specimens for making preparations of the appendages, reported them ready soon after that date. The excellent photographs by Mr. E. M. Montgomery were then submitted to Dr. T. A. Chapman for his opinion, which follows with his notes, and thanks to him also I am enabled to present the accompanying line drawings further to elucidate Mr. Rayward's studies by comparison with the structures of another member of this particular group.

So far as I am concerned, the life-histories in contemplation will have to wait until western Europe is again open to the British field naturalist. The scientific value of these remarks, therefore, rests entirely with the reports of the gentlemen who have so ably carried out the examination of the respective male appendages.

Hitherto, collectors at home and abroad do not appear to have realized that in *Thecla* (or, as Tutt insists, *Nordmannia*) *ilicis* and *T. æsculi* we have two distinct and separate species. This is all the more strange when we refer to the early authorities, and find them almost unanimous on the subject. Nor is it until the German writers of the later nineteenth century that the confusion begins which has existed ever since.

I notice that Mr. B. S. Curwen in his interesting account of "Early Summer in the Valais and North Italy" ('Ent. Record.'

xxv. p. 300, &c.) once more enumerates *Ilicis* and var. *Æsculi* among his captures at Eclépens. For the benefit, then, of those who, following the text-books of Kane, Wheeler, and others, have hitherto arranged these butterflies in their collections under the same label, I venture to offer a few remarks intended to help them to distinguish *Æsculi* as well in the museum as in the field.

Of the earlier lepidopterists, Hübner, who is responsible for the nomenclature, Ochsenheimer, and Godart all give *Æsculi* specific rank. Boisduval, in his 'Index Methodicus' (1829), classifies thus :

"*Æsculi*, H., Och., God. (vix a seq. diff.) . . . Gall. mer. . . .
Junii";

thus indicating his belief in the species, though scarcely differing from the following, which is

"*Lynceus*, F., God. . . . Europ. . . . Junii.
Ilicis, H., Och."

Twenty-four years later, Gerhard, also, figuring the genus, maintains this separate identity, and is followed by Segond ('Cat. des Papillons du Var.,' 1853), Bellier de la Chavignerie ("Lépid. des Pyr.-Or.," 'Ann. Ent. Soc. France,' 1857), and de Graslin ("Lépid. des Pyr.-Or., loc. cit. 1862), all of whom I cite as having had personal knowledge of the butterfly in its native haunts. Then, about 1863, M. Oberthür tells us ('Lépid. Comparée,' fasc. iv. pp. 75-79) Guenée attached to the box, now in his possession, containing examples taken in the Eastern Pyrenees, the following screed, written in his exquisite and microscopic handwriting:—

"*Thecla Æsculi*, Hb., 559, 560; Och.; God., Enc., p. 649; De V. et Gn., p. 40—taken by me at le Vernet in 1859; June and July. Can it be believed that this species, so distinct, is not accepted by the German authors, even the most modern, who insist upon regarding it as a variety of *Lynceus (Ilicis)*! It is as common at Montpellier as *Lynceus (Ilicis)* with us, and the latter occurs there also, and never mixes with it. Further, the var. *Cerri*, to which almost all the examples from the Midi belong, is exaggerated in the contrary direction to *Æsculi*. The general appearance, the entire absence of the tawny blotches in both sexes, the shape of the white line of the hind wings and of their tawny lunules, the absence of the terminal border, the club of the antennæ, &c., should leave no doubt of the specific validity. The larva feeds on *ilex (yeuse)*, and closely resembles that of *Lynceus (Ilicis)*. I bred No. 4; the pupa-case is beside it."

M. Oberthür then proceeds to examine the three hundred and seventy-four *Æsculi* in his collection from S. France, S. Spain, and Algeria. Both sexes, he says, are uniform dark brown on the upper side, but occasionally the female shows a trace of tawny on the fore wings above, and several spots of the same

shade along the marginal border of the hind wings. In Spain, Algeria, and the Eastern Pyrenees there occurs with the type the variety of which Hübner figures the female with Nos. 690, 691. It is this *Æsculi* which is erroneously cited by Staudinger ('Catalog,' 1901) as a synonym of *Cerri*. In this variety (*Æsculi*, Hb., female, 690-691) the male is unicolorous above, but the female is ornamented on the extra-cellular part of the fore wings with a broad tawny blotch, and along the border of the hind wings with a very well-developed border formed of similar tawny confluent spots. Gerhard figures this var. of *Æsculi*, and gives to it the name *Maculatus* (pl. 4, fig. 4). "I do not know why this var. *Maculatus*, Gerhard, is not recognized in the 'Catalog.'" And, as far as the *Æsculi* of south-western Europe is concerned, M. Oberthür reclassifies them as follows ('Lépid. Comparée,' fasc. iv. April, 1910, pp. 78-9):—

- "1. ♂ and ♀ practically unicolorous on upper side.
Æsculi, Hb. . . . (♂ 559-560) . . . S. France.
Æsculi, Gerh. . . . (Pl. 2; figs. 1a, 1b, 1c). Portugal.
- "2. ♂ unicolorous upper side, ♀ with tawny blotches on all four wings upper side.
Maculatus, Gerh. . . . (Pl. 4; ♀, fig. 4) . . . Andalusia;
 Collioure, Pyr.-Or.
Æsculi, Hb. . . . (♀ 690, 691).
 ab. *Graslini*, Obthr. (♂ Lép. Comp. iv. pl. xlix. fig. 402). Sierra Nevada.
- "3. Unicolorous upper side; deep blackish; rather large; the red tawny spots very brilliant.
Ilicioides, Gerh. . . . (Pl. 4; figs. 5a, 5b, 5c) . . . Ronda."

Meanwhile, the German authors, ignoring Gerhard, continue to refer *Æsculi* to *Ilicis*, including Staudinger, and Rühl, who gives so clear an account of the superficial differences of his type and so-called variety that it is surprising he did not suspect the truth. And it is certainly as surprising to find that M. Rondou follows their example ('Cat. Lépid. des Pyrénées, Soc. Linn. Bordeaux,' t. lvii. 1902). Even as recently as the year before last Professor Courvoisier ('Internat. Ent. Zeitschrift,' Guben, No. 36, p. 240, December 6th, 1913), in the course of a long paper on the "Nomenclature and Diagnosis of the European Theclids," repeats the error, *Æsculi* (*sic*) still appearing under *Ilicis*, though the several forms of it are correctly differentiated from the forms of *Ilicis*, as (c) *maculatus*, Gerh. (*vide supra*), (d) *mauretanicus*, Stgr., and (e) *aureonitens*, Seitz, described as a common form of the female *Mauretanicus* with a lustrous golden upper side.

M. Oberthür, then, renders us real service by once more calling attention to this long drawn-out tale of misrepresentation. Before, and until I visited Rennes in 1909, and he emphasised

the fact when showing me his collection, I, too, had not examined my Digne and Vernet *Æsculi* with sufficient care to realize that they were in effect other than a form of *Ilicis*. Nor am I the only collector, it appears, who, having come across the two species, or *Æsculi* alone, accepted the lead of Staudinger, despite the obvious fact that his acquaintance with most of the more local French species is slight, and usually secondhand. Mr. F. Bromilow ('Entomologist,' vol. xxvi. p. 348) ranks the species as a variety, "first seen on June 30th" at Nice; Mr. F. Norris (*loc. cit.*, vol. xxv. p. 240), in the same way, at Certosa di Pesio, "not at all rare." But, as might be expected of so experienced a lepidopterist as the Rev. F. E. Lowe, he expresses a decided doubt as to the specific identity of the two butterflies in Spain. Collecting at La Granja, near Madrid, he writes ('Ent. Record,' xxi. 1909): "Flying with the usual form were some very small *N. ilicis* of var. *æsculi* quite dwarfs (I have the same from Eclépens). It seems difficult to believe that this is really *N. ilicis*" (p. 63); and again "*N. ilicis* and vars. *cerri* and *æsculi*, very abundant, partial to acacia trees; is it possible that it even lays its eggs on them?" (p. 65). Mr. A. H. Jones also mentions "var. *æsculi*, worn specimens at Grenada, beginning of May" (*loc. cit.* xxiii. p. 297). At an earlier date still Mr. W. E. Nicholson speaks of "this form, with *T. pruni* at Budafok," near Budapest. Even so punctilious an authority as Mr. G. T. Bethune-Baker retains *Æsculi* as a local form of *Ilicis*, I believe, and it is because of this view especially that I have gone into the matter at so much length.

To revert to Godart ('Hist. Nat. Pap. France,' t. ii. pp. 162-163), we find the superficial differences of the two butterflies succinctly stated. *Æsculi* is his Papillon du Marronnier, and he records it in the garrigues of the Midi in springtime and in summer; though this must mean that it occurs in June and July, as it seems to be a single-brooded species in common with the other members of the genus. In such localities, he adds, it is always smaller than *Ilicis*; the under side of a less dark brown, or approaching to grey (I should call it cinnamon); the ante-marginal spots of the hind wings are more vivid in colour (red-orange, rather than yellow, as in *Ilicis*), smaller, and consequently further separated from one another. But the difference is even more apparent in the shape of the inner line of white spots on the under side, which are not, as a rule, as in *Ilicis*, continued even faintly on the fore wings. Godart rightly describes the spot which touches the inner margin toward the anal angle as in the shape of a reversed C, or crescent, and the next one to it as almost upright (*droit*), while in *Ilicis* the first spot is V, or chevron-shaped, and very clearly so. "What leads me further to suppose that the *Polyommatus* of the chestnut is not merely a local variety of *Lynceus (Ilicis)*, is that the latter

occurs also in the Midi, where it is precisely similar to the form of our central and northern departments."

The plates in Godart's work are mediocre. On plate xxi. figs. 3, 4, the white line of the under side is carried from the centre to the apex of the fore wings, and the colouring is very poor—certainly not realizing the description, "tirant sur le gris." Herrich-Schäfer follows Godart closely.

The markings, then, differ conspicuously in the shape and direction of the white line of spots; bowed in *Æsculi*; more upright in *Ilicis*. But, as I have said, the chevron shape of No. 3 spot is the easiest character by which to distinguish the species in all other, I think, than the extreme Spanish forms. As to the form *Ilicioides*, Gerh. (which Courvoisier (*loc. cit.*) entirely ignores), the under side of the female examples examined by me suggest *Æsculi* so much more forcibly than *Ilicis* that there should be no difficulty in separating them, even though the blotches on the fore wings of the male are suggestive of *Ilicis* var. *cerri*.

The habits of the two butterflies are also different in degree. While *Ilicis* is widespread over the greater part of France, *Æsculi*, so far, has only been reported with authority from the southern departments. Mr. Powell (*in litt.*) writes: "We get both species at Hyères—*Ilicis*, in the form of *Cerri*, about the middle of May, and *Æsculi* in the cork and ilex woods towards the end of that month"; and he adds, "All specimens I have seen from Spain and Algeria are forms of *Æsculi*."

My own specimens, taken at Digne and Le Vernet, in the Eastern Pyrenees, bear out the evidence of Mr. Powell, and I might add that, whereas *Ilicis* seems to have a penchant for settling on field flowers or stonecrop on walls, *Æsculi* is more often taken flying over low bushes, or at rest on bramble blossom.

M. Charles Oberthür reports the occurrence of *T. ilicis* throughout France; and the local catalogues in my possession bear out his observations; the number of Departments right up to the Channel in which it has not been recorded being few in number.

The typical *T. æsculi*, on the other hand, so far has only been notified from the following, nearly all of them in the Midi:—Alpes-Maritimes: Millière, who classes the species as a constant variety with var. *cerri*, describes both as less rare than the type; Col de Castillon (Oberthür); St. Martin-Vésubie; Vallon des Fleurs, Vallon Obscur, Nice; first seen June 30th (Bromilow). Aude: Bois de l'Alarie, very abundant (Mabille). Basses-Alpes: Digne, in addition to my own captures, reported as common by Mrs. Nicholl; Les Mées, on the left bank of the Durance opposite St. Auban (Donzel). Basses-Pyrénées: throughout (Larralde), though I have a suspicion that this

author means *T. ilicis*. I took no *Æsculi* at Biarritz and Guéthary. Bouches-du-Rhône: Vallon des Crides, Col de Bretagne, very common (Siepi); Fontvielle, July 19th-21st, 1912 (F. E. Lowe). Drôme: Nyons, beginning of July, 1911 (Rowland-Brown). Gironde: Pessac and Bouliac (Trimoulet). Haute-Garonne: occurs in the same localities with *Ilicis* up to 900 m. (Caradja). Indre: Gargillesse, rather rare (Sand); a somewhat doubtful identification I should think. Lozère: specimens in the Fallou collection at Paris from Florac; and I have taken it there also. Maine-et-Loire: described as rather rare by the late M. Delahaye, this being the most westerly and northerly locality where it has been observed. Pyrénées-Orientales: Le Vernet, very common (Bellier, and many others); the only "form" at Sorède (Spröngerts); Collioure, and generally (Roudou). Var: (Segond), probably Draguignan; Hyères (Powell); Ste. Baume (F. E. Lowe).

Lastly, it may be of interest to add that, while M. Oberthür, on Guenée's evidence, mentions *ilex* (*yeuse*) as the one food-plant of *T. æsculi*, Rouast ('Catalogue des Chenilles Européennes connues,' Lyon, 1883), quotes *Ulmus campestris*, *Acacia*, *Quercus robur*, and *Q. ilex* for *T. ilicis*, on the authority of Donzel, and *Q. coccifera*, April, on that of Martorell. To these M. Friernet adds *Æsculus hippocastanum*; and M. J. de Johannis ("Lépid. du Morbihan," 'Ann. Soc. Ent. France,' 1908, p. 703), blackthorn.

In the 'Entomologist' for 1892 (vol. xxv. p. 193) Mr. F. Bromilow describes a series of bred *T. spini*, among which appeared to be two hybrids with *T. ilicis*. In a subsequent note (*loc. cit.* p. 291) he revises this opinion on the ground that the supposed hybrids were no more than examples of var. *Lynceus*. This second note has evidently been misinterpreted by M. Friernet, for, in his book on the earlier stages of the butterflies of France ('Prem. États des Lépid. p. 87), he quotes Mr. Bromilow as the authority that *Ilicis* sometimes pairs with *Spini*, while he makes no distinction at all between *Æsculi* and what he conceives to be the type thereof.

EXPLANATION OF PLATE IX.

WITH REMARKS THEREON, BY T. A. CHAPMAN, M.D., F.Z.S., F.E.S.

Mr. Rowland-Brown asks me to revise, if necessary, some remarks on *ilicis* and *æsculi*, which I wrote to Mr. Rayward last March, with a view to his adding them to his article on these species. I think they may very well go as they are, but I have taken the opportunity again carefully to go over my specimens with the object of trying to make a point or two clearer to myself if to no one else. I find I may confine the results of this inquisition to giving some details as to the process of the ædeagus that Mr. Rayward regarded as belonging to the system of "cornuti," in which

I appear to have agreed with him, without very careful consideration. It is, however, a part of the solid ædeagus, and it forms a portion of the extremity of the organ, from which the vesica begins to evert.

Nevertheless, I believe Mr. Rayward and myself were so far right that, though not moveable with the eversible membrane, but fixed to the tube of the ædeagus, it is morphologically as much a cornutus as a portion of the ædeagus proper. The *ductus* may be chitinised more or less and in different forms, so that it is, in a sense, accidental whether some particular portion of the *ductus* be solid ædeagus or eversible membrane (with or without "cornuti"), or, as here, present a somewhat ambiguous intermediate condition.

The little group of Theclas to which it belongs have a very similar structure, varying of course a good deal in details and in the proportion of parts.

In the rough sketches from camera outlines of these parts in *T. spini* and *T. ilicis* it will, I think, be clear, that the end of the ædeagus divides into three chitinous processes. I have selected *T. spini*, instead of any other species, to illustrate this, as it seems nearer to *ilicis* and *æsculi* than any of them. I have selected specimens in which the three processes happen to diverge considerably. This is probably due to pressure of the specimen in mounting, and may be an attitude assumed when the organ is in use, but I fancy in an ordinary position of rest the three processes are more parallel to each other (as in Plate IX.). The other allied species, as judged by the structure of the ædeagus, are almost resolved into *acaciæ* only, in which the structures B and C are very similar to each other, not unlike C as formed in *ilicis*, but both with much longer free portions.

Acacia associates itself with *ilicis* and *æsculi* in having both these processes (B and C) apparently solidly attached to the chitinous cylinder of the ædeagus. In *pruni*, the other species apparently belonging to this group, there is what is almost a fundamental difference. The two processes, if we are so to recognise them, in *pruni* are not solidly attached to the ædeagal tube; but are movable with the vesica, and might be called cornuti, so nearly so as to quite excuse the mistake of at first believing them in *ilicis* to be cornuti. It is difficult to doubt that the two processes in *pruni* are homologous with those in *ilicis*, yet B is a small spiculate piece attached to the vesica, with the solid stem, as seen in *ilicis*, reduced to quite a soft membranous ribbon; C is larger, and has a slender stem unattached to the ædeagus proper. Both protrude with the vesica and separate from each other, but maintain when everted the same direction as when at rest, *i. e.* their spicules continue to point outward, and are not turned round so as to point inward as in typical cornuti. When at rest both spicular bodies lie closely together in the centre of the ædeagus near its extremity.

Fig. 1 represents *ilicis*; I have not given *æsculi*, since it differs from *ilicis* only in the extremity of the process I have marked B.

Fig. 2 represents *spini*; A is the extremity of the tube of the ædeagus; the edge of what appears as the free surface (against the letter A) has extremely fine spiculations in all these species. B is the process that, in *ilicis* and *æsculi*, affords the differentiating specific characters. C is a process that, in *ilicis* and *æsculi*, has the appearance in most preparations of a flat plate with a lancet-shaped end lying flat within the ædeagus. In fig. 1 it is seen rather sideways, and shows that it has an external free margin. D is a portion of the eversible membrane (vesica), partially extended and exposed, in accordance with the apparently corrected positions of processes B and C. Normally at rest these processes are probably parallel with the axis of the ædeagus; C, fig. 2, is obviously in a specially everted position.

The process B of fig. 1 (letters are placed on fig. 2) is the one in which there is a definite difference, apparently constant, between *ilicis* and *æsculi*.

My original difficulty with regard to feeling clear as to what the difference

between the two species consisted in, was that no two specimens seemed exactly alike and that the number of points was very various, and it seemed difficult in so small a number of specimens as that mounted, to feel any security that even more definitely intermediate forms might not occur.

My careful re-examination of these specimens shows, however, that this process B has a free margin on one side, and that the other side is adherent to the eversible membrane, leaving only the tip free all round. When one regards merely this free tip, then the specimens arrange themselves into *ilicis* and *æsculi* quite satisfactorily.

Figs. 3, 4, 5 and 6, represent examples of *ilicis* (from camera sketches), and 7, 8 and 9 of *æsculi*. The limit of attachment on the attached side is marked in each case.

It appears that in *ilicis* the free extremity is much shorter than in *æsculi*, the points usually more numerous. In *ilicis* the free portion close to the attachment is short and has several points, then further out on the free side is a shorter projection with one or more spines. In *æsculi* there may be, as in fig. 9, one long simple cusp (not unlike *acaciæ*). This cusp may have, as in 7 and 8, subsidiary spines, one or more, on the side facing the attachment, but has none on the outer side, unless we count such teeth as in figs. 4 and 8 occur at some distance down the shaft, and cannot be regarded as belonging to the free tip. Probably the long cusp of *æsculi* represents the outer group of spines that is so short in *ilicis*, while the group of longer, but still very short, spines forming the inner group in *ilicis*, are represented in *æsculi* by the few inner teeth that are so small, or even absent.

The very minute difference between these two species as regards the structures under consideration, compared with the wide distinction from *spini*, and still more from *pruni*, seems to afford proof that here, as in other characters, the species are most closely related. They also suggest this reflection, that two species believed to be distinct will, if they are so, show some differences in these appendages, minute though they may be, and though they may for long elude detection.

EXPLANATION OF PLATE X., FIGS. 1 AND 2.

Fig. 1.—Ædeagus of *T. æsculi*, male.

Fig. 2.—Ædeagus of *T. ilicis*, male.

Only the ædeagus is figured as I find no difference in the other parts of the appendages, and the female appendages, being inconclusive, are also omitted.—J. L. R.

BUTTERFLIES OF THE CHILTERNs: WITH A NOTE ON CERTAIN EXOTIC FORMS AT LARGE IN BRITAIN.

By HUGH SCOTT, M.A., F.L.S., F.E.S.

(University Museum of Zoology, Cambridge.)

THE articles in this volume by Mr. Rowland-Brown and the Rev. J. W. Bussey Bell on the butterflies of the Buckinghamshire and Oxfordshire Chilterns have been of great interest to me, since during the past sixteen years I have become closely acquainted

with that part of the Chilterns in the vicinity of Henley-on-Thames. This town lies at the meeting-point of three counties. The Thames in its windings here flows for a few miles in a general northerly direction: the country on its eastern side (where also there is an extension of the chalk hills) lies in Berkshire; the town of Henley, on the western bank, lies in a corner of Oxfordshire; while about a mile to the north of it, on the same side of the river, is the boundary of Bucks. Thus the very numerous walks to the north and west of the place, leading into the heart of the Chilterns, may lie either in Oxfordshire or Buckinghamshire.

The country in this part of the Chilterns is of the same general type as that described by Mr. Rowland-Brown. The hills form an escarpment, the steep slope of which, facing roughly north-west, lies six to eight miles distant from Henley. At the summit of this steep scarp they are naturally at their highest. A point in Bucks. not far from Watlington Hill is 837 feet above sea-level; while in Oxfordshire, a few miles to the south-west, a point near Nettlebed reaches 607 feet. On the steep face of the escarpment, too, are a number of the open spaces such as Mr. Rowland-Brown has described, covered with the wild chalk-hill flora and dotted with dwarf junipers. But it is not of the steep scarp that I wish to write so much as of that part of the much more gentle slope—facing roughly south-east—within about five miles of Henley; that is, seven or eight miles south of Mr. Bussey Bell's district. This area consists of plateaux and rounded chalk hills rising to elevations of between 300 and 500 feet and intersected by ramifying valleys, almost all of which, excepting the main valley of the Thames, are devoid of streams. Well may Mr. Rowland-Brown write that the one feature lacking in the otherwise diversified landscape is water. The hill-tops in many directions bear an almost unbroken succession of beech woods. Their steep sides are given up partly to pasture, partly to arable land; while here and there are open, abrupt slopes where the chalk-hill flora is left to flourish at will. Such places are covered with a profusion of flowers—marjoram (*Origanum*) and thyme, restharrow (*Ononis*), *Helianthemum*, *Hypericum*, hawkweeds, scabious, salad-burnet (*Poterium sanguisorba*), with *Gentiana* and *Chloris* in places, and many others; and are dotted with bushes of *Cornus*, *Viburnum*, &c. Add to this a number of gorse-covered commons on the hill-tops; plantations of larch and other conifers, mostly of recent date; occasional patches of hazel-copse; elms along many of the roadsides; and one has summarized the main features of a landscape as beautiful, in the writer's opinion, as any in England.

The subjoined notes represent the impression made by the butterfly fauna on an observer and entomologist who is *not* a special student or collector of butterflies. They are gleaned

largely from written general natural history notes kept during several years. Obviously they are very fragmentary, partly because my residence in the district has never been continuous over a whole season or year, but has consisted of shorter or longer stays at almost all seasons.

The butterflies have to some extent made an impression of relative scarcity, considering the nature of the country. Not that a complete list (which mine does not profess to be) would be by any means short, or uninteresting—for some of the species are not our commonest forms. But I can never recall meeting with butterflies in such profusion as I have sometimes seen in other parts of England. For instance, a walk across the South Downs near Worthing at the end of July, 1914, was enlivened by the presence of Fritillaries, *Lycænids*, *Pieris*, *Hipparchia semele*, &c., in numbers such as could hardly have failed to strike even a very casual observer. Such abundance as this I have never found in the district under review.

HESPERIDÆ.

H. malvæ, *N. tages*, *A. sylvanus*, *A. flava* (= *thaumas*), all fairly common. I cannot recall ever having seen *A. comma*. Of written records, *H. malvæ* was seen June 6th, 1903, and in some numbers, June 26th, 1902. *N. tages*, in numbers, June 6th, 1903, while a single bad specimen was taken June 26th, 1902. *A. flava*, numbers of bright, fresh specimens were seen, July 25th, 1902; a female was taken August 8th, 1902; and a single female was captured some time in September, 1899.

LYCÆNIDÆ.

C. argiolus has appeared in greater or smaller numbers each spring, principally about gardens in the outskirts of Henley. Judging from my MS. notes, it was particularly plentiful in the spring of 1900: I recorded it that year as scarce from April 12th till about April 20th, afterwards common up till the time of my departure on May 1st; still common, May 26th-27th, reappearing in smaller numbers in July, and becoming gradually scarcer during August.*

A. corydon appears to be absent from the vicinity of Henley. Both Mr. Rowland-Brown and Mr. Bussey Bell record it as abundant in places on the steep north-western slopes of the escarpment, but the former writer states that only a few stragglers come over to the south. The heavily-wooded nature of the hills, and the much smaller extent and less down-like character of the vegetation of the open chalky hillsides, may account for its scarcity on the southern side.

* Frequently seen this year from the time of my arrival up to the time of correcting proofs, August 13th-26th.

P. icarus and *C. phlæas* are of course common. *Thecla rubi* is also fairly common in certain places.

PIERIDÆ.

Under this family I have very little to record. A single specimen of *Colias edusa* was seen in August, 1900: apart from this I do not remember seeing any *Colias*. *G. rhamnii* is abundant; dates when first noticed in spring are:—April 20th, 1901 (in numbers), April 13th, 1902, April 12th, 1905, April 16th, 1906. Nothing specially noted concerning *E. cardamines*, *Pieris brassicæ*, or *P. napi*. Dates when *P. rapæ* was first noticed in spring are:—April 22nd, 1901 (several), April 13th, 1902, April 16th, 1906.

NYMPHALIDÆ.

I have never seen any Fritillaries in this district. This may be due to my never having been at suitable places at the right time; but, considering the frequency of my visits in most seasons, my intimacy with the details of the country, and the abundance of flowers, it is hard to understand how the larger kinds, at any rate, could have been overlooked, and their absence has always seemed to me unaccountable.

P. atalanta.^{*}—This species is present, but I have never seen it in great profusion. (My only written record is of seeing a very perfect specimen on July 30th, 1900.)

I. urticæ is common, and specially noticeable in early spring.

E. polychloros.—One seen, April 22nd, 1901; one seen, April 13th, 1902; two captured between August 16th and August 24th, 1902.

V. io.—Fairly common. Dates when first noticed in spring:—April 15th, 1905, April 16th, 1906.

SATYRIDÆ.

P. megera.—Mr. Rowland-Brown writes that this species has become very scarce in the central part of the Chilterns, and Mr. Bussey Bell calls it "quite scarce along the hills." My own experience tallies with these statements, for I have no record of its occurrence in my district. But as soon as one descends from the escarpment on to the lower lands and different soil to the north-west, this butterfly appears. Thus I saw it near Wallingford on August 20th, 1915, and Mr. Rowland-Brown tells me he found it common near Moulsoford in September, 1902.

P. egeria var. *egerides*.—Moderately common.

M. galatea.—A considerable number of specimens were present on one of the flowery hillsides described above in July, 1899, and I have noticed others in the same place on subsequent occasions, but without recording the dates.

* From August 13th till August 26th, 1915. I have not seen a single *P. atalanta* in the Henley district, but *V. io* is fairly abundant.

E. tithonus.—I do not remember seeing this near Henley. Lately (August 13th–26th) I have looked expressly for it among the hills and dry valleys without success. I saw it, however, in numbers near the bottom of the steep northern escarpment* on August 20th, 1915, and Mr. Rowland-Brown tells me it is common in the lower dingles of the part of the Chilterns known to him.

E. jurtina and *C. pamphilus*.—Common.

I may add here the record of a remarkable find made last year. On September 21st, 1914, a female of the North American *Papilio philenor*, Linn., was brought to me. It had been taken in a cottage garden a mile from Henley; it was in excellent condition, and when found in the early morning appeared torpid with cold. The cottagers declared that they had seen it, or a butterfly like it, fly over their garden about three weeks before. No information was forthcoming as to who had let this insect loose or how far it had travelled, but it was not the only exotic *Papilio* seen in England last season. In the 'Field,' September 26th, 1914, p. 551, a correspondent wrote that he had seen (but not captured) on September 6th, in his garden at Warminster, Wilts, a large *Papilio* which he thought was almost certainly *P. asterius* (= *polyxenes*), also a North American form. Mr. J. H. Durrant also told me that an observer in yet another part of the country had seen a *Papilio* which he supposed to be an Oriental species.

CÆNOPACHYS HARTIGII, RATZ. (BRACONIDÆ), A
GENUS AND SPECIES NEW TO BRITAIN.

BY G. T. LYLE, F.E.S.

(PLATE X., FIG. 3.)

As recorded in the Ent. Mo. Mag. (vol. 51, p. 169) Dr. D. Sharp has recently obtained the beetle *Hypophlæus linearis*, F., in the New Forest, having discovered it in the burrows of the common *Tomicus bidens* in fallen branches of *Pinus sylvestris*. With these Coleoptera Dr. Sharp also bred several braconids, which he kindly passed on to me. I have been much interested to recognise in these a genus and species new to Britain, *Cænopachys hartigii*, Ratz., easily distinguished by the somewhat extraordinary thickening of the radial and cubital nervures of the upper wing in the male.

Ratzeburg mentions (Lehn. d. Forst. vol. 2, p. 33) that he

* Cf. Mr. Bussey Bell's statement, "abundant . . . at foot of hills."

saw specimens of this insect which had been bred from *Harpella geoffroyella*, but Marshall (Species des Hym. vol. 1, p. 248) gives *Bostrychus (Tomicus) bidens* as the host.

A short description may not be out of place:—

Colour brown or blackish, orbits and clypeus rufotestaceous, mandibles rufotestaceous with the tips blackish. Legs testaceous. Frontal crests distinct, with curved, almost parallel, keels which give the ridges a crenulated appearance when viewed in profile. Antennae blackish, male 19-jointed, female 21-jointed. Thorax punctate, metathorax more finely so. Abdomen rather longer than head and thorax, first segment striolate, more distinctly so in female, the rest smooth and shining. Terebra exerted, somewhat longer than two-thirds of the abdomen. Wings of male clouded with fuscous, the upper with a pale median transverse band, radial and cubital nervures very much thickened, the underwing with a large stigma near the middle of the anterior margin. Wings of female paler, radial and cubital nervures of upper wing not thickened, under wing without a stigma. Occasionally the second transverse cubital nervure is very indistinct in both sexes. Length, male $1\frac{1}{2}$ – $2\frac{1}{2}$ mm., female 2– $2\frac{1}{2}$ mm.; expanse, male $2\frac{3}{4}$ –4 mm., female 4–5 mm.

Altogether I have examined fourteen specimens, five males and nine females; the first appeared on April 15th and the last so recently as June 16th.

A careful search among the dead twigs, &c., from which the insects were bred has yielded two empty cocoons; these I found firmly fixed in the burrows of *T. bidens*; they are thin, white, with no gloss, and very similar in appearance to the cocoons of some of the smaller species of the genus *Apanteles*.

NOTES ON TWO SOUTH AMERICAN PARASITIC HYMENOPTERA.

By A. A. GIRAULT.

1. *Eupelmus koebelei*, Ashmead.

The colorational description is correct but the scape is not mentioned. The pronotum bears a pair of black hair tufts, each somewhat longer and more slender than the one found on the scutellum of *Cheiloneurus* for instance. Scutellum coarsely scaly, also the triangular portion of the scutum. Elsewhere, very finely scaly. Venter transversely, mesopleurum longitudinally, finely lined. Central white portion of the ovipositor distinctly broader or longer than either black portion. Funicle 1 quadrate, 2–4 subequal, longest, each a little longer than the pedicel, nearly twice longer than wide; 6 quadrate. Scape reddish brown except above at apex. Scutellum not declivous; caudal scutum glabrous, suffused with brownish, no median ridge. Axillæ sculptured like the scutellum, barely separated.

Caudal margin at meson of segments 2-4 of abdomen slightly incised. Shape of abdomen approaching a little that of *Anastatus*. Type examined.

Three females reared from dipterous larvæ in the stem of *Anatherum bicorne*, British Guiana, H. W. B. Moore, 1914.

2. *Baeus auraticeps*, n. sp.

Female.—Length, 0.75 mm.

Black, the head and tarsi dull honey yellow. Body finely reticulated, scaly, the pubescence very minute and scattered. Funicles 2-4 subequal, ring-like yet not annular, 1 larger, a little longer than wide. Pedicel nearly as long as the funicle. Differs from *niger*, Ashmead, in being larger, less pubescent, differently coloured, the second of the two transverse sclerites between the main thorax (scutum) and the abdomen longer (very transverse-linear in *niger*) and the frons is broader. From *piceus*, Ashmead, in the darker body coloration, the more distinctly scaly abdomen. From *americanus*, Howard, in the general coloration of the body and in the different colour of the male; otherwise this species (female) is very similar. From *minutus*, Ashmead, in general coloration and the sparser, shorter pubescence. Types of the named species compared.

The male is black, the legs (except coxæ) and the antennæ honey yellow, both lightly infuscated throughout; antennæ moniliform, the second or distal club joint as long as the pedicel, the other flagellar joints subglobular yet funicle 1 somewhat longer, the joints widest distad. Marginal cilia of the fore wing somewhat over a third of that wing's greatest width. Scape compressed. Head and thorax densely, finely scaly, the abdomen much less distinctly so. Segment 3 of abdomen (the first distinct basal segment, counting the rather obscure petioliform segment as 2) with short longitudinal carinæ at base, this segment occupying about a fifth of the surface, the next segment (4) extending to distal two-thirds. Propodeum with a semicircular carina across its face, the two horns disto-caudad, the apex of the arch not quite touching the base at meson.

Described from many females and two males reared from the egg-sac of a spider, Anna Regina, British Guiana, H. W. B. Moore, 1914.

Types.—Catalogue No. 19414, U. S. N. M., a pair on a slide plus one male, eight females on two tags (the latter paratypes).

SOME NOTES ON THE BUTTERFLIES OF THE COTSWOLDS (PAINSWICK DISTRICT).

By J. H. GRANT.

I RECENTLY had the pleasure of spending four days (from June 19th to June 23rd) in the delightful country surrounding

the picturesque old town of Painswick. The surrounding country is thickly wooded, the majority of trees being beech on the hill sides, with a fair sprinkling of oaks in the valleys. Making Painswick Beacon my centre I was within easy reach of Haresfield, Birdlip, and Sheepcombe, and these hills and the connecting valleys constitute, in my opinion, one of the best butterfly grounds in England.

Seated on one of the "banks" on June 21st, in the course of an hour, *viz.* from 12 noon until 1 p.m., I counted the following insects:—

Lycæna arion (eleven), *L. icarus* (eight), *L. bellargus* (six), *L. astrarche* (very numerous), *Zizera minima* (very numerous), *Argynnis aglaia* (four), *Pyrameis cardui* (one), *Melanargia galatæa* (six), *Cænonympha pamphilus* (very numerous), *Thecla rubi* (four, much worn), *Hesperia malvæ* (three), *Thanaos tages* (two), *Augiades sylvanus* (very numerous).

In addition to the above butterflies there were a good number of the day-flying moths. *Zygæna trifolii* and *Z. jilipendulæ* were very numerous and in fine condition, and *Acidalia ornata* fairly common.

During the four days I was in this district I netted about twenty *Lycæna arion* in all, only seven of which were absolutely perfect, six being very much worn, and the remainder, although in fine condition and apparently only having recently emerged, were all useless on account of small triangular pieces being missing from the ends of the fore wings. I am rather at a loss to account for this, as the fringes of the wings were quite perfect. I have heard the opinion expressed that possibly this injury was caused by ants while the wings were expanding, and certainly I cannot think of any other explanation which quite fits the case, as when the wings are injured by briars the piece usually hangs loose. It was very interesting to contrast the habits of the various "Blues"; for instance, while *L. astrarche* and *L. bellargus* seem much attached to one place, and frequently return there even after being disturbed, the *L. arion* were never at rest, but seemed to be always on the wing, flitting from glade to glade something after the manner of the "Fritillaries"; in fact this was the surest method of distinguishing them from the females of *L. bellargus* and *L. icarus*, which rather resemble them when in flight. The *Zizera minima* are also very fond of congregating in one spot in small colonies, and strongly resent any other insects trespassing on their preserves; in fact I was very much amused to see one of these fearless little insects fiercely attack a magnificent *Argynnis aglaia* which came too near the particular plant on which it rested, the combat reminding me of a picture I had recently seen of an aeroplane attacking a zeppelin! I should like to mention one peculiar circumstance I noted in connection with *Lycæna arion*, which is that during the

whole time I spent in the district I did not see a single specimen alight on wild thyme. I had several fine clumps of thyme under observation for a considerable time, and *L. arion* was constantly passing, but although I saw several rest upon the grass at the foot of the dwarf beeches and larches which grew all over the hill side, I saw none alight on their food-plant, and this tends to confirm observations made in previous years. I could have understood this better had the great majority of the insects been males, but of the twenty I netted twelve were females and eight males. *Pararge megera* were fairly common on the stone walls enclosing the fields, but were very much worn; but *P. egeria* were in fine condition and very plentiful, flitting along the tree-lined lanes from sunlight to shadow in the manner familiar to all entomologists. I took several fine specimens of *Asthena blomeri* in the beech woods at dusk, and *Iodis lactearia* were very common among the undergrowth, and in good condition. I was rather surprised to come across a fine colony of *P. plantaginis*, both males and females being in good condition, the latter especially so, and in the same valley many *Euchelia jacobææ*, *Zygæna trifolii*, and *Z. filipendulæ*. *P. plantaginis* and *E. jacobææ* were very late for this district, although many of the insects I encountered seemed rather earlier than usual.

I saw several large colonies of larvæ of *Vanessa io* nearly full grown, and individual larvæ of *Pyrameis atalanta*. I also saw many imagines of *Vanessa urticæ*, mostly in pairs, and a few *Pyrameis cardui*, all in very good condition. *Melanargia galatæa* has now become very common on all the hill sides, and on the dates mentioned were in fine condition.

Earlier in the season I have taken the following butterflies in this district:—*Argynnis cuphrosyne*, *Euchloë cardamines*, *Cyaniris argiolus*, *Nemeobius lucina*, *Polygonia c-album*, *Thecla w-album*, and later *Lycæna corydon*, *Argynnis paphia*, *A. adippe*, *Zephyrus quercus* and *Aphantopus hyperanthus*, and, in addition to these, the commoner butterflies, such as *Pieris brassicæ*, *P. rapæ*, *P. napi*, *Epinephele ianira*, *E. tithonus*, *Cænonympha pamphilus*, *Adopæa thaumas* and *Chrysophanus phloæas*, are always to be found in large numbers in their particular localities. I have never taken *Lycæna ægon* on the Cotswolds nor *Satyrus semele*, although I believe the former was taken some years ago on one of the hills. *Ino geryon* occurs in large numbers on several of the hills in early June.

Ward End, Birmingham.

THREE NEW BRITISH CHALCIDOID HYMENOPTERA: WITH NOTES.

BY A. A. GIRAULT.

1. *Coccophagus britannicus*, n. sp.

Female.—Length, 0.75 mm.

Valves of the ovipositor exerted a short distance. Black, the vertex, distal third and lateral margins of scutum, parapsides except a dot at mesal margin near (not at) cephalic end, and the scutellum bright golden yellow. Legs pale except caudal coxa and femur, caudal tibia just below the knee, distal tarsal joints and middle femora and tibiæ at base (dusky scaly). Fore wings with a lightly infuscated band across from the whole of the marginal vein. Funicles 2 and 3 subequal, each nearly twice longer than wide, 1 distinctly shorter somewhat longer than wide, more or less subequal to the pedicel. Club joints subequal to each other and to funicle 3. Flagellum subfiliform. Longest marginal cilia of the fore wing about a third of the greatest width of those wings, somewhat shorter than the caudal fringes of the caudal wings, the latter with about five lines of discal cilia where broadest. Stigmal vein longer than wide, parallel with the cephalic margin, of about uniform width. Fore wings with uniform discal cilia. Mandibles tridentate. Marginal vein rather thick, a little shorter than the submarginal.

Described from three females on a slide with *Apterotrie longiclava*, Girault.

Types.—Catalogue No. 19632, U.S.N.M., the above specimens.

2. *Coccophagus niger*, Masi.

This species differs from *immaculatus*, Howard, mainly in having the coxæ black; its sculpture I have not seen. The venter has much yellow. A female reared at Manchester from *Lepidosaphes ulmi* (A. D. Imms).

3. *Phycus testaceus*, Masi.

This species was reared with the preceding.

4. *Aphelinus mytilaspidis*, Le Baron.

What appears to be this species was also reared with the preceding.

5. *Aphidencyrus aspidioti*, Girault, *britannicus*, n. var.

Female.—Almost exactly similar to *aspidioti*, Girault, but there is very slight staining along the marginal vein, and the frons is somewhat broader. The species runs close to *Encyrtus hyalinipennis*, Mayr, and may be that species, yet the caudal knees are not white (only the base of caudal femur), and the distal halves of the first two tibiæ are not white because the middle tibia should be described rather as being somewhat broadly banded with black

proximal, since there is considerable white below the knee. Also the marginal vein is somewhat longer than the stigmal, the proximal four funicle joints are black (not yellowish-brown), and the pale portions of the legs and antennæ are white (not yellow). Also funicle 1 is a little wider than long, not quadrate, and 6 is about the same, yet much larger than 1. These are all minor differences, and the species was named with caution and yet from North American material.

The above variety is described from three females reared from *Lepidosaphes ulmi*, Manchester, Eng., A. D. Imms.

Type.—Catalogue No. 19633, U.S.N.M., two females on a slide.

Apparent males bore a very long solid club and the legs nearly entirely black; the antennæ about 5-jointed.

6. *Apterotrix longiclava*, n. sp.

Female.—Length, 0.60 mm.

Black, the vertex, caudal margin of scutum, scutellum and parapsides yellow. Fore wings with a smoky cross-stripe from the marginal and stigmal veins. Legs pallid dusky (caudal legs black), the knees, tips of tibiæ, and the tarsi pallid yellow. Antennæ dusky, filiform, yet the long 3-jointed club is indicated; pedicel longer than any funicle joint; funicles 1 and 3 subequal, each a-half longer than wide, funicle 2 abruptly shortened, somewhat wider than long; club joints elongate, 3 conical and a little shorter, 1 and 2 each about twice the length of funicle 3, over thrice longer than wide. Longest marginal cilia of fore wings over half that wing's greatest width, slightly shorter than the longest cilia of the hind wing, the latter bearing three lines of discal cilia and infuscated proximad. Stigmal vein nearly parallel with the costal margin.

The male differs in having the antennæ stouter, the first and third funicle joints longer, not much shorter than the club joints, which are somewhat shorter; pedicel shorter, slightly longer than wide; funicle 2 much wider than long. Flagellum striate.

Described from a pair on a slide reared from *Lepidosaphes ulmi*, Manchester, Eng., A. D. Imms.

Types.—Catalogue No. 19634, U.S.N.M., the above specimens with the types of *Coccophagus britannicus*.

I doubt if the characteristic of this genus will hold.

NOTES AND OBSERVATIONS.

THE RESTING-HABIT OF HIPPARCHIA SEMELE.—Other than Mr. Arkle's entertaining account of an entomological visit paid in July, 1890 ('Entomologist,' xxiii. pp. 363-366), and occasional notes scattered through the pages of our magazines, I am not aware of any special literature dealing with the Lepidoptera of Merioneth. I am unable to determine, therefore, whether *Hipparchia semele*

is as widespread inland as it is plentiful on the sand dunes stretching from Aberdovey towards Towyn, on the Bay of Cardigan. Newman, who apparently was in touch with few Welsh localities when he wrote his 'British Butterflies,' remarks that he "never saw it settling on flowers or basking in the sun (*cp.* also Mr. W. Rait-Smith on "The Butterflies of Abertillery, Mon.," 'Ent. Record,' xviii. (1906), p. 309). With regard to flowers, my recent experience is quite the reverse. The little sequestered gullies and clefts of the sand hills, running seaward from the Aberdovey golf-links, in early August are gay with the beautiful Sea Holly, *Eryngium maritimum*, and its tufts of lavender-blue blossom are visited by both sexes in considerable numbers whenever the sun shines. I even observed on one occasion the butterfly paired upon the flower-head. In the matter of basking, *semele*, I think, contrives to combine the pleasure of a sun-bath with protective mimicry. As soon as it settles on the warm sand—usually where there is some moisture—it closes the wings immediately at right-angles to the body, and lies over on the side, just as I have seen several species of *Erebia*, notably *Erebia tyndarus*, in order to escape attention. Otherwise, the tastes of the Grayling are less æsthetic; at Aberdovey I frequently saw them upon cow droppings, as abroad, where also they affect fir-tree stems upon which, when at rest, they are effectually concealed. Other butterflies haunting the *Eryngium* were *Polyommatus icarus*, with the blue females in the ascendant, and *Chrysophanus phlæas*; but "Blues" and "Coppers" alike were completely outnumbered by *Anthrocera* (*Zygæna*) *jilipendula*, the males of small size, whose pearly cocoons were hung everywhere on the marram bents. Mr. Arkle (*loc. cit.* p. 363) reports that the furze- and fern-clad slopes in the neighbourhood of the town "are said to be a locality for *Lycæna arion*." It would be interesting to know the authority for this statement; the terrain is likely enough with its ant-hills and abundant wild-thyme and marjoram. Has anyone followed up the clue at the right season of the year? It is on just such a formation as that of these hills that I have found continental *arion* most common.—H. ROWLAND-BROWN; Harrow Weald, August 8th, 1915.

PAPILIO MACHAON: A SUGGESTION.—I do not know whether there are any resident lepidopterists in Aberdovey. If so, I venture to make them a suggestion and an offer. On the slaty rocks above and in the town, and on the right bank of the river Dovey, the fennel—*Foeniculum vulgare*—attains to continental height and luxuriance; it is widely distributed and apparently emancipated from the garden. Looking up the pabulum of *Papilio machaon* given by the various British authorities I was rather surprised to find that neither Mr. L. W. Newman and Mr. H. A. Leeds, in their recent (1913) text-book, nor the late J. W. Tutt, in his 'British Butterflies,' mention this species of fennel as an alternative food plant; though Mr. South, in 'Butterflies of the British Isles,' cites it with *Angelica sylvestris*, *Daucus carota*, and *Pucedonium palustre*. Wherever the fennel grows in France on the cliffs fronting the Channel it is a conspicuous feature in the landscape, and usually

harbours at the right season the larvæ of *machaon*. With such favourable conditions of climate as Aberdovey enjoys, it should not be difficult, under like circumstances, to maintain our only Swallow-tail, and I may add that, thanks to the generous offer of a brother entomologist, I am able to provide the necessary foundation for a colony. I have never found the larvæ of *machaon* on any other plant; though this, of course, may be a mere accident, for M. l'Abbé Frionnet ('Les Prem. États des Chenilles Lépid. Français, 1906,' p. 45), has collated a considerable variety in addition, e. g. *Seseli* (possibly an error, as this is the known food plant of *P. alectanor*); *ferula* (also of *P. hospiton*); anise, *Pimpinella anisum*, and *P. saxifraga*; *Pastinacea (Peucedanum) sylvestris*, and *P. sativa*; parsley, *Petroselinum sativum*; rue, *Ruta graveolens*; dittany, *Dictamnus albus* (teste, Lambillion); *fragaria*; and loosestrife, *Lysimachia nemorum* (teste, Kirby); cabbage! (teste, Castin); and in Algeria, according to the Rev. A. E. Eaton (Ent. Mo. Mag. 1894, p. 162), *Deverra scoparia*, Cuss, & De C. The list is remarkable for the number of cultivated herbs and growths of the garden—one may doubt the cabbage—in which evidently *P. machaon* is as much at home in France as on the sea cliffs, alps, and pastures.—H. ROWLAND-BROWN; Harrow Weald, August 8th, 1915.

HIBERNATING EXAMPLES OF EUVANESSA ANTIOPA.—Mr. F. W. Frohawk's article in this month's 'Entomologist' (*antea*, p. 197) reminds me that many years ago I was going through a box of Lepidoptera taken by the late Mr. Tester, of Tilgate; seeing a large hibernated female specimen of *Euvanessa antiopa* I asked him where he got it and he told me "he captured it in the forest in the spring flying round a sallow bush." I daresay some of the old collectors will remember seeing the specimen—a very dilapidated one—in Mr. Tester's box—but what eventually became of it I know not. In 1872, when *antiopa* was almost a common butterfly, three were brought me, one of which was taken hibernating in a dining-room on September 29th of that year. There can be no doubt that *antiopa* hibernates in this country and in my opinion breeds here also (why should it not?) only so few that we have not been able to find the larva—we do not properly search for it.—A. H. JONES; "Shrublands," Eltham, August 2nd, 1915.

HIBERNATION OF PERONEA SPONSANA, Fab.—With reference to Prof. Meldola's interesting note (*antea*, p. 198) I should like to record the capture by myself of an hibernated specimen of this species in March last at South Petherton, near Yeovil; although the specimen was rather in poor condition it was quite simple to identify it.—B. S. WILLIAMS; 77, Durham Road, E. Finchley, N., August 11th, 1915.

SYMCOCA QUADRIPUNCTA, Hw.—Although this rather striking little moth is not considered a rarity it can hardly be termed a common thing. I have been in the habit of finding it on the walls in the house here and also when living at Thornton Heath, but never more than two or three in any one season; until this summer, however, I did not know how to work for it successfully. On July

24th last I was passing a fence just as dusk was coming on and was surprised to find my little friend in some numbers. I boxed a dozen, most of them getting the worse for wear, and saw nearly as many more, all on this short piece of fencing. I looked again in the morning, but not one could I find! In the early evening I went again and found out the reason of my non-success. The fence is a "close" one, *i.e.* with the pales overlapping, and as dusk came on I watched three or four crawl out from between the overlapping pales, where doubtless they sat securely hidden during the daylight hours. In a few minutes I had taken several more. Other fences of a similar description also yielded a few. I am anxious to know something about the larva and its habits. Both Stainton's 'Manual' and Meyrick's 'Handbook' are silent. The only information I have is embodied in a very interesting article by Mr. Banks (Entom. xix. 118-121) where (p. 120) he remarks, "*Ecogenia quadripuncta* (*kindermanniiella*) amongst *Parietaria muralis*, in the dead stems of which plant the larvae have been found feeding in April." From the facts of the moth frequenting houses, and the fences on which I found them being overhung by thick privet hedges filled with dead twigs and accumulated rubbish, I expect the larva is not too particular about its pabulum so long as it is dry enough!—A. THURNALL; Wanstead, August 10th, 1915.

TORTRICINA AND TINEINA IN ESSEX.—The following list includes a few species not hitherto reported from this part of Essex: *Alucita lienigiana* occurred freely as larvæ on June 8th at Thorpe Bay. When searching the ragwort for this plume two *Aristotelia hermannella* were disturbed. *Bactra furfurana* occurred in great plenty at Bowers Gifford on July 3rd, but were so worn that it was difficult out of a large number taken to get half a dozen specimens in a sufficiently good condition for the cabinet. *Aristotelia lucidella*, not previously seen in the district, was, at the same time and place, very common. Both flew freely in the late afternoon. Our public park provided, on July 11th, *Enarmonia oppressana* on the poplars and *Catoptria juliana* on the oaks, both of them in some numbers. I noticed *Argyresthia glaucinella*, new to me, on an oak trunk. A search for further examples of this species raised the total number to eight. *Scythris chenopodiella* was found on a fence at Westcliff on July 17th, and *Gelechia dodecella* on a fence, July 18th. When sweeping for *Sesia ichneumoniformis*, which was not at all rare, at Denfleet on July 30th I got *Elachista biatomella*, flying freely; occasional specimens of *Anacampsis tæniolella*, and *A. anthyllidella*; also *Parasia metzneriella* and a few specimens of *Epiblema cæcimaculana*.—F. G. WHITTLE; 7 Marine Avenue, Southend-on-Sea.

THREE APPARENTLY UNRECORDED FOOD-PLANTS OF THE LARVA OF HYPOCRITA JACOBÆÆ.—This year I found larvæ of the above-mentioned insect feeding on *Sisymbrium sophia* and on *Senecio crucifolius*. Some years ago when collecting in Puszta Peszer, in Hungary, I found larvæ on *Podospermum jacquinianum*.—N. CHARLES ROTHSCHILD; Arundel House, Kensington Palace Gardens, W.

COLIAS EDUSA IN THE NEW FOREST.—On July 6th I saw a specimen of *Colias edusa* flying in the New Forest, but was unable to determine its sex.—(Rev.) J. E. TARBAT; Fareham, Hants, July 29th, 1915.

SECOND BROOD OF ZIZERA MINIMA.—During this month quite a number of *Zizera minima* have been taken on the Salisbury downs. As all the specimens are in good condition, and most of them have the appearance of being newly out, doubtless a second brood of this butterfly has occurred.—A. S. CORBET; August 16th, 1915.

SPHINX CONVULVULI IN ISLE OF WIGHT.—On August 12th I captured male and female *Sphinx convulvuli* at a patch of *Nicotiana affinis* in my garden. This is the earliest date that I have taken this species here.—G. NOBBS; North Lodge, East Cowes, Isle of Wight.

SPHINX CONVULVULI IN LINCOLNSHIRE.—A fine specimen of *Sphinx convulvuli* was taken early this morning sitting on a towel hanging out to dry in a back yard in this town. I have no previous record of it in this district.—G. W. MASON; Barton-on-Humber, August 21st, 1915.

ZEPHYRUS BETULÆ IN EAST HANTS.—It may be of interest to record the capture to-day (August 25th) of a male specimen of the Brown Hairstreak. I took it in an open space in a large wood about a mile from the village of Hawkley. I have never come across the species in this neighbourhood before, nor is it mentioned by Mr. Oldaker in his list of the lepidoptera occurring within six miles of Haslemere (Science paper No. 5 of the Haslemere Nat. Hist. Soc.), a radius which almost reaches this district. I searched carefully for further specimens, but failed to find any. The wood abounds with blackthorn.—SYDNEY WHICHER; Westmead, Liss, Hants, August 25th, 1915.

COLEOPTERA OF SUFFOLK.—Mr. Claude Morley has just issued a first Supplement to his 'Catalogue of the Coleoptera of Suffolk.' In 1899, when the Catalogue was published, the number of species for the county was given as 1763; in the Supplement this total is extended to 1982, but the additional species only are entered. It is satisfactory to note that upwards of 50 of the 183 species included in the 1899 Catalogue on more or less doubtful authority, are now unquestionably entitled to a place in the county list.

RECENT LITERATURE.

The Genitalia of the Group Geometridæ of the Lepidoptera of the British Islands. By F. N. PIERCE, F.E.S. Illustrated by the Author. Liverpool: F. N. Pierce. 1914. Pp. xxix-88, with xlviii. Plates.

WITH the assistance of the Rev. C. R. N. Burrows, F.E.S., Mr. Pierce pursues his researches in the Geometridæ with the same methodical care and accuracy as he bestowed upon his examination

of the ancillary appendages of the Noctuidæ. This new volume comes, therefore, as a welcome supplement to the literature of a branch of entomological science ever growing in favour and importance with scientific workers. Nor will the minute diagnosis of the organs of the Geometers appeal to the biologist alone. There are plenty of collectors who experience the same difficulties in separating the species of certain Geometrid genera, as exists with the Rhopalocera and Noctuids, difficulties which a more intimate knowledge of these structures should at once resolve. For example, in the genus *Oporinia*, where wing markings are apt to confuse the inexperienced, Mr. Pierce points out that the use of a hand-lens when setting the males will materially help identification of species. He is also in a position to disperse not a few of the legends which have grown up round continental Heterocera, claimed for the British lists, and closely allied to our insular species. Mr. Meyrick twenty years ago expressed the opinion that the "British" *Abraxas pantaria*, L., were no more than exceptional aberrations of *A. sylvata*, Sc.* Mr. Pierce shows that the appendages are entirely distinct in form; and the mistake should not be perpetuated. Students will derive considerable help from the appended Glossary of Terms, to say nothing of the exquisitely drawn figures of the respective organs, to which in each case is added the name of the species represented side by side with the design; for there are many who agree with the author and with Mr. Burrows that "drawings are preferable to photographs, as the latter, by showing too much, make it difficult to grasp the significant points." We congratulate Mr. Pierce heartily on this his latest monograph. It should be in the hands of every lepidopterist who employs microscope and hand-lens.

H. R.-B.

OBITUARY.

COLONEL NEVILLE MANDERS, A.M.S., F.Z.S., F.E.S.

Another name has been added to the imperishable Roll of Honour by the death of Colonel Neville Manders, Army Medical Service—a name well-known to the Fellows of the Entomological Society of London, among whom he counted a host of friends; for he was the most genial and lovable of men, an ardent naturalist, and, above all, devoted to the specialised branch of our science which has been called lepidopterology. Born at Marlborough in 1859, the youngest son of Major Thomas Manders, 6th Dragoon Guards (Carabineers), he was educated at Marlborough College, where he early evinced an interest in the local Lepidoptera, as shown in the very last published number of this magazine (*antea*, p. 196); and he has often discussed with the writer of this notice past captures and future possibilities of the neighbouring forest of Savernake. On leaving school he qualified as F.R.C.P. and M.R.C.S., and entered the Army Medical Service in 1884. The following year he took part in the Suakin Campaign (medal with clasp and Khedive's Star). From 1887 to 1889 he was with the British forces operating in Burnmah, where he was badly

* 'A Handbook of British Lepidoptera,' p. 268.

wounded (medal and two clasps). After further service at home and in the East, he was appointed Deputy-Director of the Medical Service in Egypt, remaining at Cairo until last January, when, by special request of the War Office, he was appointed to the Headquarters Staff of the Australian and New Zealand Forces. With them he proceeded to the Dardanelles, finding time even among the battle-smoke and din of action to observe the butterflies and other living creatures pursuing their lives undisturbed in and about the trenches. Indeed, I believe his last published words to have been a description of Nature calm amidst the turmoil of war. "Wonder of wonders, there is a nightingale in full song, oblivious of the making of history, and only impressing upon a casual listener that after all it is love that rules the world."

A keen critic of the various theories of mimicry, he contributed to the discussions and Transactions of the Entomological Society, of which he was elected a Fellow in 1887; while his service in Ceylon and the Mauritius was productive of several remarkable works, over and beyond occasional notes in this and other periodicals.*

Colonel Manders was also deeply interested in the butterflies of the palaearctic region, notably of the Mediterranean French Riviera; and latterly of Egypt, where, in conjunction with Mr. P. P. Graves, he made himself thoroughly acquainted with the Lepidoptera of the Delta.

My last meeting with him was at a meeting of the Entomological Society, when he had been transferred from the Curragh to Cairo and was home on leave. His time of service was then, to all appearances, drawing to its natural close; and we discussed the pleasures of retirement to some butterfly-haunted neighbourhood where it would be possible to ride our particular hobbies at ease. He leaves behind him a widow, the daughter of Mr. F. N. Vane, of Ceylon, and one daughter. Well has she written his epitaph:—

"Il est mort sur le Champ d'Honneur."

Mrs. Manders received the following telegram from the G. O. C., the New Zealand and Australian Division: "On behalf of both myself and the whole of the New Zealand and Australian Division, I send our sincerest condolences. Your husband's work here and devotion to duty make his loss irreparable both to me and to the Division."

Truly, he was a very gallant gentleman.

H. R.-B.

* *E.g.* "Some Breeding Experiments on *Catopsilia pyranthe*, and Notes on the Migration of Butterflies in Ceylon," "Trans. Ent. Soc. London," 1904.

"The Butterflies of Mauritius and Bourbon," *id.* 1907, with a coloured plate and figures of the male and female of *Nacaduba mandersi*, Druce, discovered by, and named after, the author of the paper; and another new sub-species named and described by himself—*Antanartia mauritiana*, Manders.

"A factor in the production of mutual resemblance in allied species of Butterflies; a presumed Müllerian combination of *Euplaeus* in South India and *Amauris* in South Africa"; *id.* 1911.

"The Study of Mimicry (Batesian and Müllerian) by temperature experiments on two Tropical Butterflies"; *id.* 1912.

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A. FORD, 36, IRVING ROAD, BOURNEMOUTH.

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A NEW ABERRATION OF *EUXOA CORTICEA*, Hb.

By GEOFFREY MEADE-WALDO, M.A., F.E.S.



I took the above aberration in my light-trap at Hever on July 5th last. The specimen is a male in good condition, and falls into Tutt's section A ('British Noctuae and their Varieties', ii. p. 61); it differs from the four varieties here listed, however, in having the claviform and orbicular stigmata almost obsolete.

It may be convenient for purposes of reference to name this aberration *obsoleta*. The specimen is deposited in the British Museum.

SOME NOTES ON THE PAPILIONIDS.

By CECIL FLOERSHEIM, F.E.S.

In spite of the fact that the late Mr. Tutt warned me that an early success of mine in crossing *Papilio machaon*, male, with *P. polyxenes (asterias)*, female, was not likely to be repeated, I have mainly spent the last few years, as far as entomology is concerned, in a fruitless endeavour to obtain further hybrids amongst the Papilioninae. In the course of my experiments, it

has been my habit to turn the surplus population of my butterfly-house loose on the countryside, and I gather from letters which I have received and from notices which have appeared from time to time in the 'Field' and other newspapers, that some of the insects which I have set at large have been observed or captured by students of nature in this country.* In view, however, of the large number of specimens which I have released, amounting in the case of *Laertias philenor*, a North American pharmacophagous *Papilio*, to several hundreds each season, I have been surprised rather by the want of notice occasioned than by the reverse. It has struck me as remarkable that insects so conspicuous as *Papilio bianor* and *Laertias philenor* can be flying in considerable numbers for weeks at a time in this neighbourhood without attracting more attention. Perhaps some of the native butterflies which are believed to be extremely rare are not really so uncommon as we imagine, the more so as they are far from being as striking to the untrained eye as the species I mention.

It has been suggested that some of the exotic species of Papilionidæ which I have liberated might succeed in establishing themselves permanently in this country. This I believe to be unlikely on account of the fixed habit of double-broodedness of some, and the limited distribution of the food-plants of the others. And since my experiments, though fruitless in their main object, have given me a certain intimacy with the life-habits of the species concerned, I append some notes on the subject, laying stress on the points at which my own observations of the last few years supplement, or are at variance with, the information given in the usual text-books, including the life-histories which I worked out for the late Mr. Tutt, to which he refers in his 'Natural History of the British Butterflies,' vol. iii. part xviii., and the notes which at various times I supplied to the 'Entomologists' Record' when it was under his editorship.

The species which I have bred, or attempted to breed, in the semi-captivity of my butterfly-house, are the Nearctic Papilionids: *Laertias philenor*, *Heraclides cresphontes*, *Euphocades troilus*, *Jasoniades glaucus*, *Papilio polyxenes (asterias)*, *P. zolicaon*, *Iphiclide ajax (turnus)*; and the Palæartic: *Papilio alcinous*, *P. bianor*, *P. xuthus*, *P. hippocrates*, and *Iphiclide podalirius*. I will now deal with these *seriatim*:—

(1) *Laertias philenor*.—This beautiful and interesting butterfly, a near relative of the so-called Ornithoptera, is an inhabitant of the greater part of the United States. In spite of the fact that it is a southern species which has spread northwards, and that its congeners, with the exception of one species in Mexico, are denizens of the forests of tropical America, it exhibits great climatic adaptability. In the southern portion of the United States it is said to produce several broods in the year, and in

* Cp. Mr. Hugh Scott, *antea*, p. 212.

the northern portions of its habitat to be double-brooded. Here, on the whole, it may be said to be single-brooded, about eighty per cent. of the first brood going over the winter as pupæ after ordinary summers. Even after the exceptionally hot summer of 1911 about half my pupæ did not disclose imagines till the following year, and this in a season in which, with me for the first time, even *machaon* became almost entirely double-brooded. In common with several others of the Papilionids which I have had under observation, this species in the larval state shows great diversity in the time taken for feeding-up by different individuals, and half-grown "laggards" may be found, when "forwards" from batches of ova laid at the same time are already pupating. I think that in summers so variable as ours, this should prove a not unfavourable factor as far as the survival of this butterfly is concerned, since it is subject to the attacks of few enemies. As far as I have been able to observe during the last ten years, it is immune from parasites. The minute black ichneumon which infests my butterfly-house, and "stings" the newly-formed pupæ of all my other Papilionids, *alcinous* excepted, leaves *philenor* severely alone, and I have never bred *Trogus exesorius*, the pest of the Nearctic Papilionids, from any of the pupæ received at different times from America. It is free from the ravages of nocturnal foes of an insect kind. Neither earwigs nor Carabid beetles which prey on the young larvæ and newly formed pupæ of other species, even *alcinous*, appear to attack it, though I have seen the half-grown larvæ bitten and killed by a small green spider which abounds on my *Aristolochia*. Birds, too, show a pronounced distaste for it. The wild larvæ appear to live unmolested on the large plants of *Aristolochia* in my kitchen garden, and the pupæ have survived, though fully exposed throughout the winter, on bushes and the outer wall of a hothouse in the neighbourhood of my butterfly-house. Once when a box containing pupæ of this species and *P. polyxenes* was left open by accident in my uncovered butterfly-house during the winter, all the *polyxenes* were taken and the *philenor* left untouched. In this case I think that the culprits must have been birds, because the box in question was suspended by a string from the roof of the house, and was out of reach of other possible enemies. Mice, however, will eat the pupæ, though they prefer other kinds. In short, I think that this species would stand an excellent chance of establishing itself in the southern portions of this country were it not for the extremely limited distribution of the food-plant, *Aristolochia*, to which it is confined. In North America it is said to feed upon *Aristolochia siphon* and *A. tomentosa*, but of these *A. siphon* (Dutchman's pipe) is the only one which I have growing here. Unfortunately it does not seem to take readily to *Aristolochia clematitis*, our only native, or rather naturalized, species, which is found wild in

some parts of southern England. I have never known it to oviposit on plants of this species in my butterfly-house, always choosing *A. siphon*, and the larvæ will only feed upon it when hard up for food.

I have treated this species at greater length than I intend to do in the case of others, because of all the exotic Papilioninæ with which I am acquainted, it appears to have the best chance of surviving in this country, providing, of course, that its food-plant were grown in greater abundance. I may add, though it is outside the scope of this article, that in 1911 the first of the second-brood specimens were abnormally large, and creaked their wings, when handled, after the manner of the Vanessids, a phenomenon which I have never before remarked in this species or any other of the Papilionids I have bred.

(2) *Heraclides cresphontes*.—With this butterfly I have been wholly unsuccessful. I have had no difficulty in obtaining pairings of it in my butterfly-house. But I have never seen it oviposit, nor have I ever discovered any of its ova or larvæ. It is a native of the Southern United States, but appears to have been spreading northwards of late years, and has been met with in Canada. It is highly distasteful to birds and rests with its wings fully expanded, not closed as did the other Papilionids I have observed, I suppose in order to display its warning colours.

(3) *Euphacodes troilus*.—This species is a native of the Northern and Central United States. It has bred freely with me both out-of-doors and in my butterfly-house. In the text-books it is said to feed on lilac and magnolia, in addition to its ordinary food-plants, *Sassafras* and *Benzoni*, but though I have an abundance both of magnolia and lilac in my garden, I have never found the larvæ on anything but *Lindera benzoni* (Spice-bush)—I have no *Sassafras*. The ovum is white in colour and is laid usually on the under side of the leaf, only occasionally on the upper side. During the greater part of its existence the larva conceals itself by drawing together throughout their length the edges of a leaf of its food-plant by means of a silken carpet which it spins. Even when it is too small to do this, soon after emergence from the ovum, it bites out a transverse section of leaf and, using the same means, folds over a small portion, making a flap inside which it lives. It only leaves these tents in order to feed, returning when its meal is ended. When about to pupate, the larva, which when full grown is a bright apple green in colour, turns a clear orange brown, exactly resembling in tone a newly withered leaf of *Lindera benzoni*. It generally pupates on the lower twigs of the food-plant itself. A large proportion of the pupæ which I have received from America contained the ichneumon *Trogus exesorius*. This species, though usually single brooded with me, became entirely double brooded

in 1911. The rarity of its food-plants, *Lindera benzoni* and *Sassafras officinale*, should prevent it from ever establishing itself in this country, though in other respects it may not be unsuited. A peculiarity which I have noticed in this butterfly is that the imagines do not oviposit, or even as far as I have been able to observe, pair, for at least a week after emergence.

(4) *Jasoniades glaucus*.—This butterfly, the common tiger swallow-tail of the Eastern United States, in spite of its being a northern butterfly which has spread southwards rather than the reverse, shows far less climatic adaptability than *Laertias philenor*. Unlike that species and *Euphocades troilus*, it shows with me a noted tendency to remain double-brooded, and individuals which I have collected as full-fed larvæ and allowed to pupate in the cool temperature of a fruit-house, have still completed their transformations in the same season, emerging as imagines until late in October. This species does not oviposit freely in my butterfly-house, though I have found the larvæ out-of-doors on *Ptelea trifoliata* (American hop-tree). In the text-books it is said to feed on various Rosaceæ, &c., and indeed for a Papilionid larva, to be polyphagous. But though at the time I first bred it, plum, cherry, and birch, said to be amongst its food-plants, were grown in my butterfly-house, it always chose to lay its eggs on *Ptelea* (natural order Rutaceæ). I have found the young larvæ even on *Aristolochia siphon*. I may mention that on several occasions I have seen *machaon* pursue and attempt to pair with *glaucus* in my butterfly-house, and once I found a pair *in copulâ*. The ova were infertile as might be expected in the case of species so widely different. I may add that on this and the other occasions I mention, it was always the normal yellow female *glaucus* by which *machaon* was attracted, never the black variety. I have also seen *machaon* attracted by the female *Heraclides cresphontes*, and *Laertias philenor* (male) pursue the (female) *Euphocades troilus*. In all these cases the colours, and, to some extent, the general markings of the two species are similar. The habits of the larva of this species bear some resemblance to those of *Euphocades troilus*, in so far as it rests on a silken carpet which it spins over the middle of the upper side of a leaf. In its case, however, the edges of the leaf are only partially bent over, probably to prevent the larva from being washed away during heavy rains, not made to close completely over its back as in that of *E. troilus*. After the winter the pupæ of the spring brood of *glaucus* have a tendency to die unless supplied with an abundance of water, which would kill most other species.

(To be continued.)

A NOTE ON COLLECTING IN THE HIMALAYAS;
WHERE THE EAST AND WEST MEET.

By J. C. MOULTON, B.Sc., F.E.S.

OUR favourite study, entomology, is fortunately above most of the restrictions imposed upon mere man. Thus Kipling's immortal decree that "East is East and West is West, but never the twain shall meet," has no force in the realms of entomology. The East and West *do* meet, and, what is more, fly together side by side in the Himalayas!

Like many others in these troublous times, the writer has laid aside the forceps and net for the sword—only for a short while, let us hope—so it is with more than usual enthusiasm that Sunday is welcomed as a respite from an uncongenial occupation. Off with the cares of khaki and let us away to some wooded dell, where insect life abounds, where the mind can turn to higher thoughts.

A further word of personal explanation is perhaps necessary. The Indian hot weather began towards the end of April, and our half battalion left the sweltering plains of Delhi for the more habitable hill-station of Kailana. This stands on a narrow ridge some 7000 ft. above the sea-level, a little west of the centre of the Himalayan range; lat. roughly 31° E. and long. 78° N. On a continuation of this ridge northwards is Chakrata, where more Territorials are stationed for the hot weather. Some fifty miles north-west is the well-known hill-station of Simla, the present seat of Government; thirty odd miles to the south-east is the less fashionable station of Mussoorie, well-known to students of Indian butterflies as the *provenance* of several important collections. To the north-east of the Kailana, Chakrata ridge, some sixty miles away, the wonderful chain of snow-clad mountains rises in majestic grandeur to 25,000 ft., a magnificent sight on clear days. To the south-west one has a glimpse of the jagged Siwalik Hills, bordering the Himalayas, and beyond them stretches an interminable expanse of heat—the plains of India.

Two hours' walk from Kailana brings one to the bottom of a valley rather less than 5000 ft. above the sea-level; two hours in another direction leads to Deoban, alt. 9300 ft. Try the first walk and the Eastern collector is busy with *Acræas*, *Danaines*, *Euplœas*, *Papilios*, *Kallimas*, and other familiar friends. Try the second walk and the entomologist might fancy himself in England chasing *Colias*, *Vanessa cardui*, *Fritillaries*, "Whites," our old friend the "Sulphur," not to mention "Small Coppers" and familiar *Satyrines*. Being used to Oriental butterflies, the lower walk appealed to me first, but it was not until I had collected on the higher altitudes that the contrast, and more

especially the proximity of the contrasting species, was really brought home to me.

The following notes are intended to illustrate the two series of home reminders that I experienced in this strange land, the one series reminding me of happy years among the butterflies of Borneo, the other of earlier days after English species; both reminders of East and West, be it noted, occurring within four hours' walk or in many cases actually together in this Himalayan station.

Leaving Kailana neck at 7.30 one Sunday morning towards the end of May, we followed the road along under the shady side of the hill. Deodars, chestnuts, and an occasional big rhododendron tree formed a pleasant border to the lower side, over which we could look a thousand feet or more below. Insects of any sort were scarce at this time in the morning; the only species noticed in the first quarter of an hour's walk along the road were the two Pierines, *Aporia soraeta*, three individuals, and the blacker-veined *Aporia agathon* (*phryxe* *), and a little white moth.

As the sun rose the butterfly world soon came more into evidence; after 8 o'clock I could count ten to twelve *A. soraeta* in sight together; some chestnuts in bloom seemed particularly attractive to them. In Kailana one or two trees literally swarmed with them, and near Mussoorie, thirty miles to the south-east at about the same altitude, I saw hundreds along a short stretch of the path, but that was a fortnight before.

Two large *Lycænopsis* species appeared as the first representatives of the "Blue" family (probably *L. vardhana*), followed shortly after by a small swift-flying *Argynnis*, which devoted its energies to the marguerite daisies on the roadside.

The little white moths appeared in greater profusion. I think this species must feed on oak, as I had noticed a large number fly out from these trees a few days before.

About this time I noticed some half-dozen Pierine "casualties" in the road; two of the dark *Aporia agathon* and two of the lighter *A. soraeta* were lying dead in the road, and three more of the latter species were fluttering near by in a very feeble manner. Two were very much the worse for wear, but the others appeared to be uninjured, and I imagine their downfall was caused by a very heavy hail-storm the night before; if the hail-stones had not beaten them down, I suspect they had succumbed to the unusual cold.

A large brown Pentatomid sitting under the lee of a wall caught my eye and paid the penalty. Near him were two small Chrysomelid beetles on a black paling; they were also annexed.

* Subspecific names are placed in brackets, thus, after the specific name throughout this paper.

At 8.30 the road through the straggling township of Kailana-Chakrata came to an end at a place called Morrow's Neck. From this point the ascent continued by a good bridle-path, first along a thickly-wooded slope, then for the best part of a thousand feet over an open rocky moor-like slope, very steep in some parts, but more amenable to butterfly collecting in others.

Before coming to this, a "Small Copper," *Chrysophanus phleas*, had been added to the list, as well as one of the Satyrines, *S. schakra*, which flattens itself out against the cliffs like our allied species in England.

Once out into the heat of the open hillside, a host of butterflies engaged my attention for the best part of two hours. Fritillaries were abundant; I think there was one other species besides the common Queen of Spain, *Argynnis lathonia (issæa)*, which, however, was the only one I caught. *Vanessa cardui* is "distributed over the whole world," Bingham states, and sure enough we found him on the slopes of Deoban in some quantity and variety. I think I saw the very similar *V. indica* once; certainly both occur together at Kailana. "Tortoiseshells" (*V. cashmirensis* or *V. rizana*) added to the home-like appearance of the fauna, as did an occasional *Gonepteryx rhamni*, which, by the way, ranges throughout the Himalayas under the above familiar name, unadorned by subspecific distinction. *Aporia soracta* still followed us into this open country, but in much diminished numbers. In its place another familiar Pierine helped to enliven the scene; this was the orange-coloured *Colias eogene*, Feld., very likè our *C. edusa*.

Two swift-flying Hesperids were noted in the shady wood, and on the open slope we were able to catch a little *Syrichthus*-like species, *Hesperia galba*, Fab., flying close to the ground. Near it a species of *Macroglossa*, rather smaller than our *M. stellatarum*, was caught.

Visions of an exclusively English fauna were dispelled by a swift-flying Satyrine, in flight rather like *Limenitis sibylla* of England or *Papilio polytes* of the tropics. He first appeared at about 8000 ft, and then became quite common at 9000 ft. He was an aggressive butterfly, bigger than everything else on the wing, and apparently anxious to emphasize the fact by chasing now a Pierine, now a *Vanessa*, or perhaps, with more idea of right and wrong, one of his own kind. Bingham gives the range of this genus, *Aulocera*, Butl., as the Himalayas, Tibet, and Western China. Four rather similar species apparently occur together in the Himalayas; those I caught are referable to *A. padma*, Koll. Near the summit, 9300 ft., a large butterfly flew over, which I think must have been the leaf-like *Kallima inachus*. Several were seen 4000 ft. below this two days before, and I had seen two near Mussoorie at about 7000 ft., so perhaps this record from 9000 ft. is not impossible. In Borneo, *Kallima*

is rare, and usually found at low elevations. When alighting temporarily *Kallima* does not seem to be particular whether it selects the trunk of a tree, a branch, or the upper surface of a leaf. They are very worn here now, and I am informed that these are hibernated specimens.

Along the edge of a glade (just below the summit), carpeted with buttercups, wild strawberry plants and anemonies, fritillaries flew up and down much as in the New Forest; one big species, *Argynnis childreni*, conspicuous by the blue suffusion on the terminal portion of its hind-wing, evaded capture, as did the blue *Vanessa canace*, of which I saw two. It was a joy seeing this old friend again, whose brother subspecies I had taken in some quantity at 3000 ft. on Mt. Kinabalu in British North Borneo.

Pieris brassicæ and *P. rapæ* were seen, but only a few. Another English-reminder was taken in the person of an *Erebia*, very like our *blandina*. And like a typical day's collecting in England, not a single *Papilio* was seen the whole day, although in a gorge 3000 ft. below our path I found several lovely species: the beautiful green *Papilio polyctor* (which is replaced further east by the well-known *P. paris*), the big black *P. protenor*, a mountain species ranging through the Himalayas (from Kailana, which appears to be its westernmost limit) east to China and Siam, then another Oriental friend, *P. sarpedon*, described by Linnæus a hundred and fifty years ago. These Himalayan specimens did not appear to differ at all from those of *sarpedon* caught in Borneo. This typical form ranges from North India and the Phillippines, south to the Malay Archipelago, with subspecies extending its range as far as Japan in the north and the Solomon Islands in the south. Another beautiful *Papilio* caught at this lower altitude was *P. cloanthus*, which ranges through these mountains from Kashmere to Burma.

The absence of all these *Papilios* emphasized the British aspect of this day's collecting on the higher slopes above Kailana. A few days later *P. machaon* (*sphyrus*) was caught, reminding us that the Himalayas could produce a British *Papilio* if necessary.

The summit of Deoban was reached before mid-day, and after lunching in the open under some shady trees, in full view of the wonderful snows, we spent some hours collecting in the little glade below the summit and along some sunny paths near by. After four o'clock butterfly life became scarcer, and on our return journey down to Morrow's Neck, hardly a butterfly was seen. About 7 p.m. we reached Kailana; the sun had gone down; the vultures had finished their day's work—so sublime in the grandeur of their soaring, so repulsive in their unceasing search; now we saw them sitting in the tops of the trees below the ridge, looking like so many untidy fowls at roost. The shrill chorus of Cicadas somehow added to, rather than disturbed, the peacefulness of the gathering night.

But for these few foreign touches our day had been a pleasant reminder of collecting in England. A few days later in another walk from Morrow's Neck to a sheltered glade in a ravine some 3000 ft. below the summit of Deoban, the English dream was dispelled, and once more we could revel in all the glory of Oriental Rhopalocera. By way of a change I had brought a dozen men out armed with nets instead of rifles, and after they had been collecting for a quarter of an hour near the head of this ravine I wandered off by myself a little lower down. Soon a perfect stream of butterflies came down through the rather sparse undergrowth, and for the best part of an hour I watched them pass me. The energetic collectors above me evidently acted as beaters and drove all the butterflies of the place down the ravine and past me. None seemed to go back. The species most in evidence was the fine big Pierine *Delias belladonna*, in perfect condition. All the Papilios mentioned before were taken, also the big *sibylla*-like Satyrine *Autocera padma*, the leaf-butterfly *Kallima inachus*, the delicately traced white Nymphaline *Cyrestis thyodamas*, a strong flyer quite new to me, black, marked with orange brown, which turns out to be *Sephisa dichroa*, an essentially Himalayan species ranging from Kashmir to Kumaon. Then an occasional *Acræa*, *Pareba vesta*, which had wandered in from its more natural haunt, the open hill-side, was taken. Lycænids were in abundance, bunched together on tasty patches of mud. A few monkeys crawling about on the steep sides of the ravine, a great eagle or vulture occasionally soaring over far above us, all added to the Oriental nature of the scene, and yet 3000 ft. immediately above us, as I have described already, the entomological atmosphere was typically British.

Since those two days' collecting at the end of May, several entomological incidents have occurred to illustrate this meeting of the East and West. One night the silver-striped hawk-moth, *Hippotion celerio*, blundered into the room, just as he ought to in England when one wants to finish a day's collecting with a good capture. Another night the eastern element paid a visit in the person of a noisy Cicada, *Platylocma saturata*, and one afternoon I found one of those enormous mosquitoes in the house, a species of the curious genus *Toxorhynchites*, very like two species of this genus which we get in Borneo.

In July the rains began; on some of the finer days between the storms, great swarms of locusts visited us. By timing them over a small stretch of ground I calculated their rate of travelling as about nine miles an hour. To one who had never seen them before they presented a wonderful spectacle. The whole valley below us was literally brown with them and the air thick with them, just as if they were large brown flakes of snow moving before the wind. They did a lot of damage to the

vegetable gardens, but apparently did none to the trees on which they rested in millions. The crows enjoyed a feed of them, but other birds did not appear to come out after them; probably they stayed quiet in the bushes catching all they wanted there. The species was *Acridium peregrinum*, in its pink and brown migratory coloration.

The lovely green dragonfly *Neurobasis chinensis* (possibly a distinct local race here) reminded me of many a tropical scene in the interior of Borneo. The common Pierines, *brassicæ*, *rapæ* and *G. rhamni* rudely jerk one into duller memories of Palæarctica. Then a large Tabanid fly, probably *Pangonia longirostris*, thrusts a three-inch proboscis into a flower before me, as much as to say, "What about me? Do I remind you of East or West?" No, *Pangonia*, you are new to me, and will therefore serve as a good reminder of these wonderful Himalayas.

A comparison of East and West in the entomological world, as represented by the insects of this small portion of the Himalayas, could provide material for a very lengthy paper; but I have written enough to record my own pleasant surprise at meeting old friends of East and West, and I hope these notes may be sufficient to rouse the interest or pleasant memories of other entomologists who have had similar experiences.

A country which offers the possibility of captures *παραπροσδοκίαν* is more than usually attractive to the entomologist.

Kailana, United Provinces, N. India, August 18th, 1915.

NEW SPECIES OF NOCTUIDÆ FROM FORMOSA.

By A. E. WILEMAN, F.E.S.

(Concluded from p. 196.)

Chusaris (?) *angulata*, sp. n.

♀. Head white, thorax ochreous white flecked with brown. Fore wings ochreous white finely flecked with darker brown; ante-medial line black, nearly straight, interrupted; postmedial line black, deeply angled beyond end of cell, interrupted; discoidal spot black, almost round; terminal lunules black. Hind wings rather white, traces of a dusky discoidal dot. Under side whitish brown flecked with dark brown and blackish; all wings have a dusky discoidal mark and a black transverse line beyond; the line on fore wings angled and only distinct towards the costa; the line on hind wings wavy.

Expanse, 17 millim.

Collection number, 1391 A.

A female specimen from Kanshirei, April 30th, 1908. Three specimens from Kanshirei (Wileman) in the British Museum.

Hypenagonia bipuncta, sp. n.

Fore wings pale brown finely sprinkled with darker brown, costa dotted with darker brown; a black dot on the cell and two black spots at outer end of the cell; postmedial line dark brown, outwardly edged with whitish, inwardly shaded with purplish brown, band round cell thence inwardly oblique to dorsum; subterminal line dusky, diffuse, outwardly shaded with purplish brown; terminal dots black, connected towards apex; fringes pale brown mixed with grey-brown. Hind wings pale brown sprinkled and mottled with darker, whitish towards base; two black discoidal spots placed on a purplish brown band which is outwardly edged with black followed by a whitish diffuse line; postmedial line dark brown, diffuse, preceded by a dark brown medial shade; terminal dots black, connected towards apex, fringes pale brown. Under side pale brown, suffused with darker on the fore wings; all the wings have a black discoidal mark; there is a black dot in cell of fore wings and traces of dark transverse bands on the hind wings.

Expanse, 14 millim.

The type, from Formosa (Wileman), is in the British Museum.

Hypenagonia angulata, sp. n.

Head and collar whitish brown, thorax darker brown; abdomen brown, paler at the base. Fore wings rather pointed at apex; termen bluntly angled at vein 3, whitish, suffused with pale brown and finely sprinkled with blackish scales; costa dotted with black towards apex; subbasal line indicated by a black dot on the costa and one below it; antemedial line black, interrupted, angled at costa, turned in at dorsum; discoidal mark black; postmedial line black, outwardly edged with whitish, excurved from costa to vein 3 thence inwardly oblique to dorsum; subterminal line formed of black dots edged with whitish, preceded by an almost parallel whitish line with two black dots on it about middle and one nearer the costa; terminal line black, not distinct between angle and termen; fringes whitish, brownish at tips and marked with dark brown at angle and apex. Hind wings slightly angled at vein 3; whitish with two brown transverse bands and a medial brown shade; discoidal mark black, followed by an almost straight black line, the latter forming the outer limit of the inner brown band; black scale on the outer brown band; subterminal line formed of linear black dots, area beyond pale brown, fringes slightly paler. Under side whitish clouded with brown on fore wings, markings somewhat as above but with some short black bars between the veins on terminal area of fore wings.

Expanse, 18 millim.

Collection number, 1298.

Two female specimens from Kanshirei, June 14th, 1906, and July 11th, 1908; also a male in poor condition and minus antennæ, August 3rd, 1908. Four specimens from Formosa (Wileman) in the British Museum.

Nearest to *H. brachypalpia*, Hampson.

Hypenagonia minor, sp. n.

♂. Head and thorax whitish, the latter brown tinged; abdomen brownish also whitish but inclining to brown at base. Fore wings angled at vein 3, apex pointed; whitish, suffused with pale brown, faintly dotted with black on costa; medial band rather dark brown enclosing traces of a whitish line, inner edge dark brown and almost straight, outer edge diffuse obtusely angled above middle; discoidal mark blackish, edged with whitish, a black dot at each extremity; subterminal dots black, more or less connected towards costa, preceded by an interrupted and irregular brown band; fringes whitish, brown at base. Hind wings whitish, suffused with pale brown chiefly on costal and terminal areas; medial line brown, double, blackish discoidal mark on the inner; subterminal dots black, preceded by a brown irregular band; fringes whitish, brown at base.

Expanse, 14 millim.

Collection number, 566.

One example of each sex, the male from Takow (plains), November 1st, 1905; the female from Tainan (plains), September 29th, 1905.

Possibly this may prove to be a small form of *H. angulata*.

Anepa indentalis, sp. n.

♂. Antennæ with moderate long bristles. Head whitish, thorax brown, ochreous tinged; abdomen brown, whitish towards the base, tufts rather darker brown. Fore wings brown, ochreous tinged; antemedial line blackish, excurved, indistinct except towards the dorsum; postmedial line whitish, white and outwardly oblique to vein 4 where it turns under the cell, thence almost straight to dorsum; space between antemedial and postmedial line rather darker, a black dot in the cell; subterminal line indicated by seven black dots—three near the costa, two about the middle, and two near dorsum; fringes darker than the ground colour. Hind wings fuscous, fringes paler. Under side pale brown, clouded with blackish on disc of fore wings.

Expanse, 35 millim.

Collection number, 1875.

A male specimen from Kanshirei, April 21st, 1909.

Neachrostia leechi, sp. n.

♂. Fore wings pale brown freckled with darker especially on the terminal area; antemedial line black-brown, interrupted about middle; postmedial line black-brown, wavy, elbowed below cell, united with a blackish spot in cell; subterminal line pale, sinuous, inwardly edged on costal area by a black-brown spot; terminal line black, fringes whitish. Hind wings fuscous, discoidal dot and transverse line beyond blackish; terminal line black, fringes whitish. Under side of the fore wings pale brown suffused with darker; hind-wings pale brown freckled with darker on the costal area, discoidal lunule and line beyond black.

♀. Similar, but the medial area of the fore wings is whitish and the black-brown clouding less distinct.

Expanse, 15 millim. ♂ ; 18 millim. ♀ .

Collection numbers, 1301 ♂ and 1039 ♀ .

A male from Arizan (7500 ft.), August 15th, 1908, and a female taken in September, 1906. There is a specimen from Arizan (Wileman) in the British Museum. Also two specimens of a *Neachrostia* from Moupin that are probably referable to this species.

Neachrostia limbata, sp. n.

♀. Head and thorax whitish brown flecked with dark brown; abdomen whitish brown marked with darker on the segments. Fore wings whitish brown, freckled with darker, lightly between the antemedial and postmedial lines and heavily beyond the postmedial; antemedial and postmedial lines black-brown, approaching each other above and below the cell; subterminal line pale, sinuous, inwardly clouded with black-brown. Hind wings whitish suffused with fuscous, discoidal dot darker. Under side of fore wings suffused on the disc with fuscous, costa pale brown marked with darker, dorsal area whitish; hind wings whitish marked with brown on costal area, discoidal dot black, postmedial line blackish deeply indented about middle.

Expanse, 18 millim.

Collection number, 1354.

Four rather worn females from Arizan, August, 1908.

Near *N. leechi*.

Magulaba nigromaculata, sp. n.

♂. Head and thorax pale grey-brown, minutely speckled with black. Fore wings pale grey-brown finely speckled with black; antemedial and postmedial lines blackish, sinuous; subterminal line pale, wavy, indented on costal area; subterminal and postmedial lines preceded by black marks; the antemedial line is followed by a black mark, and there is a black mark near base of the wing; discoidal bar black, followed by a blackish shade; terminal lunules black; fringes pale brown, inclining to ochreous at the base. Hind wings dark fuscous, terminal lunules black, fringes pale brown ochreous at base. Under side pale brown sprinkled with darker, costa dark brown dotted with whitish; disc of fore wings suffused with dark fuscous; dorsal area of hind wings whiter.

♀. Generally darker and greyer on the fore wings, the hind wings blackish; markings as in the male.

Expanse, 20 millim.

Collection number, 1042.

One example of each sex from Kanshirei, the male taken April 18th, 1906, and the female October 27th, 1908.

Allied to *M. mæstalis*, Walk.

Antarchæa (?) *sordida*, sp. n.

♂. Head and thorax whitish brown mixed with darker brown; abdomen brown, segmental divisions whitish. Fore wings whitish

brown, suffused and clouded with darker brown; a small black spot in the cell and a white spot at outer end of the cell enclosing a black-brown ring and a brown 8-shaped mark beyond end of the cell; subterminal line pale, costal half bordered inwardly with blackish and followed by some blackish marks; terminal dots black, at ends of the veins. Hind wings whitish, powdered with brown. Under side whitish suffused with fuscous on disc of the fore wings, and sprinkled with brown on the hind wings; all the wings have a dusky discoidal mark and line beyond.

Expanse, 23 millim.

Collection number, 1400.

Two male specimens in rather poor condition from Kanshirei, April 28th, 1908, July 7th, 1908.

Paragona biangulata, sp. n.

♂. Palo greyish brown, sprinkled with dark grey; antemedial line blackish, sinuous; discoidal mark black, lunular; postmedial line black, acutely angled at middle and less acutely above middle; subterminal line dark grey, serrated, indistinct; some blackish clouds on terminal area; terminal line black, interrupted; fringes dark grey, pale at the base. Hind wings pale greyish brown sprinkled with darker grey; traces of blackish antemedial line, discoidal mark and some clouds on terminal area blackish; terminal line and fringes as on fore wings.

♀. Similar to the male but somewhat darker in colour.

Expanse, 16 millim. ♂; 18 millim. ♀.

Collection numbers, 550 and 1361.

A male specimen, August 15th, 1905, and a female, May 29th, 1908; both from Kanshirei. There is a specimen from Kanshirei (Wileman) in the British Museum.

SOME REMARKS ON *THECLA ÆSCULI*, Hb.

BY G. T. BETHUNE-BAKER, F.E.S.

I AM most interested in Mr. Rowland-Brown's valuable paper on *Thecla* (or, as I think we should call it *Strymon*) *ilicis* var. *æsculi*. I should be thankful for the elucidation of any species of the *Ruralidæ* that could be undertaken in like manner. There is one thing, however, that has set me wondering, that is why Mr. Rowland-Brown says that I retain *æsculi* as a local form of *ilicis*.* As a matter of fact I do not think I have ever considered the question, and, strange as it may seem, I cannot recollect ever having taken *æsculi*. I have referred as far as I could, and

* I was evidently mistaken with regard to Mr. Bethune-Baker's views of the species designated. I have an idea that the identity suggested was derived from an MS. note, but I may be mistaken; and Mr. Bethune-Baker has now resolved the ambiguity for which I was responsible.—H. R.-B.

“ Colour : *Cerri*, darker, greyish brown.

Æsculi, lighter brownish grey.

“ Marginal peacock eyes, hind wings :—

Cerri, diminishing rapidly in size as they extend from the anal angle ; and somewhat lighter ground-colour.

Æsculi, not diminishing in size from the anal angle outwards ; somewhat darker than ground-colour.

“ Row of spots or white lines, hind wings :—

Cerri, extending from anal peacock-eye to nearly middle of costal edge.

Æsculi, nearly parallel with hind margin.

“ The arrangement of these spots or dashes to one another is quite different in these two species. There is, also, a difference in the shape of the tails.”

This latter point Mr. Tylecote emphasises in his communication to Dr. Rosa as follows :—

“ (i) *Cerri* : Tails generally thin, and of the same breadth throughout ; tips of antennæ dark brown.

“ (ii) *Æsculi* : Tails short, and wedge-shaped ; tips of antennæ dark brown.”

I have again examined the examples of both species in my possession, and recognise Dr. Rosa's additional points of differentiation now brought to notice. Guenée, as recorded, remarks a difference observable between the respective antennæ ; but his label in the Oberthür collection does not specify of what these differences actually consist.

Harrow Weald : September 14th, 1915.

NOTES AND OBSERVATIONS.

ENTOMOLOGICAL CLUB.—A meeting was held at “Hodeslea,” Eastbourne, on September 18th, Mr. Robert Adkin being the host. The members and guests assembled at 1 o'clock, and, having partaken of lunch, strolled along the front of the cliffs where such of the local butterflies remained on the wing at this late season of the year were noted, among them *Agriades corydon* and *A. bellargus* flying together in some numbers. After a stiff climb to the “head” tea was taken at the Beachy Head Hotel, the return being made by way of the Paradise Down. The Club supper was held at “Hodeslea,” the members present being Messrs. G. T. Porritt, H. St. J. K. Donisthorpe, and the host of the day ; the honorary members, Messrs. A. H. Jones and Richard South ; and the guests, Messrs. E. J. Bedford, W. L. Distant, A. E. Gibbs, E. P. Sharp, A. E. Tonge, and H. J. Turner. After supper Mr. Turner exhibited a number of specimens of *A. corydon* recently taken at Royston, and Mr. Adkin a living specimen of *Polygonia c-album* taken in the “Hodeslea” garden that morning. Later several of the company returned to

London, but those who were able to stay over the week-end took the opportunity to visit Abbot's Wood, where a pleasant morning was spent, the afternoon being devoted to a well-earned rest in the garden, where the scene was enlivened by the numbers of *Pyrameis atalanta* that visited the flower beds. Some additional interest was manifested in the meeting from the fact that it was held at the house where the late Professor Huxley spent the later years of his life.

RESTING HABIT OF HIPPARCHIA SEMELE.—I was very interested in Mr. Rowland-Brown's note (*antea*, p. 218) on the resting habit of *Hipparchia semele* at Aberdovey, and having recently returned from the same coast, I am able to inform him that as far as my observations went *semele* is confined to the sandhills. My opportunities were limited, as I was very late for this species, but I observed it frequently on the sandhills at Llanbedr (where I was staying), Harlech and, on my single visit, at Aberdovey. I worked very considerably over the country for some six miles back, from Llanbedr and Harlech, and on one occasion for about the same distance behind Portmadoc, but did not see a single specimen, although much of the country is just the kind where one would expect it. Of course it may have been over on the inland ground, but I do not think so, as taking a line through *Pararge megara* (which was very plentiful), these were certainly as fresh—if not fresher—on the higher ground, than by the sea. The habit of lying over on its side that Mr. Rowland-Brown describes is very familiar to me, and I have noticed it much more frequently with *semele* in its chalky and sandhill localities, than when it occurs on peaty ground, but I think the habit is not an uncommon one among Satyridæ. I have certainly observed it in *Epinephele ianira* and *Erebia epiphron*. The habit of resting on pine trunks is also very familiar, and in the New Forest I have even found it settled there after sundown. In general *H. semele* can scarcely be considered a flower-loving butterfly, but on occasions—as Mr. Rowland-Brown found at Aberdovey—it will visit them in some numbers. Two instances occur to me: the first, many years ago at marjoram blossoms in a hollow on the Polegate Downs, and the second in the present year at scabious on the Cliffe Hill, Lewes. On this last occasion the scabious was growing in among long grass, and *semele* was resting on the flowers in considerable numbers. There is much ground behind Llanbedr, apparently exactly similar to that upon which *Lycæna arion* occurs in North Cornwall, but I know of no one who has worked there at the right time. The locality is quite new to me and apparently a very rich one. I hope on some future occasion to have an opportunity of visiting it earlier in the year, when Mr. Arkle's *arion* suggestion could be put to the test.—RUSSELL JAMES; Brockenhurst, Bloomfield Road, Highgate, N., September 16th, 1915.

HIbernated EXAMPLES OF VANESSA ANTIOPA.—In his note in the 'Entomologist' (*antea*, p. 220), Mr. A. H. Jones states that in his opinion *V. antiopa* breeds in this country and adds "why should it not"? I think this question can easily be answered. The number of specimens which survive hibernation in Britain are undoubtedly

very few, and distributed over wide areas; consequently, after hibernation, when pairing takes place, it appears to me extremely probable that the sexes are unable to find each other owing to the localities where they occur being widely separated, and as far as we know hibernated examples do not migrate to these shores in the spring. Mr. Jones further states that we do not properly search for the larvæ. This can hardly be the case, because the larvæ of this insect are very conspicuous and would require but little searching for on account of their gregarious habits, black colouring, and large size; consequently, a brood of these caterpillars during their last two stages, forming a black mass on the foliage of trees would, no doubt, have been readily detected at some time or other by entomologists had they existed here.—F. W. FROHAWK.

LYCÆNA ARION IN NORTH WALES.—Mr. Arkle's reference to the supposed occurrence of *L. arion* at Aberdovey (*antea*, p. 219; *et vide* 'British Butterflies,' J. W. Tutt, vol. iv., p. 351) is probably "teste Kerr." Nearly fifty years ago, when a boy, I spent a summer holiday there with my people, and on that occasion I met an old gentleman, a keen entomologist, who was collecting in the district. Even in those days I was possibly keener than most schoolboys about butterflies and moths, and he most kindly helped me in many ways. I still have a copy of Stainton which he gave me. He showed me some boxes of insects he had taken, and amongst them I am almost certain—though at this distance of time I cannot be certain—were some *arion*. What I am certain of is that he told me *arion* occurred on the hills where the Trefiddian Hotel now stands. Some twenty-five years elapsed, but I had not forgotten my old friend and his *arion*, and when an opportunity occurred I visited Aberdovey with a good hope, not to say expectation of seeing the insect. In glorious weather during the first week of July I tramped over the whole district, taking many interesting things, but no *arion* were seen. Since then, many July days have been spent on the hills overlooking the sea between the village and the cemetery. The "Large Blue" has never been sighted. That is the story of the supposed existence of *arion* at Aberdovey. Personally I still believe that it once flew there, though I fear now long extinct, as has happened in other localities for the butterfly in England; though, perhaps, on the evidence I can hardly expect others to be equally convinced. Some five years since I took *arion* freely near Bude, and last year more sparingly on the Cotswolds. I noticed how similar in many ways the localities were to the Aberdovey hills.—W. J. KERR; Falconside, Cromer, September, 1915.

INJURY TO THE WINGS OF LYCÆNA ARION.—I think I can account for the injured specimens of *L. arion* alluded to by Mr. J. H. Grant in his notes on the "Butterflies of the Cotswolds" (*antea*, p. 215). It is the practice of a certain dealer to capture large numbers of specimens for the purpose of examining them for varieties, and all that are found to be normal are marked by removing the apices of the fore wings, and then liberated; by this means they can be recognised, which saves the trouble of recapturing them.—F. W. FROHAWK.

CUCULLIA LYCHNITIS AND VERBASCI IN THE CHILTERN DISTRICT.—In the year 1893 I found a few larvæ of *C. lychnitis* feeding on their food-plants on the sides of one of the Chiltern hills. From that time I always associated this species with the dry hillsides, but during the present month I have had cause to modify my views. I came unexpectedly upon a waste piece of land some distance from the hills, and the ground, which was in most places soft and spongy, was covered with a profusion of the golden-yellow flowers of the food-plants. By searching I obtained some dozens of the larvæ of *C. lychnitis* of all sizes, varying from the little larva just emerging to the perils of caterpillar life, to the full-fed individual about to burrow in the soil. It was interesting to note that the smaller larvæ were feeding on the flowers, whilst the largest were bravely attacking the seeds. From the fact that larvæ were taken of various sizes, it is clear that the plants must have been visited by several female moths. No doubt *C. lychnitis* can adapt itself to circumstances in a similar manner as *C. verbasci* does, for at one time or another I have met with this latter larva on hill-tops, in valleys, and by the sides of streams. Until this year I had never met with *C. verbasci* in the Chilterns, but this July I came across plants in the hollows of the hills that had been eaten to a "frazzle" by the larvæ. They had, however, "gone down," and I only met with a single belated individual.—A. J. SPILLER; Chinnor, Oxon., August 24th, 1915.

ABNORMAL ANTHROCERID (ZYGÆNID) PAIRING.—M. René Oberthür in a recent letter to me mentions a curious case of abnormal pairing. He writes, under date August 28th last: "There has recently been taken at Vernon, Eure, a Zygænid coupled with *Malacosoma neustria*. This sounds almost incredible, but the old authors who placed the Zygænids near the Bombycids appear to have been somewhere not so far of the mark." There have been several cases reported of abnormal pairing in this group; at one of the recent meetings of the Entomological Society of London I believe that it was stated that a pairing with *Dryas paphia* had been observed.—H. ROWLAND-BROWN; Harrow Weald, September 14th, 1915.

HIPPARCHIA (SATYRUS) SEMELE AND FLOWERS.—Respecting Mr. H. Rowland-Brown's remarks on *Hipparchia semele* settling on flowers, I may say that during many years observation I have only very occasionally seen this butterfly settle on flowers; in fact, as far as my memory serves me, it was not until ten years ago that I first saw this species feeding on blossoms, when on July 12th, 1905, at 3 p.m. in Cornwall, I was surprised to see within the space of a few minutes, no less than three *semele* feasting on the nectar of three different kinds of flowers, viz. centaury (*Erythraea centaurium*), bramble (*Rubus fruticosus*), and field thistle (*Carduus acanthoides*). Again, on August 12th last, I observed and captured a female example while settled and feeding on the blossoms of hedge calamint (*Calamintha clinopodium*).—F. W. FROHAWK; September, 1915.

ARGYNNIDS IN WEST LONDON.—On August 13th last I noticed a pair of large Argynnids flying round and settling upon a golden privet hedge in the garden here; I am practically certain the species was *A. aglaia*.—W. R. TAYLOR; 86, The Avenue, West Ealing, W.

ZIZERA MINIMA IN AUGUST.—I notice that a second brood of *Zizera minima* is recorded as occurring on the Salisbury downs (*antea*, p. 222). I may say that a partial second brood has also occurred in this district in August for the past two years. These August specimens were nearly all males, and for the most were much larger and finer than the specimens occurring in May–June.—A. T. POSTANS; 55, Raglan Street, Portsmouth, September 13th, 1915.

EUROIS OCCULTA IN DURHAM.—Two specimens of *Eurois occulta* were taken from a tree-trunk at Castle Eden, county Durham, on August 21st.—W. R. TAYLOR; 86, The Avenue, West Ealing, W., September 8th, 1915.

NOTODONTA DODONEA FEEDING ON BEECH.—On September 1st, 1914, I met with a full-grown larva of the above species feeding on beech in a wood near Watlington. The moth emerged on May 24th, 1915, and was a fine female specimen. About twenty-four years ago I also met with two larvæ on beech trees, and the late Rev. Bernard Smith, of Marlow, told me he had met with a similar occurrence himself.—A. J. SPILLER; Chinnor, Oxon.

COLIAS EDUSA AT EASTBOURNE.—I first noticed *Colias edusa* in this neighbourhood on September 5th, when one was seen flying on the downs near the sea, and another on the flowery banks of the parades in front of the town. In this last named position I have also seen one on 13th, two on 17th, and four on 18th, and on 19th one in my garden; they all appeared to be males, and none of them in very fresh condition. My chances of observation have not been frequent, but from the foregoing I should conclude that the species has been by no means rare in this immediate neighbourhood this autumn.—ROBERT ADKIN; "Hodeslea," Eastbourne, September 22nd, 1915.

COLIAS EDUSA IN ESSEX.—On September 3rd I saw a specimen on the wing making comparatively slow headway against a strong westerly wind at Thorpe Bay, Essex. As it was some distance from me I could not determine the sex with certainty, but I believe it was a female. This is the only specimen I met with in Essex this year where this species generally occurs.—F. W. FROHAWK; September, 1915.

COLIAS EDUSA AT BRIGHTON.—On August 25th a very fine freshly emerged female was netted by F. Jay Arnott in the Devil's Dyke Valley, Poynings, near Brighton. On September 8th a recently emerged male was caught by Mr. F. G. S. Bramwell on the downs close to Stammer Park, near Brighton. On September 13th a male was observed flying rapidly in the Devil's Dyke Valley by Messrs. F. G. S. Bramwell and F. J. Arnott.—F. JAY ARNOTT; Springfield Road, Brighton.

ABERRATION OF VANESSA IO.—A specimen of *Vanessa io*, which flew into the bedroom of our neighbour, Mrs. Humphry, and which was captured by Miss Rhoda Stubbs, was found to be a fine variety; the eye-spots on the fore wings being replaced with a white suffusion. The spots on the hind wings are as in the type.—JOSEPH ANDERSON; Chichester.

MULTIPLE COCOONS.—In the 'Entomologist' there have appeared two records of multiple cocoons, *viz.* a double cocoon of *Habrosyne derasa* (February, 1915, p. 44), and a double cocoon of *Dasychira pundi-bunda* (July, 1915, p. 170). In a brood of larvæ of *Malacosoma neustria* which I reared this year, in one case three larvæ spun up in a large common cocoon on a sprig of hawthorn. The cocoon was of the usual doubled walled structure, but there was no partition whatsoever within the cocoon to divide the pupæ off from one another. The three imagines all made their exit from the cocoon through the same hole.—F. G. MANN; "Oreston," 21, Thurlby Road, West Norwood.

POLYGONIA C-ALBUM IN SUSSEX.—On the morning of September 18th, among the number of Vanessids that for the past week or two have been wont to gorge themselves at the flowers of the Michaelmas daisies in my garden at Eastbourne, one was noticed which appeared to differ from the common herd, and, on being secured, it was found to be *Polygonia c-album*. Although as a specimen it is in by no means bad order, it is evident upon a close examination that it had been on the wing for some time before capture.—ROBERT ADKIN; "Hodeslea," Eastbourne.

SPHINX CONVULVULI AT BRIGHTON.—One female taken on August 13th in Queen's Park, Brighton, and another in the same locality on September 3rd.—F. JAY ARNOTT.

SIREX GIGAS AT CHICHESTER.—Three specimens of *Sirex gigas* (all males) have been taken in this neighbourhood during the month of August. The first on the 9th of the month.—JOSEPH ANDERSON.

SPHINX CONVULVULI IN HAMPSHIRE.—I took a fine female specimen yesterday, September 17th, at Hill Head (near Titchfield), Hants. It was crawling on the cliff path just above the beach, unable to fly, but in very fair condition.—R. BARNARD CRUICKSHANK; 22, The Crescent, Alverstoke, Hants, September 18th, 1915.

SPHINX CONVULVULI IN LANCASHIRE.—It is so seldom that one of these visitors is recorded from the Southport district, that perhaps it may be worth mentioning a capture in Ainsdale on August 22nd last. The specimen is in the collection of Mr. Stanley Gibson, Ainsdale.—W. A. TYERMAN; 4, Cathedral Mansions, Huskisson Street, Liverpool.

SPHINX CONVULVULI IN SCOTLAND.—The last time I wrote to the 'Entomologist' was in 1897-98, on some of the Lepidoptera of Tirah. Many years have rolled by, and now again, during wars alarms, I feel constrained to report to you the occurrence of a *Sphinx convulvuli* asleep on the fence outside camp here, where I left it undisturbed. Strong northerly winds have prevailed the last few days, and my sleepy friend had travelled and slightly frayed his wings.—K. DINGWALL (Major); Tenth (Service) Battalion, Seaforth Highlanders, Tain, Ross-shire, N.B., August 24th, 1915.

ERRATUM.—Page 221 (line 25 from bottom) for "ragwort" read "mugwort."

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*Wednesday, May 5th, 1915.*—The Hon. N. C. Rothschild, M.A., F.L.S., F.Z.S., President, in the chair.—Following on his exhibits and notes of March 3rd last, Mr. Newman again exhibited living pupæ of *Pyrameis atalanta*, and said he thought he might now fairly claim to have proved that this species can pass the winter in England in this condition.—Mr. Talbot exhibited specimens of the genera *Hyades* and *Tenaris*; also, on behalf of Mr. J. J. Joicey, some new Lepidoptera from the Arfak Mountains, Dutch New Guinea.—The Rev. F. D. Morice drew attention to a paper in the *Trans. Ent. Soc.* vol. i. (1836) by W. Spence on "The Italian Mode of Exclusion of the House-fly."—Prof. Poulton read "Further Notes on the Habits of the African Ant *Megaponera fœtens*, F.," an account sent to him March 27th, 1915, by Mr. C. O. Farquharson. He also exhibited specimens from a collection kindly sent to the Hope Department by Archdeacon G. K. Kestell-Cornish from Ambinanindrano, Mahanoro, Madagascar (about 400 ft.). Also a Uganda bug devouring a Lycaenid butterfly.—He also read a letter from Dr. G. D. H. Carpenter containing observations on butterflies and the attacks made on them by birds, about thirty miles W. of the Victoria Nyanza and about 1 deg. S. lat.—The following papers were read: "New Lepidoptera from New Guinea," by J. J. Joicey, F.L.S., F.E.S., A. Noakes, F.E.S., and G. Talbot, F.E.S.; "Descriptions of South American Micro-Lepidoptera," by E. Meyrick, B.A., F.R.S., F.E.S.; "Life-History of *Caligo memnon*," by F. L. Davis, M.D., F.E.S.; "Some Palearctic Species of *Cordulegaster*," by Kenneth J. Morton, F.E.S.; "Experiments on some Carnivorous Insects," by C. F. M. Swynmer-ton, F.E.S.

Wednesday, June 2nd.—The Hon. N. Charles Rothschild, M.A., F.L.S., F.Z.S., President, in the chair.—Dr. A. B. Northcote, Blenheim House, Monkgate, York, was elected a Fellow of the Society.—Dr. Chapman exhibited some full-fed larvæ of *Agriades escheri* bred from the egg.—Mr. O. E. Janson, specimens of *Ornithoptera alexandrae* selected from a series to show the extreme variations in the wing-markings; also a female example of *Morphotenaris kenricki*; all from New Guinea.—Mr. C. B. Williams, a method of breeding *Psocidae* and other small insects which feed on fungi, &c.—The Rev. F. D. Morice, a female of the solitary bee *Andrena labialis* taken near Woking on May 19th, 1915, having attached to the disc of its clypeus a vegetable substance, apparently a pollinium of some orchid.—Mr. Donisthorpe, specimens of the ants *Anochetus cameroni*, Forel, a new species taken by Dr. Cameron at San Roque, December, 1914, and *Cremastogaster injlata*, F. Smith, taken by Mr. Bryant at Saruwak, December, 1913.—Prof. Poulton read "Further Observations on African Insects by Dr. G. D. H. Carpenter.—Dr. Eltringham exhibited a family of five examples of *Acrea johnstoni*, Godm., bred by the Rev. K. St. A. Rogers at Sagalla, B.E.A., together with the female parent.—Comm. Walker, living specimens of *Elater*

sanguinolentus, beaten from *Pinus sylvestris* at Brockenhurst on the morning of the meeting.—The following paper was read: "What the Larva of *Lycæna arion* does during its last instar," by T. A. Chapman, M.D., F.Z.S., F.E.S.—GEO. WHEELER, M.A., *Hon. Sec.*

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—July 22nd.—Mr. A. E. Gibbs, F.L.S., Vice-President, in the chair.—Mr. Newman exhibited living examples of a species of Braconid which had just emerged from a batch of ova of *Microthylacia rubi* found at Rutham in the autumn of 1914.—Dr. Chapman, specimens *Latiiorina pyrenaica*, the first that had been bred, from the Pyrenees; and also *L. orbitulus* var. *oberthüri* from the same area, but found also in Switzerland. He also showed specimens of *Agriades escheri* var. *rondoui*, bred from the egg, and pointed out their distinction from the form known as ab. *rondoui* from Gayarnie. He showed living specimens of the Ichneumon *Aphidius ervi*, bred from the aphid of *Ononis arvensis*.—Mr. B. H. Curwen, some first-brood females of *Polyommatus icarus*, from Ranmore Common, all much suffused with blue; and several under side aberration *melanotoxa* (*arcuata*). He also showed a series of *Syntomis phegea*, interbred for the past four years.—Mr. Sich, coloured drawings of the larvæ of the British species of *Acrionicta*, and pointed out the difference between the larvæ of *Triæna psi* and *T. tridens*.—Mr. B. Adkin, long series of *Apatura iris*, from many British localities; and showed that the species was much more varied than it was usually considered to be. A considerable discussion took place on the occurrence and disappearance of the species in its near London localities.—Mr. R. Adkin, living larvæ, pupæ, and imagines of *Ephestia kühniella* in rice flour.—Several members gave experiences of the present season, making remarks on *Agriades thetis*, *Polyommatus icarus* (abs. of females), *Celastrina argiolus*, *Pyrameis cardui*, *P. atalanta*, *Lithosia complanula*, *Euchloë cardamines*.

August 12th.—Mr. B. H. Smith, President, in the chair.—Mr. B. H. Smith exhibited a number of Lepidoptera from New Zealand, including Chrysophonids, Lycænids, and species of the giant Hepialids.—Mr. B. S. Williams, *Anthrocera trifolii* var. *palustris*, with confluent forms from Somerset, and an aberration of *Xanthorrhoe sociata*, in which the usual dark band on the disc of the left fore wing was reduced to a blotch on the inner margin.—Mr. West (Ashtoad), the ova of *Chrysopa perla*.—Mr. Hy. J. Turner, examples of an excessively local form of *Brenthis pales* var. *arsilache*, taken by him on one side of one small lake at St. Moritz, Engadine, at flowers of *Cornarum palustre*, the marsh cinquefoil. He also showed a series of forms of *Parasemia plantaginis* from the Engadine, varying from the normal yellow and black males to the form with a much extended white ground on the one hand, and on the other hand, to the form with a much extended black area.—Mr. Edwards read his report as delegate of the Congress of the S.-E. Union of Scientific Societies at Brighton.—HY. J. TURNER, *Hon. Rep. Secretary*.

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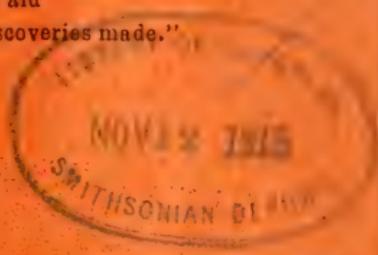
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EDITED BY RICHARD SOUTH, F.E.S.

WITH THE ASSISTANCE OF

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| H. ROWLAND-BROWN, M.A., F.E.S. | W. J. LUCAS, B.A., F.E.S. |
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NOVEMBER, 1915.

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NEW MUTILLIDÆ FROM CALIFORNIA.

BY T. D. A. COCKERELL.

DURING a recent visit to California I obtained a number of Mutillidæ, among which I find three undescribed species.

Dasymutilla aletina, n. sp.

♂. Length about 8 mm., slender, integument entirely black; top of head, mesothorax and scutellum, abdomen above beyond basal third of second segment, and sides of segments 3 to 5 below, with very long, erect, very bright red hair, with a distinct crimson tint, and no appressed hair at its base; rest of hair on head and body, and that on legs, black; mandibles bidentate, not enlarged; clypeus with a median projection on lower margin; eyes nearly spherical, not at all emarginate, minutely faceted; ocelli small; mesothorax coarsely and strongly punctured; metathorax rounded, dull, very coarsely cancellate; tegulæ piceous; wings black, slightly pallid in the region of the marginal and submarginal cells; second submarginal cell not narrowed to a point above; first abdominal segment nodose, very coarsely and densely punctured, the suture between it and second deeply constricted, ventral keel ending in a sharp tooth which projects downward and backward; second ventral segment strongly punctured, but flattened and scarcely punctured in middle, the following ventral segments punctured only along hind margin.

Hab.—Avalon, Catalina Island, California, middle of August, 1915 (*Aleta Venable & Hazel Andrews*). Allied to *D. coccineohirta*, Blake, but differing in the venation, the entirely black tegument, and the small and slender form.

Dasymutilla sumneriella, n. sp.

♀. Length about 9.5 mm.; moderately robust, the thorax conspicuously narrower than the abdomen, the head scarcely as wide as the thorax; eyes nearly circular, smooth and shining; first abdominal segment broad, sessile on the second; upper part of head, including cheeks and front, and dorsal surface of thorax and abdomen, with the tegument red, and this closely covered with erect and appressed

very bright red hair; antennæ brownish, scape strongly curved; prominent red tubercles at bases of antennæ; face and lower side of head, and legs, with very long dull white hair; posterior lateral margins of metathorax not dentate; posterior sides of thorax forming deeply excavated basins, impunctate in middle; ventral keel of first abdominal segment large, prominent, truncate, somewhat as in *D. medea*; first two ventral segments of abdomen with whitish hair, the others with red; pygidial plate very well defined, striated.

Hab.—La Jolla, California, August (*Cockerell*). Named after Dr. F. B. Sumner, who kindly helped me to collect Mutillidæ on the grounds of the Scripps Institution for Biological Research at La Jolla. In addition to the new species, we found *D. pacifica*, Cresson, and *Nomiæphagus harpalyce*, Fox, the latter quite common. *D. sumneriella* is related to *D. creusa*, Cress., but is easily known by the abdomen above being covered with bright red hair, even at the base.

Nomiæphagus acuum, n. sp.

♀. Length about 8 mm.; clear ferruginous, including legs and antennæ, apical part of the tridentate mandibles (formed as in *Pseudomethoca canadensis*) black; eyes broadly suboval, smooth and shining; third antennal joint a little more than half as long as fourth; head very broad, quadrate, face sunken and abbreviated; face with thin long white hair; cheeks with appressed silvery hair; front and whole of top of head densely covered with appressed pale golden hair, with scattered erect yellowish-white hairs also; thorax rather short, fiddle-shaped when seen from above, the margins of metathorax strongly dentate; metapleura smooth and shining, impunctate; dorsal surface of thorax with appressed copper-red hair, not hiding the densely and coarsely punctured surface; anteriorly there is a thin wide band of blackish hair, and at the sides of metathorax silvery hair, there are also scanty erect hairs, partly dark; legs with thin silvery hair; abdomen pyriform, the first segment completely sessile on the second; first segment with long erect white hair basally, appressed brilliantly silvery hair apicolaterally, and appressed black hair on apical middle; second segment dorsally with appressed bright copper-red hair, the apical margin very broadly covered with a band of black, and the sides (invading the coppery area beyond the middle) with thin silvery hair; segments 3 to 5 with appressed silver hair and scattered erect hairs; pygidial plate well-defined, microscopically irregularly cancellate, but largely surrounded and covered by shining reddish-golden hairs; first ventral segment without a prominent keel.

Hab.—Needles, California, in the railway station, August 28th, 1915 (*Hazel Andrews & T. D. A. Cockerell*). A distinct species, readily known by the large head covered with pale golden hair. It recalls *Pseudomethoca scævolella*, Ckll. & Casad.

IS *THECLA ÆSCULI*, Hb., A SWISS INSECT?

BY F. E. LOWE, M.A., F.E.S.

MR. ROWLAND-BROWN'S interesting and enlightening article, "Some Remarks on *Thecla æsculi*, Hb.," in the 'Entomologist' of September last, awoke again in me the question at the head of this note. And I set out to work through my Theclids in the hopes of solving the problem. I am now convinced that, whether *T. æsculi* is a separate species or a variety of *T. ilicis*, at least it is certain that the butterfly which has passed as ab. *æsculi* from Swiss localities differs much more from the *æsculi* of Southern France than it does from typical *ilicis*, and that the butterfly we take in Switzerland is an undoubted form of *ilicis*, whose only claim to be called var. *æsculi* is that it lacks the white line on the under side of the upper wings.* To this I would give the name of "*pseudæsculi*," though, except for this agreement in the absence of the white line, there is practically no other likeness to *æsculi*, but it is in every other respect a typical *ilicis*. Whereas, *æsculi* from the South of France and La Granja differs consistently in almost all points from *ilicis*, and while showing some variation, *inter se*, always exhibits certain distinctive qualities of its own. It differs in size, shape, colour, markings, and wing-tails. I have never attempted the difficult study of the construction and comparison of the male appendages, and judge only by examination of the outward appearance. From externals, *æsculi*, Hb., appears to me much nearer akin to *acaciæ* than to *ilicis*. For many years I was content to believe that any specimen destitute of that white line was var. *æsculi*, following the lead of other collectors and authors, who probably, like myself, had never come into the happy relations of a field-naturalist with the southern insect. But, when I took *T. æsculi* in Spain, and later in various localities in the South of France, I began seriously to question the validity of the Swiss and Tirolese examples' claim to the title.

I venture to propose a comparison of certain differences, as I see them, between Swiss *pseudæsculi* and *æsculi*. My specimens of the former come from Eclépens, Aigle, Martigny, and other parts of the Rhone Valley, Innsbruck, and Bozen.

The chief points for comparison are: (1) the colour; (2) white lines; (3) red spots; (4) tails.

(1) The colour to my eye differs but little on the upper side, but on the under side *pseudæsculi* is deep coffee-brown, while *æsculi* is hardly brown at all, but a dark grey with something of

* Mr. Harold Powell is of the same opinion as Mr. Lowe. He says (*in litt.*) that he regards all Swiss "*æsculi*" as a form only of *ilicis*.—H. R.-B.

a sheen upon it. Both above and below *æsculi* is very like *acaciæ* in colour.

(2) The white line on the under side hind wings in Swiss specimens (*pseudæsculi*), as in all typical *ilicis* of France or elsewhere, is much more rudely broken up into acute zigzags, the apex of each being sharp and forming an inverted V, and the sharp point of the second, counting from the anal angle, approaching much nearer and with more decision the red chevrons, and on account of its greater irregularity the line is less parallel with the hind margin than in *æsculi*. The dark almost black edging on the inner side of this white line is much stronger in *pseudæsculi* than in *æsculi*.

In *æsculi* from France and Spain the white line is scarcely broken, but runs in regular undulations without sharp angles at apex of the waves, and the second semi-detached curve projecting much less towards the red chevrons than in the other.

N.B.—I have two beautiful specimens from La Granja which have not a trace of white on *either* wing* (one of these is suffused with yellow upper side with spots on hind margin of lower wings—var. *auronitens*); the red spots are very firm, regular, and continuous round the whole outer margin, without any black setting.

(3) The red spots. The colour in Swiss specimens is always an *orange-red* of different depths. In the true *æsculi* I think never, but a brownish-red, often very intense, but without any orange tone whatever. The Swiss insects have this row of red chevrons generally composed of two large or double spots next the anal angle, and three more rapidly diminishing in size as they approach the upper margin, till the last is often little more than a haze. The dark setting of these spots is much broader and blacker than in *æsculi*. *Æsculi* has three spots much *rounder*, and hardly appreciably diminishing in size as they ascend, often continuing round the whole outer edge of the wing in French examples, so making seven to eight spots in all. In those from La Granja these red spots are almost entirely absent, and represented only by the three nearest the anal angle, but still maintaining their special form and distinctive colour.

(4) Of the wing-tails I will only say that Mr. Tylecote (p. 241) describes the difference just as it appears to me. Seitz strangely describes *esculi* (sic) as a small form with rather a *long* tail. His plate figures only on the *upper* side, and hence is valueless, and might represent anyone of this group as well as another.

* Examples from Le Vernet exhibit same characteristic loss of the white lines.—H. R.-B.

SOME NOTES ON THE PAPILIONIDS.

BY CECIL FLOERSHEIM, F.E.S.

(Continued from p. 229.)

(5) *P. polyxenes (asterias)*.—This butterfly, an inhabitant of Southern Canada and the Central and Southern United States of America, belongs to the Umbelliferæ-feeding branch of the Papilioninæ, and is most likely sprung from the same original stock as our own *P. machaon*. It is, however, sexually dimorphic, the female differing greatly both in size and in colour from the male, and being, like that of the dark southern variety of *Jasoniades glaucus*, probably a mimic of *Laertias philenor*. In its earlier stages it closely resembles *Papilio machaon*, except that the larva when full-grown has the black bands on each segment more broken, and the red spots replaced by yellow ones. The pupa tapers rather more in the abdominal segments than that of *machaon*. I have found this species easy to breed in my butterfly-house, where the female oviposits freely on fennel, unlike that of *machaon*, which with me shows a decided preference for laying its eggs on *Skimmia* (natural order Rutaceæ). I think that there would be no difficulty in getting *polyxenes* to establish itself in Southern Europe, though in England its fixed habit of being at least double-brooded would prevent it from ever becoming naturalized. It is not a particularly rapid feeder-up, and only in exceptionally hot summers, like that of 1911, would it be able to complete its transformations here for the second time. Some years ago I was fortunate enough to obtain a pairing of this species, female with *P. machaon* male. The resulting larvæ fed up well and quickly on fennel, and resembled typical *polyxenes*, but in trying to obtain a second brood I forced the pupæ in a vinery, and by subjecting them to too great heat killed most of them. The pupæ, like the larvæ, were indistinguishable from normal *polyxenes*. The few imagines that emerged were all males. They also seemed to be typical *polyxenes*, though one of them paired readily with a female *machaon*, which unfortunately was drowned the next night during a heavy thunderstorm. It would appear that *polyxenes* is the Mendelian dominant in this case.

(6) *P. zolicaon*.—I was only once able to obtain pupæ of this butterfly, an inhabitant of the Western United States of America and Vancouver, in any quantity. It is an even nearer relative of *machaon* than the preceding species, the differences between it and its English relation being exceedingly small. I had intended if possible to cross them, but my *zolicaon* began to emerge at the end of April, three weeks before *machaon*, which I have always found constant to May 20th or thereabouts, whatever the season is like. In consequence of this most of my *zolicaon* were dead

before my *machaon* began to put in an appearance, and I did not notice any pairings between the two species. It is a curious fact, however, that for three or four years after a certain proportion of my *machaon* larvæ exhibited the blue-green ground-colour of *zolicaon* when full-grown, though the pupæ and imagines seemed in all respects normal *machaon*. This state of things continued until three years ago, when an irruption of field-mice into my butterfly-house, and an exceptionally cold and wet August, obliged me to replenish my stock of *machaon*. From my small experience with *zolicaon* I should say that it is habitually double-brooded, but though in the year in which I bred it unfavourable weather conditions prevented me from obtaining pupæ of the second generation, its early date of emergence, and the fact that April is usually a fine and dry month with us, should give it some chance of establishing itself, if introduced into Southern England.

(7) *Iphiclides ajax*.—This beautiful insect is the principal North American representative of the great branch of the Papilioninæ known as the kite swallow-tails, and is said to be common everywhere in the United States of America, where its food-plant, *Asimina triloba*, papaw (natural order Anonaceæ, *i.e.* custard apples) is found. Though it is a near relative of the European *Iphiclides podalirius*, to which species it bears a striking general resemblance in all its stages, unlike the latter, which is the most refractory species in captivity with which I have ever had to deal, it takes very kindly to the conditions in my butterfly-house, feeding, pairing, and ovipositing freely there. Apart from the objection that it is seasonably polymorphic in its native country, where the four varieties of its two broods used to be mistaken for as many separate species, the fact that the food-plant to which it would seem to be confined, *Asimina triloba*, is only half hardy, and is grown but seldom in England, would seem an insuperable objection to its ever succeeding here. It has been suggested, I think by Edwards, that as it has been observed in parts of the United States of America where the papaw is not found, it must have some other means of sustenance; and with the view of discovering what this may be I have tried to induce the imagines to lay their eggs, and the larvæ to feed on plants belonging to the families represented here which are most nearly related to the Anonaceæ. In this I have been quite unsuccessful, the butterflies generally choosing to die with their ova unlaidd and the larvæ to starve, rather than exchange the usual pabulum of the species for *Cocculus* or *Berberis* or any other allied plants. In one instance, in the absence of *Asimina*, one of my *I. ajax* oviposited on a plant of *Aristolochia siphon* growing in my butterfly-house, but the larvæ died at once after feeding on it. On another occasion, also in the absence of *Asimina*, I saw a female of the spring

brood oviposit on the dead stump of a birch tree, attracted possibly by the fact that the corresponding brood in America lays its eggs before the papaw is in leaf. Perhaps in their choice of food-plant butterflies may sometimes be guided by other senses than that of scent. In this connection I may mention that while with this exception I have never known my *Papilios* to oviposit on anything but a growing plant, shrub, or tree, the moths I have bred in my butterfly-house have usually laid their eggs haphazard on the gauze covering the roof and sides, and this even when their food-plants have been present in abundance.

(8) *P. bianor*.—This fine and interesting butterfly is a member of a somewhat ill-defined group of the Papilioninæ, of which *Papilio paris* is perhaps the most familiar species. It inhabits the whole of Eastern Asia from Eastern Siberia and Japan to Southern China. Judging from the great range of variation shown both in size and in colouring by the specimens I have bred, I should think it possible, from the descriptions given by Leech and others, that some of the forms of this group which have been given specific names may in reality be only local or seasonal varieties of *Papilio bianor*. It is not seasonally dimorphic, though individuals of the summer brood are in some cases larger than any of the spring ones, and the glossy green scales which powder the upper side of the wings are, in the females, of a browner or more golden green than in the earlier imagines.

The ovum, which is spherical, is of a pale green when first laid, darkening in colour before the emergence of the larva, and, like the pupa, is relatively small considering the size of the larva and imago. The larva in its first stadium is light brown, with two prominences like horns one on each side below the head. At its second instar it acquires the characteristic saddle-markings of so many of the Papilionid larvæ, which it keeps until its last stadium, being during the middle part of its existence usually of a dull olive-green though sometimes olive-brown, and with a glistening surface to its skin, which gives it a slimy appearance like that of some bird-droppings. In its last stadium, like most but not all of the Papilionid larvæ with which I am acquainted, it is without that characteristic saddle-marking. Its skin has now lost the viscous look, and it is of a clear olive-green, darker on the back than on the sides, and speckled with small blue dots. It has transverse dark green stripes on the sides of its middle segments, and has a white stripe on each side extending from immediately above the first pair of prolegs to the anal claspers. In addition to these markings it has on each side of the swollen segments behind the head a large dark ocellated spot, often rimmed with red, with a pale centre, which has the appearance of an eye. While behind these a black slit across

the back heightens the likeness to the head of some strange creature. The pupa, which is generally of a bright leaf-green in colour, is flattened in shape and almost oval. It has generally a rim of pink, but sometimes a narrower one of dull white, on each side, which combined with a narrow ridge of white which runs down its back gives it almost the exact appearance of a thick evergreen leaf, such as that of *Skimmia*, with the sunlight playing on it. There are two other forms of the pupa; one of a uniform pale brown, and one with the exact colour and markings of a lichen on stone, but these are relatively scarce, not amounting together to more than one in a hundred as far as I have been able to observe.

In all its earlier stages this species exhibits an extreme love of secrecy. The ovum is laid singly, for the most part on the under side of a leaf of the old growth of *Skimmia*, the female often fluttering as low down as possible, sometimes even deep in the middle of the bush, for the purpose. This habit is unlike those of *xuthus*, *machaon*, or any other *Skimmia*-feeding *Papilio* with which I am acquainted, which invariably choose the side shoots or the topmost sprays of the new growth for oviposition. The larvæ, which are lethargic in habit and seldom move except when food fails them, live on a silken carpet which they spin on the upper side of a leaf, in most cases only coming up gradually towards the light as they grow larger, and often remaining hidden all their lives. Even when full-grown they show a distinct tendency to hide themselves on the stem under the topmost leaves; and this in spite of the fact that no Papilionid larva known to me harmonizes more perfectly with its surroundings than that of *bianor* in its later stages. In the comparatively few instances when I have observed it sunning itself on the top of the bushes, it is extremely difficult to detect. In consequence of this I find it hard to estimate the number of ova or larvæ of this species that my butterfly-house contains at any particular moment, and in the past season I had the unwelcome experience of finding my *Skimmia* bushes stripped by what proved to be literally thousands of *bianor* larvæ which I had been harbouring for weeks, without in the least suspecting their presence in any such quantity. The larva, which keeps its love of remaining hidden to the end, usually pupates on the food-plant itself, a favourite position being on the stem of a slender twig amongst the lowest leaves a few inches only from the bottom of the bush. I have found, however, in the case of those individuals which give rise to the partial second brood, pupation takes place near the top of the bushes or even on the under side of the broad leaves of the plant of *Aristolochia siphon* which overhang them, I suppose because in such a position the pupa would receive the greater amount of sunlight which is necessary for its more rapid development. A curious fact in regard to this species

is the abnormal diversity of time taken in feeding-up by different larvæ. For instance, I have to-day, on October 17th, laggards of the first brood which are not yet fully grown, though the first imagines of the second brood emerged on August 10th. and the last ova of the parent butterflies were laid on or about June 27th.

Of all the species with which I have experimented *Papilio bianor* adapts itself most readily to the conditions of my butterfly-house; the imago, in spite of its powerful and dashing flight, making itself quite at home there, and living in its semi-captivity often for as long as five weeks. The larvæ, too, I have found to be less exposed to the attacks of insect or Arachnid foes than those of any other non-pharmacophagous species which I have bred. The newly-formed pupa, however, suffers from the minute black fly which infests my butterfly-house, though I have not found the pupæ of *bianor* which I have received from Japan to contain any of the larger Ichneumonidæ or Diptera. In the matter of food-plant this species seems, with one notable exception, to be confined to various kinds of Rutaceæ. In my butterfly-house *Skimmia* is undoubtedly the favourite of these, the females seldom choosing any other plant when this is available. It will, however, feed readily on *Ptelea trifoliata*, less so on *Aegle sepiaria* (*Citrus trifoliata*). Out-of-doors I have found the larvæ on dittany (*Dictamnus fraxinella*), but not, as I have often found those of *xuthus*, on *Phellodendron amurense*. In several instances during the past season, when their supply of *Skimmia* had run short, I found the half- and full-grown larvæ making an occasional meal of *Aristolochia siph* without apparently any ill result to themselves. I have never known other Papilionid larva, except those of the *Aristolochia*-feeding species, able or willing to do this (cf. Tutt's 'A Natural History of British Butterflies,' vol. iii. part xviii. p. 40). I may here mention one other fact of interest in connection with this butterfly. In the summer of 1911, the first occasion on which I was able to procure the pupæ from Japan, only one imago emerged, a slightly crippled female, which lived for almost six weeks in my butterfly-house, and though unmated oviposited freely on *Skimmia*. As might have been expected, none of the ova hatched out. In no other instance have I known an unfertilized female of any of the Papilioninæ to lay her eggs.

I feel that I have described the appearance and habits of this species in its earlier stages at great, perhaps inordinate, length. I must plead in extenuation that I have not hitherto succeeded in meeting with any full description of them in the text-books. Besides this there is, in my opinion, a greater likelihood of *bianor* being able to establish itself in this country than any other species of foreign *Papilio* I have bred, with the exception of *philenor*. And it has the advantage even over *philenor* of a less restricted food-plant; *Dictamnus fraxinella* and *Skimmia*

both being grown fairly commonly in this neighbourhood, to say nothing of the other members of the Rutaceæ on which it may feed. It is only during the last two years that I have been able to obtain the pupæ in sufficient quantities to breed from them, and as both summers have proved somewhat cool ones I should not perhaps be justified in concluding that *bianor* is always single-brooded in the conditions which obtain in the South of England. I may mention, however, that in 1914 about 75 per cent. of the pupæ of the spring brood did not disclose imagines until the following spring, and that this year an even larger percentage show every sign of doing the same.

(To be continued.)

Errata.—Page 226, line 35, *et seq.*, *Euphocades troilus* should be *Euphocades troilus*. Line 37, *Iphiclides ajax (turnus)* should read *Iphiclides ajax*; *turnus*, of course, being a synonym of *Jasioniades glaucus*. Page 228, line 29, *Benzoni* should be *Benzoin*, and line 31, *et seq.*, *Lindera benzoni* should be *Lindera benzoin*.

NOTES ON NEW AND LITTLE KNOWN BRITISH APHIDES.

BY FRED V. THEOBALD, M.A., F.E.S., &c.

I.

THE Aphididæ recorded here, which I have found or which have been sent me during the last few years, are either new to the British Fauna, or have not been recorded since the time of their description; whilst a few are described for the first time. The number of British species is rapidly increasing, and many new species are constantly being found.

1. *Idiopterus nephrolepidis*, Davis.—This very marked and pretty aphid was described by Davis in 1909 (Ann. Ent. Soc. Am. ii. p. 198) from ferns in America. Specimens of alate viviparous and apterous viviparous females were sent me by Mr. Gough, of the Board of Agriculture, on August 21st, taken on *Polygonum*s in a glasshouse near London. Again, on October 7th, more apteræ were received from another nursery near London. The peculiar venation and the ornamentation of the wings, the marked white spots on the black body of the apteræ and the white legs, make it a very conspicuous species. It causes the tender leaves of the ferns to curl up, and is said to be very harmful to ferns under glass in America. Mr. Gough wrote me that one grower told him that this aphid quite blackened the tops of the ferns in his houses, but that it was controlled by the use of insecticides. It is probably an introduced tropical species both here and in America.

2. *Aphis cherophyllii*, Koch.—Described by Koch in 1857 ('Die Pflanzenläuse,' p. 79, figs. 104–106) from *Cherophyllum temulum*. Specimens were sent me on July 17th, 1915, by Dr. Durham, who found it in quantities on *Cherophyllum tuberosum* at Hereford. Most were alate viviparous females and a few apteræ and nymphæ. This dark species gives a fine pale violet tint in 70 per cent. alcohol, not the rich port wine red of *Aphis rumicis*. Later Dr. Durham wrote me that the plants had been ruined by this insect.

3. *Aphis apposita*, Walker.—This insect does not seem to have been found since Walker described it in 1850 ('Zoologist,' viii. p. ciii. App.). Specimens from groundsel (*Senecio vulgaris*) were sent me on August 27th, 1915, from Windermere by Mr. A. W. Rymer Roberts. They were all apterous viviparous females, and were sheltering in the unopened flower heads. They are very sluggish in nature.

4. *Aphis chrysanthemi*, Koch.—This species described by Koch in 1857 (Die Pflanz. p. 73, figs. 95 and 96) must not be confused with the *Aphis chrysanthemi* of Walker ('Zoologist,' vii. p. lvi. App.). Koch's species was described from specimens on *Chrysanthemum leucanthemum*, the "ox-eye daisy," and *Matricaria chamomilla*, the "wild chamomile." Walker's from the former plant only. I found this aphid on August 2nd at Wye on the wild and cultivated ox-eye daisies. They were all apteræ, and clustered in dense masses up the flower stalks of the cultivated kinds and under the leaves of both. They occurred in such large colonies that the blossoms became stunted and many died. Some colonies were six inches long. The colour of the aphides was dull greenish-black; a few individuals were shiny. On August 6th a few nymphæ appeared, and I hoped to rear the alate female. But by the 14th practically all the colonies had died off from an attack of parasites. On August the 30th the same insect occurred again on *Matricaria chamomilla* close to the attacked daisies. This species was largely attended by ants (*Lasius fuliginosus*).

5. *Aphis crataegi*, Kalténbach.—This aphid does not seem to have been recorded in Britain. Buckton's *Aphis crataegi*, Kalt. (Mono. Brit. Aphid. ii. p. 35, pl. xlvii. figs. 1–3) is certainly not Kalténbach's species (Mono. Fam. Pflanz. p. 66, 1843). This insect was taken by me several years ago on apples at Marden, Kent, where it did some damage and was recorded as *Aphis sorbi*, Kalt., and also on hawthorn at Wye in May, 1910, but no alate females could be obtained. On May 23rd, 1914, Mr. Rymer Roberts sent me specimens taken on the hawthorn at Alice House, Windermere. These colonies consisted of alate females, many nymphæ, and a few apteræ. As this insect is of economic importance on account of its attacking the apple, I append a new short description of it:—

Alate viviparous female.—Black and shiny with a band covered with snow white meal at the base of the abdomen, beneath which it is pure white, creamy white, pale pink and more rarely pale greenish, and on this pale area are a few dark spots; the posterior part of the abdomen may be pale colour, with narrow transverse dark bars, and there are two pairs of submedian papillæ behind and five pairs of lateral black papillæ before the cornicles; the venter is pale whitish-pink covered with white meal. The black antennæ are shorter than the body, the third segment having 64–70 sensoria; the fourth with 25–30. The proboscis reaches to the third pair of legs. Cornicles black, rather short, cylindrical, imbricated, in some slightly expanding at the base. Cauda black, blunt, with two pairs of lateral hairs. Legs black, except base of femora, which are yellow. Insertions of the wings yellowish. Length 1.8 to 2 mm.

The apterous females vary from dark blackish- or greyish-green to black, and are covered with white meal; when denuded some are shiny; antennæ shorter than the body, of five segments only, the third very long; venter deep greenish. Cauda black. Cornicles short and black. Legs black. Length 2 mm.

The *nymphæ* are either fawn-coloured and mealy, with dark eyes, dusky legs, black cornicles, and wing pads of pale to deep green with similar coloured legs, &c., to the former.

The *food-plants* are *Cratægus*, *Pyrus mali* and *Pyrus communis*, as described by Kaltenbach. They gall or blister the leaves of the hawthorn and apple, which become yellowish and red and rosy-pink; at one time the midrib region is deformed, at others the leaf may be bent over at the edges, or any part may become abnormal; beneath or between the galled areas the plant lice feed and breed.

6. *Aphis symphiti*, Schrank. — This aphid, described by Schrank (Fn. Boic. ii. 107, 1801), and redescribed by Kaltenbach (Mono. Pflanz. p. 61, (1843) from *Symphitum officinale*, is also referred to and described by Koch (Die Pflanz. p. 72, figs. 93 and 94), from the same plant. In July, 1914, I found this species in my garden in small numbers on *Anchusa italica*. Most were apteræ and a few nymphæ. They occurred on and inside the blue flowers, in some cases three or four mature females and many young. Lichtenstein records this aphid from *Anchusa*. The apterous females varied much in colour, some being pale yellow, others pale yellowish-green, a few reddish, and others dark brown and brown and green. None answered exactly to Koch's figure of the apterous female, but as those I found varied so much there is little doubt that it is the same species. The same insect was found at Wye in July, 1915, on *Borago officinalis*, and in August, 1889, on *Anchusa officinalis* at Ottery St. Mary, S. Devon.

7. *Aphis callunæ*, nov. sp.

Apterous viviparous female.—Black, marked with a fine mealy white hexagonal and polygonal sculpturing, which is most character-

istic under a $\frac{2}{3}$ -power, appearing as a pruinose mealy coating under a Coddington lens; five pairs of more or less prominent dark lateral spots are present, due to the absence of the mealy sculpturing. Cauda black, prominent, coated with farinose matter. Legs and antennæ black; venter dull greenish-brown with much mealy covering. Cornicles short, thick and black. On immersion in alcohol all the beautiful mealy markings go, and the insect becomes a deep reddish-brown. The antennæ are shorter than the body, the basal segment is wider but scarcely longer than the second, the third is a little longer than the fourth, the fourth about equal to the fifth; the sixth the longest, its flagellum rather more than twice the length of the basal area, the fourth to sixth markedly imbricated, the third less so; sensoria on fifth and sixth normal. The proboscis reaches to the coxæ of the second pair of legs, acuminate, the apical segment twice as long as the penultimate, both dark. Cornicles black, short and rather thick, about the same length as the cauda or slightly longer, imbricated. Cauda black, slightly constricted at the base, spinose, with four pairs of lateral hairs. Anal plate black and spinose. A small papilla on each side of the pronotum, and another just caudad of the hind wings. Abdomen with a few short hairs, some showing slight apical enlargement. Head flattened in front, with two median frontal hairs, slightly capitate. The surface of the body shows more or less clearly hexagonal and polygonal sculpturing answering to the white sculpturing shown when alive. Tibiæ with moderately long hairs.

Length, 1 mm.

Food Plant.—Heather (*Calluna vulgaris*).

Locality.—Brockenhurst, New Forest, August 20th, 1915.

Observations.—Described from a single colony found in the flowers and flower-heads of the heather in the New Forest. The young are greenish with black legs and antennæ; a few were pale plum colour. It is a very marked and beautiful species when alive and in the adult apterous stage, which alone was found. It appears to be rare, as I have frequently searched both *Calluna* and the *Ericas* in England and Wales, and this is the only aphid colony I have been able to find. The only record I know of an aphid on Ericaceæ is the species described by Walker from Hardy's MSS. as *Aphis ericæ* (List. Homop. Ins. in Coll. Brit. Mus. part iv. p. 1038, No. 307, 1852). This is a small, grass-green, shining, flask-shaped aphid, convex above, very slightly granulose; legs testaceous; antennæ dusky, longer than the body, the first and second segments greenish, third long, fifth shorter than the fourth. Length $\frac{3}{4}$ line. Found in Scotland. Clearly quite a distinct insect from the one described here.

8. *Macrosiphum centranthi*, nov. sp.

Alate viviparous female.—Head brown; pronotum with a broad brown band; metathoracic lobes brown, and a spot below the base of the wings deep brown, ground-colour of thorax green to deep

yellow-green. Abdomen bright green with three small dark lateral spots before the cornicles and traces of some smaller ones above them. Eyes dark reddish-brown to brown, the two stemmata dark. Antennæ deep brown. Cornicles black, except at the base, where they are green. Legs black, except the basal two-thirds of the femora, which are green. Cauda rather long, acuminate, green. Antennæ longer than the body, basal segment larger than the second, the third very slightly longer than the fourth, with 20-28 sensoria spread over its whole length; fourth longer than the fifth, the latter with normal sub-apical sensoria; sixth not as long as the fourth and fifth. Proboscis reaching to or just beyond the second pair of legs, black at the apex. Cornicles long, thin and cylindrical, about as long as the third antennal segment, the apex markedly reticulate, remainder imbricated; in some specimens the basal one-third of the cornicles may be dark green. Cauda with six long chætæ on one side, five the other, and two curved dorsal apically placed ones. Wings large; stigma yellowish-green; veins darker.

Length, 2.5 to 3 mm. *Wing expanse*, 9 to 10 mm.

Apterous viviparous female.—Green; the apices of the femora, tibiæ, proboscis and cornicles black, and all the tarsi black. Antennæ long, brown, except the two basal segments, which are green, the fourth to sixth darker than the third; the first segment nearly twice as long and wider than the second; the third longer than the fourth, but not as long as the sixth, with 3-5 sensoria close together near the base; apex darker than remainder; the fourth longer than the fifth; the fifth imbricated, with the usual sub-apical sensorium close to its apex; sixth not quite as long as the fourth and fifth; antennal hairs simple and slightly capitate. Proboscis green, dark at the apex, reaching nearly to or just past the third pair of legs; broad, the last two segments short. Legs long, green, apices of femora with broad black areas; narrower apical dark bands on the tibiæ and black tarsi; femora with a few hairs on each side; tibiæ with many more. Cauda long, about half the length of the cornicles, bluntly acuminate, green, with six pairs of lateral hairs and two median dorsal ones near the apex, the apical one curved towards the tip. Anal plate green. Cornicles long, about as long as the third antennal segment, rather thin and cylindrical, slightly curved outwards, green, black at the apices, or dark brown and black at the apices; the dark area at the apex with large marked reticulations, the remainder faintly imbricated.

Length, 2.5 to 3 mm.

Food Plants.—Red valerian (*Centranthus rubra*) and common valerian (*Valeriana officinalis*).

Localities.—Ramsgate and Margate, May 20th, 1914; Wye, June 30th, 1914; Windermere, June 16th, 1914 (Rymer Roberts).

Observations.—I first found this aphid in dense masses on the red valerian on the chalk cliffs at Ramsgate and Margate on May 20th. They were then all apteræ with a few nymphæ. I took home some large colonies, and on the next day some became alate viviparous females, and on the 23rd the alatae

swarmed. They continued to become alate until the 30th. I transferred many of these alatæ to peas (*Pisum*) and bramble (*Rubus*), and they seemed to settle on both, but none of the larvæ produced on both plants lived. It was thought then that this species might be the same as the *M. pisi* of Kaltenbach. It has since proved to be quite distinct. On June 30th I found it at Wye on red and white cultivated valerians (*Centranthus*), when all were apteræ, many being immature. These were watched, and alatæ appeared on July 16th. This species is quite distinct from any of the other allied *Macrosiphæ*, now placed in a separate genus by Mordwilko called *Acyrhosiphon* (Faune de la Russie Mus. Zool. Acad. Imp. Sci. de Petrograd Ins. Hemig. vol. i. p. 75. 1914. Petrograd). There is no doubt that *pisi*, *ulmarie*, *gei*, and others with this species should be placed in a distinct genus and separated from *Macrosiphum*, for they present many marked divergent characters from *Macrosiphum rosæ*.

The valerian species is markedly mealy in the larval and nymphal stages, and so are many of the apterous viviparous females.

The young are yellow or pale green. The nymphæ are yellow-green and mealy, with a dark central line; antennæ pale brown, dark on the apical half, and are carried over the body; legs pale brown, except the base of the femora; apex of the tibiæ and tarsi dark; cornicles long, thin, cylindrical, and dusky; eyes black.

(To be continued.)

NOTES AND OBSERVATIONS.

INJURY TO THE WINGS OF *LYCÆNA ARION*.—I note Mr. Frohawk's explanation with regard to the damage to the wings of this butterfly commented on in my notes published in the September 'Entomologist' (*antea*, p. 215), but I am convinced that his explanation does not apply in this particular case. For one thing, I am practically certain that the locality referred to is known as an habitat of *L. arion* to extremely few people; and, further, as I spent a considerable amount of time on the spot, I am able to state positively that no dealer had anything to do with the injury to the wings referred to. I find I omitted to mention one very interesting fact in connection with this, which throws rather more light upon the matter. Early one morning I noted a fine female resting on a stem of grass, and, without using my net, merely tapped the grass, causing the butterfly to drop into the killing-bottle without being handled at all. When examining it, however, about half a minute afterwards, I noticed a triangular piece was missing from the edge of the fore wings, and therefore replaced it on the grass, hoping that it would revive. I then made the discovery that the specimen in question had only very recently emerged from the pupa, the wings, although

fully expanded, being quite limp and useless for flight. There is, therefore, no question about the specimen having been captured and released, and in any case it is scarcely likely that a dealer would damage and liberate specimens of a comparatively rare butterfly when searching for varieties, in view of the fact that *L. arion* is little given to variation, and normal specimens, from a dealers point of view, are well worth the taking. Finally, I have a specimen in my collection that well illustrates the particular style of injury, being absolutely perfect with the exception of a triangular piece measuring about 8 mm. each way which is missing from the fore wing between the sixth and eighth veins, the membrane being absent, but the seventh vein being intact, and it was this particular specimen that made me feel inclined to agree with the theory mentioned in my previous letter, that this injury had been caused by ants, either before or while the wings are expanding. I am only acquainted with the Gloucestershire localities of *L. arion*, but I should like to know if the Cornwall specimens exhibit similar injuries.—J. H. GRANT; Cole Dale View, Coleshill Road, Ward End, Birmingham, October 14th, 1915.

ABNORMAL PAIRING OF *ENDROMIS VERSICOLOR*.—Mr. H. Rowland-Brown's note in the 'Entomologist' for October, 1915, on abnormal pairings, recalls an instance which came under my notice when living in London. I happened to have a number of pupæ of *E. versicolor* raised from Culbin ova, and a few of these had emerged, three females and two males, together with a female *Amphidasys strataria*. One of the *versicolor* males shortly paired with a female of its own species, the remaining male buzzing restlessly around the cage. On looking at the insects again an hour or so later, I found the male *E. versicolor* paired with the female *A. strataria*. They remained paired for several hours, and ultimately a large batch of ova resulted, but none of them came to anything.—G. BERTRAM KERSHAW; West Wickham, Kent.

THE RESTING HABIT OF *HIPPARCHIA SEMELE*.—My note on pp. 218-9 has called forth some interesting observations from correspondents, to whom, as to myself, the affection of *H. semele* for flowers was something of a novelty. It is curious to find that in Algeria this unusual experience of the butterfly is constant during a certain period of its emergence in the case of *H. semele algerica*, Obthr. Writing in 'Lépidoptérologie Comparée,' fasc. x. pp. 135-7, Mr. Harold Powell lays special stress upon the flower-loving propensities of the species. "During the month of June," he writes, "the butterfly affects flowers; I observed it principally on thyme and thistle; in the wood clearings and upon uncultivated ground . . . near Sebdou, in the warm mornings of June, 1907, *semele* was to be seen on the thyme bloom by tens at a time . . . I saw *semele* also in abundance at Djebel-Ksel, near Géryville, and there also thyme was the favourite plant . . . Later in July, August, and September, the flowers being over, the butterfly betook itself to the shade of the green oak scrub, or rested on the trunks . . . It happened more than once that I found this species at my collecting lamp . . . probably disturbed from its rest in the neighbourhood thereof."

M. Oberthür, however, associates it in Brittany with the granite cliffs of the Côte d'Emeraude, flitting over the flowering gorse and heather.—H. ROWLAND-BROWN; Harrow-Weald, October 14th, 1915.

HIPPARCHIA SEMELE AND FLOWERS.—You may hardly think it worth while to add any further notes on the habits of *Hipparchia semele* in relation to flowers, for like most butterflies it appears to vary its practice according to locality. But this summer on the Guernsey cliffs *H. semele* was very abundant, and on large patches of heather and cushions of wild thyme was to be seen resting in numbers, and as actively enjoying the sweets as any other visitors. Had it not been for Mr. Rowland-Brown's experience of its fondness for sea holly—and Messrs. Russell James's and F. W. Frohawk quoting scabious, majoram, centaury and field thistle—I should have said its attentions were, with few exceptions, confined to flowers lying close against the ground. It is, I think, probable that its habits vary less with locality, than with its length of days. It will not often, I believe, visit flowers when it is recently emerged from chrysalis, but as it becomes worn and vitality is lowered, it seeks rejuvenescence from the flowers. Perhaps after pairing, or between the labour of ovipositing, the females thus refresh themselves. Certainly those captures (in my own experience) settled on flowers are often far past their first beauty.—FRANK E. LOWE; Guernsey, October 13th, 1915.

SIREX GIGAS IN GLOUCESTERSHIRE.—A specimen of *Sirex gigas* was captured here on September 4th, on the wall of the house in the early morning.—B. A. CONEY; Pucklechurch, Gloucestershire, October 23rd, 1915.

CUCULLIA LYCHNITIS AND VERBASCI.—Having met with the larvæ of *verbasci* feeding indifferently on various species of *Verbascum* (mullein) and *Scrophularia* (figwort) in sundry places, I was rather puzzled to reconcile some of Mr. Spiller's statements on p. 244. He speaks of a waste piece of land "in most places soft and spongy," by which, I presume, he means boggy or marshy, and "covered with a profusion of the golden-yellow flowers of the *food-plants*" (italics mine), by which, I presume he refers to several species of mullein. It would be interesting to know which species they were, because the mulleins, as a genus, are characteristic of dry calcareous or gravelly soils, and all our British species have yellow or creamy-yellow flowers. On the other hand, all the figworts have reddish or purple flowers, except one, in which they are yellow, and all, except this one, prefer damp or wet situations. If Mr. Spiller found mulleins growing in boggy or marshy ground it is a botanical observation worth noting. Possibly, though, the plants were growing on dry "islands" amongst the surrounding "soft and spongy" spots; but even this would be worth noting. I myself met with four larvæ of *lychnitis* in Gloucestershire, in July, 1913, and they were feeding on the flowers of water figwort (*Scrophularia aquatica*) along the banks of a stream in a low-lying meadow. All pupated safely and went over two winters, three of them producing nice specimens last

May; the fourth pupa went mouldy. I carefully kept a look-out for the species on the mulleins, *Verbascum thapsus* and *nigrum*, both common on dry downs and hillsides in the district, but saw no *lychnitis*, although *verbasci* occurred on them and also on *Scrophularia*. I had never come across *lychnitis* before.—C. NICHOLSON; 35, The Avenue, Hale End, Chingford.

UNRECORDED OCCURRENCE OF ANOSIA PLEXIPPUS; PIERIS DAPLIDICE AND VANESSA ANTIOPA IN BUCKINGHAMSHIRE.—I am indebted to Mr. William Crouch for the following interesting notes concerning the occurrence in Bucks. of *Anosia plexippus*, *Pieris daplidice*, and *Vanessa antiopa* which, I think, should be placed on record. I may add that this instance of *A. plexippus* brings up the total number to *thirty* specimens either seen or captured in the British Islands (including one captured in Guernsey by Col. A. H. Collings on October 2nd, 1886), since the appearance of the first recorded example at Neath, S. Wales, on September 6th, 1876. Respecting this species Mr. Crouch states in his letter dated October 14th, 1915: "Having made no note of the date at the time I can only say that it was about 1894. I was having breakfast in the verandah at my old house—Rickfords Hill, Aylesbury—(my son, Capt. L. W. Crouch, now at the front was with me) when this large butterfly flew across the garden within a few yards of us. It could be nothing else than the black-veined brown from its size and colour. The impression it gave us was being like a silver-washed fritillary, only about three or four times as large. My son was then quite a small boy, but neither he nor I have ever forgotten the unaccustomed sight. The garden being very small we had no opportunity of catching it as it did not settle." This is perhaps the most interesting record we have of this butterfly, as it is the only one seen in an inland county, all the other examples occurred in the coast counties, and it is also one of the most northern localities where this species has occurred. *Pieris daplidice*, male, captured by Col. John Day at Stoke Mandeville, Bucks., on August 2nd, 1913, while sketching in a clover field. It is fairly perfect, being a little faded, and is now in Mr. Crouch's cabinet. *Vanessa antiopa*.—A specimen seen on two consecutive days, September 15th and 16th, 1915, by Mr. Crouch and his gardener in his garden at Friarscroft, Aylesbury. It was first observed sitting with expanded wings on a chestnut tree in the sunshine; it then sailed about in a stately manner but did not fly fast. The following day it was seen by the gardener while resting on a row of sweet-peas. It was evidently attracted by some rotten fruit which was lying about in the adjoining orchard.—F. W. FROHAWK; October, 1915.

PYRAMEIS ATALANTA, &C., IN THE CHILTERN, 1915.—In my article on the butterflies of the Henley district of the Chilterns (September 'Entomologist,' pp. 208-212) I stated that from the time of arriving at Henley on August 13th till the time of writing, August 26th, I had not seen a single *P. atalanta*. Subsequently, however, a few specimens were noticed. The first occasion was on August 30th, a very windy day, when two were seen. After this I saw them at intervals of two or three days up till my departure on September 20th, but never more than one or two specimens in a day except

once, on September 4th, when about six were observed during a walk of four miles along the summit of the northern Chiltern escarpment. These particulars will serve to show the scarcity of the butterfly in the district this year, a scarcity which seems to have prevailed also in other places. On September 10th I saw a fresh looking specimen of *P. cardui*, the only one noticed during my stay. *C. argiolus* was observed at intervals up to September 8th.—HUGH SCOTT; Cambridge, September 30th, 1915.

VANESSA ANTIOPA IN SURREY.—It may be of interest to report that a friend of mine (not a collector) residing at Addiscombe, Surrey, had a specimen of *Vanessa antiopa* fly in his window on September 22nd, which he asked me to set for him as a memento.—C. SAVILLE; 16, Mincing Lane, E.C., October 15th, 1915.

COLIAS EDUSA IN 1915.—The only *Colias* I have seen alive this year was a specimen of *C. edusa*, which I think was a female, on Southsea Common, September 25th. The appearance of this species in some numbers in the Portsmouth district during August has been noted elsewhere.—HUGH SCOTT.

COLIAS EDUSA IN SUSSEX.—Whilst driving from Arundel on September 8th last, Mr. J. C. Kershaw and I observed a male *C. edusa* flitting amongst the flowers by the roadside; it appeared to be in perfect condition.—G. BERTRAM KERSHAW.

COLIAS EDUSA IN HAMPSHIRE.—On August 19th a male specimen of *C. edusa* was seen on the cliffs at Milford-on-Sea.—A. S. CORBET.

COLIAS EDUSA IN CORNWALL.—I saw no *C. edusa* this year in Cornwall, and, if I remember rightly, I saw none last year, though during the ten years or more I have been going to West Cornwall, I have seen them, I believe, every year up till 1914. They usually appeared at the end of September, and I have more than once seen more of them in October than in September. Their non-appearance this year had nothing to do with weather, which was of the best. *P. cardui* was common. But nothing in the way of butterflies this season has struck me so much as the large number of *C. argiolus*. I have seen them commonly, both early and late broods, nearly everywhere I have been, including our own garden at Highbury; though, of course, they were not numerous there.—HAROLD HODGE; October 13th, 1915.

DRAGONFLIES BRED IN 1915.—I have bred this year *Cordulegaster annulatus* (one male, nymph taken in New Forest), *Æschna grandis* (nymphs from Byfleet), *Æ. cyanea* (nymphs taken at Corfe Castle), *Libellula depressa* (nymphs from Corfe Castle), *Pyrrosoma nymphula* (nymphs from Angarrack, Cornwall), *Agrion puella* (nymphs from Byfleet), *Calopteryx splendens* (nymphs, I believe, from Richmond, Surrey; but I am not certain, as they were not taken by myself). From my experience this has been a late year with dragonflies. The nymphs of nearly every species I had were late in emergence. *L. depressa* began to come out in July or the last day or two in June; one emerging on July 31st. Latest of all, a *Sympetrum*

striolatum came out on October 5th; this, however, may have been a case of prematurity rather than delay. The nymph was one of a number I had just got from Angarrack marshes in Cornwall, and the general excitement of the violent disturbance may have brought about emergence. At any rate, I have noticed that very often when nymphs have just been caught and removed to new quarters, one or more of them emerge at once, no others coming out until after a considerable interval of time. I think the general lateness this year was largely due to the coolness of the summer. A hot spell usually brings out many dragonflies; while nymphs apparently fully mature and showing the usual signs of contemplated emergence will not come out on a cold day; protracted coolness causing some of them to give up the attempt for the whole season, sometimes apparently with fatal results.—HAROLD HODGE; October 1st, 1915.

ZYGÆNA FILIPENDULÆ AND MACROTHYLACIA RUBI ON THE HAYLE ESTUARY.—There is an entomological phenomenon about the Hayle Estuary, in Cornwall, which seems worth recording. At low tide the estuary is certainly not more than three hundred yards wide in parts, and divides an absolutely homogeneous terrain. Yet on one, the Lelant, side the cocoons of *Zygæna filipendulæ* are to be found in thousands; on the other, the Hayle, side hardly one is to be seen. I have visited this part in the autumn, staying some four or five weeks, for now many years following, and I have not found more than three *Z. filipendulæ* cocoons on the Hayle side. In exactly the same case are the larvæ of *M. rubi*, swarming on the Lelant side, not seen on the Hayle towans on the other side. The phenomenon is constant year after year.—HAROLD HODGE; 9, Highbury Place, London, N.

THECLA ESCULI IN THE SOUTH OF FRANCE: ERRATA.—Page 240, for “♂” read “to.” Page 241, line 2 from top, there should be a comma after lighter; line 5 from top, after “lighter” insert “than”; and line 6 from top, after “diminishing” insert “much”; line 18 from top, for “dark” read “light brown.” I much regret these errors, probably due to my inaccurate transcription of the MS. notes so kindly placed with me by Dr. Rosa.—H. R.-B.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—August 26th.—Mr. A. E. Tonge, F.E.S., Vice-President, in the chair.—Mr. Main exhibited leaves of the sycamore in which were the larvæ of the Sawfly *Phyllotoma aceris*, and leaves of alder in which another species of *Phyllotoma* fed in a somewhat similar manner. Mr. Edwards, butterflies from S. America of the genera *Cybdelis*, *Cyclogramma*, *Cotenephile*, and *Myscelia*, showing marked seasonal dimorphism.—Mr. Newman, a “blue” captured in Kent in July, which, from its colour and markings, he considered a hybrid between *Agriades coridon* and *A. adonis*.—Mr. Bunnett, bunches of the ova of the lace-wing *Chrysopa flava*, each laid on a separate

stalk.—Mr. C. B. Williams, a box of Lepidoptera he had met with in the Italian Val Formazza, from Domodossola leading up to the Tosa Falls.—Mr. Ashdown, two aberrations of *Coccinella bipunctata*, in which the spots were enlarged and united in a very unusual manner.—Mr. West (Greenwich), a rare Coleopteron, *Scymnus arcuatus*, presented to the Society's collections by Rev. J. T. Perry.—Mr. Sperring, extremely dark examples of *Boarmia gemmaria* (*rhomboidaria*), bred from ova, the female parent from Darenth.—Mr. Tonge, confluent examples of *Anthrocera filipendulae* from Reigate.—Mr. B. S. Williams, on behalf of Mr. Wanhill, a *Gonepteryx rhamni*, in which male and female colour were mixed on the fore wings, and several melanic specimens of *Hibernia defoliaria* from Epping Forest.—Mr. Bowman, a very fine series of *H. defoliaria* from Epping Forest, including a dozen melanic examples, several light forms, strongly banded forms, mottled forms, &c. In nine years previous to 1914 he had only met with two melanic forms in this locality.

September 9th.—Mr. A. E. Gibbs, F.L.S., F.E.S., Vice-President, in the chair.—Mr. Sano exhibited living larvæ, pupæ, and imagines of the Longicorn Coleopteron, *Rhagium inquisitor*.—Mr. Leeds, under side aberrations of *Agriades coridon*, ab. *semisyngrapha*, blue suffused females of *Polyommatus icarus*, and an ab. *syngrapha* with very dark margins to the wings.—Mr. H. Moore, imagines of the *pylades* group of *Papilio* from Africa, and read notes.—Mr. West (Greenwich), the rare Coleopteron *Athous rhombus* taken at Ascot during the field-meeting on July 3rd.—Mr. B. S. Williams, an aberration of *Eupithecia subnotata* in which the mottled markings were absent, there being present on the sub-marginal area a series of quadrate light spots.

September 23rd.—Mr. A. E. Gibbs, F.L.S., F.E.S., Vice-President, in the chair.—An evening for the exhibition of lantern-slides.—Mr. Tonge exhibited some beautiful slides illustrating the resting attitudes of the imagines of several Lepidoptera.—Mr. Colthrup, the attitudes of living larvæ of several Lepidoptera.—Mr. Hugh Main, coloured slides of botanical and entomological subjects.—Mr. Tonge exhibited a series of *Boarmia repandata* reared from Norfolk ova, the *repandata*-form ♂ = 1, ♀ s = 29, and *conservaria*-form ♂ = 0, ♀ s = 39. He also showed a series of *Numeria pulveraria* reared from Abbot's Wood ova; the variation was practically nil—♂ s = 24, ♀ s = 27.—Mr. B. S. Williams, an aberration of *Crocallis elinguarina* in which the ground was heavily dotted with dark brown and the central band sharply margined white.—Mr. Morford, the case of the Psychid *Pachythelia villosella* from the New Forest.—Mr. Buckstone, a bred series of *Lithosia deplana* from Mickleham, one example being very smoky with rich yellow costa and fringes.—Mr. Priske, the large galls in the stems of thistles.—Mr. Leeds, many aberrations of "blues" taken this season mainly in Herts, with an *Epinephele jurtina* having extra ocelli on both upper and lower side, and an *Agriades coridon* ab. *semisyngrapha* from Kent.—HY. J. TURNER, *Hon. Rep. Sec.*

RECENT LITERATURE.

Some South Indian Insects and Other Animals of Importance Considered Especially from an Economic Point of View. By T. BAINBRIGGE FLETCHER, R.N., F.L.S., &c., Imperial Entomologist to the Government of India. Pp. i-xxii, 1-565. Madras: Printed by the Superintendent, Government Press. 1914. Price 6 rupees (9 shillings).

THE first part of this excellent work is divided up into twenty-three chapters, and of these the first nine are devoted to more or less brief consideration of the following subjects: Definition and Structure of Insects, Classification and Nomenclature, Metamorphosis, Means of Defence in Insects, Communication amongst Insects, Tropisms, Insects and Plants, Symbiosis and Parasitism, the Balance of Life. In the limited space allotted to each of these chapters the author has skillfully marshalled most, or perhaps all, the more telling facts connected with the matter dealt with. Chapters x. and xi. treat of insect pests and the control of insect pests of crops. The author then proceeds to deal with the various kinds of insects and their depredation on growing crops or stored products. Insect pests of the household are also considered, and a chapter is devoted to insects and disease. Not all insects are inimical to man, however; some, indeed, are really helpful in various ways. This side of the subject is duly noted and adequately treated in a chapter headed "Beneficial and Useful Insects." In the main portion of the book (pp. 264-546) the more important species are duly classified, and details are furnished in the matters of synonymy, life-history, distribution, &c. We consider that this part of the work has been admirably arranged.

Although the author states in his preface that the volume has "no pretensions to the assumption of any status as a text book," we feel assured that it will be accepted as such, especially as regards South Indian insects. From the economic point of view, the work will be of first class importance.

It only remains for us to add that the illustrations are excellent and very numerous. The coloured plates, forty-nine in number, are beautifully reproduced from original drawings. Although many of these plates have appeared in other publications, their inclusion in the present volume will enhance its value.

Insects and Man. By C. A. EALAND, M.A. Pp. 343. London: Grant Richards. 1915. Price 12s. net.

IN dealing with this important subject the author has brought together in handy form all, or nearly all, that really matters in connection with each phase under the following headings: Insects and Plants (pp. 33-87); Insects and Human Disease (pp. 88-159); Insect Enemies of Live-Stock (pp. 160-196); Beneficial Insects (pp. 197-233); Household Insects (pp. 234-273); Some Human Parasites (pp. 274-294); Insect Control (pp. 295-322).

In the introduction (pp. 17-32) the progress and present position of applied biology is reviewed, and the various orders of the Insecta briefly discussed.

There is a bibliography and a useful index.

The book is exceedingly well illustrated, as in addition to sixteen plates there are one hundred figures in the text.

OBITUARY.

JEAN HENRI FABRE.

Born 1823. Died 1915.

THE announcement of the death in October of Jean Henri Fabre at the ripe age of ninety-two will have awakened emotions of regret in the hearts of many Englishmen and Frenchmen, besides those of all nations who are also entomologists. Fabre was one of the grand old men of France. His name will ever be linked by me with that of another of her grand old men, Mistral, the supreme poet-historian of Provençal humanity, just as Fabre described the insect fairyland of that delectable country. They were life-long neighbours, well-known to one another, and friends, and both brought up under the same blue sky of the Midi, though Fabre was actually native-born of Sainte Leone in Aveyron. He received his first schooling at Vaucluse, in the land of Petrarch, and proceeded thence to the management of the primary school of Carpentras beneath the shadow of Mt. Ventoux—Mistral's own town—or ever Avignon and Arles claimed him for their own to join that wonderful band of troubadours, the Félibre, who restored the *langue d'oc* to its rightful place in literature. And just as the Pleiads of Provence starved body and back to possess themselves of the wherewithal to study the poets beyond their ken, so Fabre would sacrifice a whole month of his meagre £40 a year to purchase a first text-book on entomology. It was not until he had passed his thirtieth year, however, that he proclaimed himself Master of Arts in the great "*Ecole buissonnière*" of Nature, where we, too, have been privileged to sit as humble pupils. His first published work, I believe, is to be found in the '*Annales des Science Naturelles*,' 1855-58; and this later was extended in the '*Souvenirs Entomologiques*,' continued from 1879 onwards to 1907. His first published volume is a '*Faune Avignonnaise*,' apparently interrupted by the war of 1870, and stopped with the first fascicule, "*Insectes. Coleoptères*."

Essentially an observer rather than a collector, he found ample material to last a long life in the insects of all Orders occurring within a modest radius of Sérignan—that land of red earth and slanting olive orchards where the cicadas chirped their secrets to his ears—"the roadside nightingale of the nymphs, who at mid-day talks shrilly in the hills and the shady dells"—as to the other but unknown poet who sang of them in Attica two thousand years ago.

Fabre's works occupy no great space upon our bookshelves. "Infinite riches in a little room," they have revealed the conscious life of the insect to thousands who a generation since, perhaps, grudged admiration for the loveliest butterfly, and regarded the field-naturalist as a harmless, unintelligible lunatic. His essays, the epic of entomology, have been translated into many languages, and it is some consolation to reflect that in very old age he was relieved of financial anxieties by an appreciative public at home and abroad, as well as by a grateful country.

A naturalist of the old school, his writing has little in common with that of the pioneers in the then newly exploited realm of research invaded by Darwin, Bates, and Wallace. With the problems of evolution, the meaning of mimicry and such like he was wholly unsympathetic. The theories and speculations of the museum and the laboratory interested him not at all; the labour of his love was pursued in the field where he searched out the lives of the little people of earth and air with the eternal patience of Genius.

It is instructive as a commentary on the retiring nature of the greatest French naturalist of the nineteenth century that his merits were only borne in upon the world at large towards the close of his career. He was not elected an honorary member of the Entomological Society of France until 1894, when he was past seventy; ten years later the Society of London honoured itself by placing the name of Jean Henri Fabre among the twelve Internationals who head the list of Fellows. In 1912 the French Government made him a grant of £400, *honoris causâ*, following the subscription raised in 1910 by his admirers, and the issue of the charming medal designed to his memory which bears a faithful portrait of the Poet of Science.

The ten volumes of the 'Souvenirs Entomologiques' (Ch. Delagrave, Paris) contain two hundred and nineteen studies of insects generally; only a few papers are devoted to Lepidoptera; among them "La Processionnaire du Pin" (6^me sér., xviii-xxiii), "La Grand Paon" (7^me sér., xxiii), and "Le Cossus" (10^me sér., vi). "La Vie des Insectes" consists of selections from the same work. Besides which have been issued a number of his lectures on different branches of science, chiefly entomology and botany (first published in separate form in 1873); and the causeries on similar subjects for young people, delivered by him as "Uncle Paul."

Of these several works I cannot do better than quote the eulogy conferred on them by Mr. Paul Thureau-Dangin on the occasion when the Académie Française awarded the Prix Née to the author:—"Lisez ces récits, vous en goûterez le charme, la bonhomie, la simplicité, la vie, vous vous passionerez à cette science aimable qui se fait au jour le jour, dans les belles heures d'été 'au chant des cigales,' à cette science qui n'a rien de germanique, oh non! qui est bien latine, virgilienne par moments, qui donne la main à la poésie, qui est, enfin, si pénétrée d'amour qu'il semble, parfois, que de ces humbles souvenirs entomologiques, s'élève une strophe du Cantique des Créatures."

A biography entitled 'J. H. Fabre, Naturaliste,' by J. V. Legros, Paris, appeared in 1913, and apparently a translation of the same work entitled 'J. H. Fabre, Poet of Science,' 1913. The principal English editions of his works are 'Insect Life,' translated by Margaret Roberts, edited by F. Merrifield (Macmillan & Co., 1901); 'The Life and Love of the Insect,' translated by A. Teixeira de Mattos (A. & C. Black, 1911); 'The Works of J. H. Fabre,' translated by A. Teixeira de Mattos, with preface by Maurice Maeterlinck (Hodder & Stoughton, 1912), in progress; 'Social Life in the Insect World,' translated by Bernard Miall (T. Fisher Unwin, 1912).

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THE ENTOMOLOGIST

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[No. 631

SOME CONIOPTERYGIDÆ IN THE NORTH, WITH A DESCRIPTION OF A SPECIES NEW TO THE BRITISH ISLES.

By J. W. H. HARRISON, B.Sc.

I HAVE spent a considerable amount of time during the past few years in the investigation of the more obscure groups of our local flora and fauna, with very successful results. Amongst the species taken is a Neuropteran, *Conwentzia pineticola* (Enderlein), allied to, but very distinct from, the common *C. psociformis* (Curtis); this species of Enderlein's is new to the British list.

I first took this insect from larches, between Ormeby and Nunthorpe stations, badly victimised by *Chermis laricis*; subsequently I procured the insects with hosts of *Coniopteryx tineiformis* (Curtis) from silver fir (*Abies pectinata*). In both cases the insect occurred in considerable numbers and, what is specially noteworthy, without a single *Conwentzia psociformis*. Further work in similar localities, both in North-east Yorkshire and South-west Durham, has proved the insect to be widespread with us, and to have a range of altitude from sea-level to nearly 1200 ft.

In Lonsdale, in Cleveland, at a height of 800 ft., the insect was beaten from larch in a mixed alder and larch wood in company with *C. psociformis*. From holly and many deciduous trees, on the outskirts of the same wood, only *C. psociformis* was obtained, but in large numbers.

Coniopteryx tineiformis is very common throughout our area in the lowlands, but thins out as one ascends. I have taken it from elm at sea-level at Greatham, South Durham, and likewise at a height of 800 ft. from birch and alder on Eslor Nab and in Lonsdale (both in Cleveland), and even at a height approaching 1200 ft. near Wolsingham, in Durham, from oak. In the intervening tracts it occurs on many trees in greater or less abundance.

Semidalis aleurodiformis (Stephens) is everywhere rare here,

having been beaten only once, and that from honeysuckle near Gunnergate, in Cleveland.

Conwentzia psociformis is more or less common everywhere, especially on holly, ivy, and honeysuckle.

A very brief note of the capture of this new form has appeared in the 'Vasculum,' the local Natural History Magazine for Durham, Northumberland and the adjacent areas, but no description was appended. The deficiency is now remedied.

Conwentzia pineticola (Enderlein).

Head and thorax pitchy brown; collar and under side of thorax much paler; thorax with three white spots forming an inverted isosceles triangle. Antennæ 32 jointed; legs and antennæ fuscous in colour. Abdomen yellowish, more or less regularly mixed with brownish red. Wings, in life, snowy, but preserved in spirit, smoky, clearer just above the median vein. The subcostal nerve, the radius, and cubitus 1 are very dark and heavy, and the ground area near them slightly darker. The other veins dark, but not black, with the exception of the two outer transverse nervules which are almost colourless. The neuration and depth of colouration of the wings are very variable, and may be different in the two sides of the same insect; it is therefore clear that differences in neuration, such as have been used to separate this species from *C. psociformis*, are of but little use. Nevertheless the two insects cannot be confused, even without the examination of the genitalia, if one considers the colours of the abdomen of the two; I have never seen a *C. pineticola* without the reddish colouration or a *C. psociformis* with it.

Habitats.—Throughout N. Cleveland, Upper Teesdale, Durham.

NOTES ON NEW AND LITTLE KNOWN BRITISH
APHIDES.

BY FRED V. THEOBALD, M.A., F.E.S., &c.

(Continued from p. 263.)

IN 1903 Clarke described a *Macrosiphum valerianicæ* in California (Canad. Entom. xxxv. p. 253). I at first considered that the British species was the same, but as Clarke describes the apterous viviparous female as being yellow-brown and with black nectaries, and the general colour of the abdomen of the alate female as yellow-brown, I have described the insects I have found as a distinct species. I should not be surprised, however, if they proved to be the same, a point which can only be decided by a comparison of American and British specimens.

Schoutenden (Ann. Soc. Ent. Belg. 47, p. 190, 1903) records *Aphis viburni*, Scopoli, from *Valeriana officinalis*. Tavares (Brotéria, S. Fiel. vi. Le Zool. p. 113) a black Aphid from *Centranthus calcitrapa*, Lichtenstein (Les Pucerons, p. 131) records *Siphonophora rosæ*, Linn., and *Aphis papaveris*, Fabr., from *Centranthus*, and the former from *Valeriana* (p. 140). I assume these apply to the new species described here and to *Aphis rumicis* which is common on both plants.

9. *Macrosiphum lamii*, nov. sp.

Alate viviparous female.—Head and thorax yellowish-green to yellow; thorax with brownish lobes. Abdomen bright green in front, yellow to orange posteriorly; with rather indistinct darker green lateral spots. Venter green; mesosternal plates pale brown. Antennæ longer than the body, dark brown; base of third segment pale. Cornicles pale, dark at the apex. Legs fawn-coloured, apex of the femora, tibiæ and tarsi, black. Wings with dark brown veins and stigma.

Antennæ arising from prominent frontal processes, two basal segments pale, the first longer than the second; the third longer than the fourth, with 13–16 sensoria, more or less in a straight line, and more or less extending to the apex of the segment; fourth segment longer than the fifth; sixth not as long as the fourth and fifth. Proboscis reaching to the second pair of legs, green; apex black, rather thick. Cornicles narrow, cylindrical, shorter than the third antennal segment, with one or two laterally branched transverse striæ at the apex, rest imbricated. Cauda green, prominent, with three pairs of lateral hairs and one median dorsal one near the apex, less than one-third the length of the cornicles. *Length*, 2 mm.; *wing expanse*, 9 mm.

Food Plant.—The red lamium (*Lamium purpureum*).

Locality.—Wye, Kent (June 8th, 1914).

Observations.—Described from some alate viviparous females which were found producing their young in isolated colonies. The larvæ varied from pale to deep green. No apterous viviparous females could be found. They were found amongst the flowers and under the leaves.

10. *Kaltenbachella menthæ*, Schouteden (Mém. d. l. Soc. Ent. Belg. xii. p. 195, 1906).—This root-feeding aphid, described by Schouteden from the terminal roots of corn mint (*Mentha arvensis*), was sent me by Mr. J. C. F. Fryer, of the Board of Agriculture, on the roots of water mint (*M. aquatica*) from Chateris, Cambridgeshire, on September 15th, 1914. All the specimens were apterous females, but one which just showed traces of wing-buds; unfortunately this died. These insects produced much flocculent white wool on the roots, often in little compact patches. It clearly bears strong resemblances to Passerini's *Rhizobius menthæ*. I have this water mint colony still alive, but no alatæ have occurred at present.

SOME NOTES ON THE PAPILIONIDS.

By CECIL FLOERSHEIM, F.E.S.

(Continued from p. 258.)

(9) *Papilio alcinous*.—An account of my experience with this species should have preceded the notice of *P. bianor* in the last number of the 'Entomologist.' It was for reasons of space only that it was omitted. *P. alcinous* is a native of Japan and

other parts of Eastern Asia, and is one of the Pharmacophagous or *Aristolochia*-feeding Papilionids, a branch of the family which, as has been stated in a former note, *Laertias philenor* represents in North America. I bred it successfully, both in my butterfly-house and out-of-doors in the summers of 1913 and 1914. But in point of adaptability to its English environment, it is far from proving as accomodating as its Nearctic congener. In my butterfly-house, though I had a considerable number of fertilized females on the wing, it oviposited sparingly; out-of-doors, under natural conditions, it did so freely enough. In both circumstances, however, not only did the larvæ feed up very slowly, but the resulting pupæ all gave rise to a second brood in the early autumn. The newly-formed pupæ, unlike those of *L. philenor*, I found to be exposed to the attacks of earwigs, which in many cases devoured them and left only their shell, and in several instances I bred a large member of the Ichneumonidæ, closely resembling *Trogus exesorius*, from the pupæ which I received from Japan. I found, however, that my *alcinous* pupæ were not subject to the ravages of the small black fly which infests my butterfly-house. I am unable to explain why my *alcinous*, which fed upon the same plants of *Aristolochia sipho* as my *philenor*, did not enjoy an equal immunity. It has been stated by Leech, who quotes Pryer, in his 'Butterflies of Japan and Corea,' and by Seitz in his 'Macro-Lepidoptera of the World,' that the larva of *alcinous* feeds upon *Cocculus Thunbergii* (natural order Menispermaceæ); though I had a number of plants of this creeper growing both in my butterfly-house and out-of-doors, I never found the ova or larvæ of *alcinous* on them. *A. sipho* was without exception the food-plant chosen, the imagines, as if they wished to accentuate the fact that they were true *Aristolochia*-feeders, haunting the large *Aristolochia* plants in my kitchen garden for days at a time, sunning themselves upon the broad leaves and returning to them if driven away almost invariably. Mr. Green, who came over from Camberley a few months ago to see my butterfly-house, gave me the probable explanation of this. It appears that *A. Indica*, a common Eastern member of Aristolociaceæ, greatly resembles both in habit of growth and in leaf *C. Thunbergii*. Hence the mistake probably has arisen. In its like-habits this butterfly presents some points of difference from *L. philenor*. The ovum, which is like that of the latter species in colour, being of a brownish red, is laid singly, instead of in batches, upon the fully expanded leaves, not the stems or budding leaves of the food-plants. The larva is solitary, not gregarious, and is as sluggish in habit as that of *philenor* is active. It clings to the under side of the largest *Aristolochia* leaves, and moves as little as is compatible with feeding. It is a striking-looking object when fully grown, brownish black, with scarlet and white

fleshy filaments, the latter taking the place of the white saddle-marking, which, unlike *L. philenor*, it possesses in its earlier stages. It is exceedingly short and thick-set, and looks like a small porcupine with its quills erect rather than the ripe mulberry to which Seitz compares it. The pupa, which is fluted and curved like the scroll of a violin, is of a clear light brown in colour, and both in size and shape resembles that of *Papilio Hector*. It reminds me, in miniature, of drawings I have seen of the pupæ of some of the Malayan Ornithoptera. The imago, unlike that of *L. philenor*, seems to feed seldom on flowers, but spends most of its time, particularly in the case of the females, in fluttering in and out of the *Aristolochia* leaves, or sunning itself upon them. It is, however, long-lived, and in the fine early summer of 1914 individuals would haunt my *Aristolochia* plants for weeks together.

(10) *Papilio xuthus*.—I have found this butterfly, which is said to be the commonest of all the Papilionids in Eastern Asia, extremely easy to rear in my butterfly-house. It is, however, seasonally dimorphic, and probably under natural conditions, even in the South of England, would be almost entirely double-brooded. In the summer and autumn of 1913 I managed to get some sixty pupæ of the first brood to go over the winter without emerging, by keeping them until late in November on ice in a refrigerator. In 1914, when I neglected to take this precaution, all my pupæ disclosed imagines of the summer or *xuthus* type in August and September, and I lost my stock. I may remark, in confirmation of the experiments of other entomologists, that the delayed pupæ of 1913, which would no doubt have disclosed imagines of the normal summer kind had their development not been arrested, gave rise only to individuals of the *xuthulus* or spring form in 1914. Some of those were larger than is usual with *xuthulus*. It was, however, only the medium-sized and smaller summer pupæ with which I was successful. The largest pupæ all either gave rise to imagines in the autumn or died during the winter.

Though the earlier stages of this species have long been familiar to entomologists and I need not describe them in length, a few remarks on its life-habits may not be superfluous. In food-habit, as far as I have been able to observe, it is confined to the Rutaceæ. In my butterfly-house *Aegle sepiaria* (*Citrus trijoliata*), for which I should say the imago shows a slight preference, and *Skimmia* were the plants chosen, and out-of-doors I have found the larva on *Skimmia*, *Dictamnus*, *Phellodendron*, and *Aegle*. I also fed up some of the larvæ in a cool greenhouse on shaddock, *Citrus decumana*, but the resulting pupæ and imagines were decidedly smaller than those reared upon other plants mentioned, and the larvæ fed up slowly as if the food was not altogether to their liking.

The ovum is laid singly, sometimes on the upper side, but more frequently on the under side of a leaf of the new growth, the topmost side-shoots of *Aegle* and *Skimmia* being often chosen for this purpose. The larva feeds fully exposed in the sunlight, and is remarkably difficult to detect when full-grown. Its general protective scheme of leaf green, with lateral stripes of lilac-grey edged with white to imitate the effect of sunlight falling on leaves, is strikingly like that of our own *Sphinx ligustri*. In most instances it pupates either on the food-plant itself or at a short distance from it. The pupæ of the green variety I have often found in most exposed positions on the topmost shoots, and so difficult are they to tell from their surroundings, that I have sometimes looked at them for days without finding them, discovery at length resulting from the darkening in colour prior to the emergence of the imago, or even only when the empty brown shell had been abandoned. Of course I am speaking of the pupæ of the first brood, which would normally give rise to *xuthus*. I have never yet seen those of the second under natural conditions. In conclusion, I may remark that I do not think it at all likely that *xuthus* would ever be able to establish itself in the British Isles, though, like so many other of the species with which I have dealt in these notes, it could probably be easily introduced into Southern Europe in localities where a sufficiency of plants of the Rue family, with the possible exception of the Aurantiaceæ, to which it does not seem addicted, were grown.

(11) *Papilio hippocratis*—This butterfly is a native of Japan. It closely resembles our own *P. machaon* particularly in its early stages, and has been treated by the text-books as a variety of that species. While, however, I feel that I am not competent to express any decided opinion on the subject, I should venture to doubt whether the differences between them are merely those of a varietal nature.

I have always found *machaon*, var. *britannicus*, to interbreed freely enough with any of the Continental races of the species. But though I have had the imagines of *hippocratides*, the spring brood of *hippocrates*, out in my butterfly-house at the same time as those of *machaon*, both in 1912 and in 1914, on neither occasion did I notice any pairings between them. In the former season I had been able to procure very few pupæ of *hippocratides* from Japan, and the imagines which emerged were all males. I did not see any of these *in copula* with *machaon*, of which both sexes were present in abundance. Neither did any trace of *hippocrates* reveal itself in the *machaon* which I bred that season. I must, however, point out that owing to the abnormal cold and wet of the late summer of 1912, I succeeded in rearing very few *machaon*. In 1914 I was able to procure a fairly large number of *hippocratides* pupæ, and at one

time during that season I must have had at least forty of the imagines of both sexes out in my butterfly-house with about double that quantity of *machaon*. I did not notice any cross-pairing, each confining itself to its own kind in so far as I was able to observe. It is only fair to remark here that a large proportion of the pairing which takes place in my butterfly-house are not witnessed by me, partly because they often occur low down amongst the herbage or in similar places where the insects are difficult to detect, partly because I myself am frequently away. Perhaps a comparative examination of the genitalia of *hippocratides* and *hippocrates*, with those of the spring and partial summer broods of *machaon*, would throw light on the matter.

In any case, *hippocrates* would, I fear, be totally unsuited for introduction into this country, for it is seasonably dimorphic, and even in the not particularly warm summer of 1914, proved to be entirely double-brooded. I have seen it stated that it is only in the third brood of *hippocrates* that the largest specimens of the dark female variety occur. Naturally enough, I was unable to test this for myself in our northern latitudes, but two of my female *hippocrates* which were among the first to emerge at the end of July measured more than five inches across the wings. With the larva of *hippocratides* I am not acquainted. The pupa differs both in shape and in colour from that of our English *machaon*, but not more so than many pupæ which I have received from the Continent. The larva of *hippocrates* is indistinguishable from that of *machaon* except in respect of size. The pupa of *hippocrates*, though of course much larger than any *machaon* I have ever seen, seemed to be identical with that of *machaon* var. *britannicus* in shape. The few specimens I found of the brown variety of the pupa resembled those of our English variety far more than did the *hippocratides* both in colour and in markings; while the far more numerous individuals of the green variety appeared to be similar in both respects to those of the small partial second brood of *machaon*. I have always found those, which are also usually of the green variety, to differ in a marked degree in colour and slightly also in shape from the pupæ which hibernate. Both the green and buff are more vivid, and the projections on the dorsal parts of the abdominal segments slightly more raised.

(12) *Iphiclides podalirius*.—In regard to this Papilionid I have little to say. On several occasions I have had the imagines out in my butterfly-house; but they clung obstinately to the sides of their prison and refused to fly, feed, pair, or indulge in any other of the normal processes of butterfly life. In consequence, after a few days I have always given them their liberty, and have had the pleasure of seeing them float away in apparent enjoyment of the upper air.

Though, as I have said before, my experiments in hybridiza-

tion have proved on the whole a failure, the breeding and observation of the species of exotic Papilionidæ described in the foregoing notes have been of great interest to me, and I hope that time will enable me to extend what I feel to be a limited and superficial knowledge of the life-habits of this family. Various attractive by-paths, too, have presented themselves, exemplifying the paradox that the more men know the more ignorant they become. Since each fact which the human mind adds to its slender store increases in ever-growing proportion the number of those which it becomes possible for it to learn. The subject of the food-habit of the group in itself opens a long, if not endless, vista for research. For instance, to touch on one small matter, why should the *Aristolochia*-feeding habit, which seems to confer complete immunity from parasitic attack on the larva and pupa of *Laertias philenor*, only protect to so small an extent those of *Papilio alcinous*? Or to take quite another line of investigation, is the remarkable general likeness which exists between the full-grown larvæ of *Jasoniades glaucus*, *Euphocades troilus*, *Papilio xuthus*, and *Papilio bianor* due to the fact that these species are closely allied, or is it merely a similar means of protection evolved by the organism in a similar environment? As an example of the latter, I would instance the case of the partly-grown larva of *Hyloicus pinastri*, which, when it is of the same size as the full-grown larva of *Panolis piniperda*, presents so striking a likeness to it that it would be difficult to tell the two apart were it not for the presence of the anal horn in the Sphingid.

Yet the pleasure which I have derived from observing and experimenting with my Papilios has been equalled, if not surpassed, by that which I have taken in watching the liberated imagines flying about my garden—quam familiariter—sights such as an apparently endless succession of *bianor* chasing one another over a high hedge of *Escallonia macrantha* one fine summer morning, or of some thirty *philenor* feeding simultaneously with quivering wings at a patch of the still bluer flowers of *Anchusa* var. *Droptmore*, will not soon be forgotten by me. If by giving their freedom to those beautiful creatures I have raised false hopes in the breasts of some brother entomologists, I wish to tender them a formal apology. But I am inwardly impenitent. For I look forward to the time when man who has done so much to beautify his life by surrounding his habitations with the flowers of other countries than his own, will do so to a lesser extent by introducing various exotic kinds of the Lepidoptera, which, in the past of this planet, played so important a part in the development of the flowers themselves; perhaps improving and adapting insect life to his purpose by means of artificial selection, as he is beginning to do with plant life.

When, in far generations to come, this shall happen, I am sure that he will find no butterflies more suited to his ends than the Papilionidæ, both for their beauty and their specialization in food-habit. For anyhow, as far as Europe is concerned, it is only in the South, where the orange and lemon are grown for commercial purposes, that any of the crops and fruits in which man finds sustenance would be exposed to damage from the *Aristolochia* and Rue-feeding branches of the family.

NEW SPECIES OF GEOMETRIDÆ FROM FORMOSA.

BY A. E. WILEMAN, F.E.S.

Caberodes costipicta, sp. n.

♀. Head and thorax pale brown, darker mixed; abdomen greyish brown. Fore wings pale brown, sprinkled and flecked with darker brown, costa reddish brown; two oblique blackish streaks on the costa represent antemedial and postmedial lines; discoidal dot dusky, terminal lines black; fringes blackish, becoming greyish towards apex. Hind wings whitish suffused with fuscous brown towards termen and on dorsal area; discoidal dot dusky. Under side whitish flecked with brown, chiefly towards margins; all the wings have a black discoidal dot, and the hind wings have an interrupted brownish postmedial line.

Expanse, 32 millim.

Collection number, 1812.

Three female specimens; one from Arizan (7300 ft.), March, 1908, the others from Rantaizan, May, 1909.

Near *C. paralba*, Swinhoe.*Boarmia fulvipicta*, sp. n.

♂. Head and thorax dark brown, front of thorax greyish tinged; abdomen pale brown mixed with black-brown, chiefly on the posterior edges of segments. Fore wings grey, striated with darker; costa, red-brown, veins marked with black; base red-brown striated with dark grey; antemedial line black, inwardly oblique, wavy and bent outwards below costa; postmedial line black, wavy and incurved from costa to vein 6, thence inwardly oblique to just below vein 2, where it turns in to the dorsum; the black vein marks on this line are very distinct; area beyond postmedial clouded with red-brown; subterminal line pale, wavy, traversing the red-brown clouds; terminal line black, interrupted; fringes dark grey, chequered with red-brown. Hind wings grey striated with darker; discoidal mark and transverse shade blackish; postmedial line black, serrated, outwardly pale edged, area beyond line clouded with red-brown below middle; subterminal line pale, interrupted; terminal line black, interrupted, fringes dark grey mixed with red-brown. Under side grey-brown suffused with fuscous; all the wings have

black discoidal marks and two black transverse lines, the outer line on the fore wings serrated towards costa, and the outer line of hind wings bidentate about middle.

Expanse, 38 millim.

Collection number, 1888.

A male specimen from Arizan, August, 1908.

Bears a resemblance to *B. nigrescens*, Warren.

Boarmia squalida, sp. n.

♂. Head, thorax, and abdomen whitish-grey, abdomen mixed with darker grey. Fore wings greyish-white, freckled with darker, a blackish patch at the base divided by the median nervure; antemedial and postmedial lines black, the former bluntly angled about middle, the latter serrated and outwardly edged with white; discoidal lunule black, a blackish cloud above it on the costa; a blackish triangular patch on termen between veins 4 and 7; terminal line blackish, interrupted; fringes white chequered with blackish at ends of the veins. Hind wings greyish white, discoidal spot black; postmedial line blackish, serrated, outwardly edged with whitish; terminal line black, fringes whitish. Under side fuscous, apex of fore wings whitish; transverse lines as above but indistinct.

Expanse, 24 millim.

Collection number, 1695.

A male specimen from Arizan, August, 1908.

Near *B. nigrofasciata*, Leach.

Ectropis arizanensis, sp. n.

♂. Head, thorax, and abdomen whitish-brown mixed with darker brown; antennæ brown, fasciculate. Fore wings whitish-brown dusted with darker, costa tinged with ochreous and streaked with blackish; antemedial line blackish, double, inwardly oblique, indented below costa; medial line blackish, indented below costa; curved around end of cell, approximating to postmedial on dorsum; postmedial line blackish, inwardly oblique, indented below costa, slightly bent outwards below the middle, followed by blackish dots on veins 3, 4, 6, 7, and on dorsum; subterminal line pale, inwardly edged with dusky at costa, above middle, and on dorsum; black dots between veins on termen. Hind wings whitish-brown dusted with darker; antemedial line brown, zigzag; discoidal mark brown, lunular; postmedial line brown, dentate and irregular, marked with black below costa and on dorsum, followed by a paler brown line also dentate; subterminal line pale, inwardly shaded with brown; terminal dots black. Under side paler, transverse lines faintly in evidence.

Expanse, 23 millim.

Collection numbers, 787 and 789B.

Two male specimens from Arizan. One (the type) captured on September 8th, 1906, the other on August 6th, 1908.

Comes nearest to *E. dentilineata*, Moore, but the antennæ are different.

Silabraxas kanshirei, sp. n.

♂. Antennæ not ciliated; head blackish, collar ochreous; thorax whitish, mixed with ochreous and marked with black; abdomen yellow, spotted with black marks, the subdorsal series smaller than the others. Fore wings white, basal patch yellow marked with rusty black and flecked with metallic; antemedial band leaden-grey, broken towards costa; medial group of leaden-grey spots on the costal area; postmedial band leaden-grey, maculate, bifurcate at costa, uniting with a yellow centred and metallic-flecked darker spot near tornus; leaden-grey spots on termen, placed between veins and preceded by larger leaden-grey spots on veins 3 and 4 and some smaller spots nearer the costa. Hind wings white with a large leaden-grey discoidal spot; subterminal series of leaden-grey spots decrease in size towards costa, those at dorsal end black inwardly edged with ochreous and flecked with metallic; terminal spots leaden-grey. Under side similar to above, but without ochreous or metallic scales on dorsal spots.

♀. Fore wings without marking on dorsal half of median area; no discoidal spot on hind wings.

Expanse, 43 millim. ♂; 46 millim. ♀.

Collection number, 650.

One example of each sex from Kanshirei (1000 ft.); the male taken in June, 1906, and the female in April, 1908.

Except difference in antennæ, this species comes nearest to *Abraxas leopardina*, Koll.

Triphosa arizanensis, sp. n.

♀. Head and thorax pale brown, darker mixed; abdomen pale brown. Fore wings pale brown with many darker transverse markings; subbasal line blackish-brown, double, wavy; antemedial line black, sinuous, shaded outwardly with blackish-brown; postmedial line black, undulated, bluntly angled below costa and indented before dorsum, inwardly shaded with blackish-brown; middle of space enclosed by antemedial and postmedial lines suffused and clouded with dark brown; discoidal lunule black; subterminal line pale, interrupted, area beyond dark brown; area between postmedial and subterminal lines clouded with darker between veins and traversed by three or four wavy dark lines, the latter thicker and more conspicuous on the costal area, the veins appear to be dotted with pale brown; fringes dark brown, preceded by a black crenulate line. Hind wings pale brown, basal half suffused with fuscous traversed by darker lines; space between the dark line limiting the basal half and the subterminal line traversed by four wavy dark lines; area beyond the subterminal line dark brown; terminal line black, crenulate; fringes dark brown. Under side pale brown suffused with fuscous, markings of upper side faintly visible.

Expanse, 60 millim.

Collection number, 1668.

A female specimen from Arizan, May, 1908.

Closely allied to *T. expansa*, Moore.

(To be continued.)

NOTES AND OBSERVATIONS.

MIGRATION OF *PYRAMEIS ATALANTA*.—The Bishop of Ripon sends us the following note:—"On September 13th last, I was fishing with Mr. Percival Williams, of Lenarth, and Dr. Leverton-Spry, of St. Keverne, on the south coast of Cornwall, about half a mile off the Blackhead, which lies halfway between Lizard Point and Falmouth. We were moving about, and noticed several 'Red Admirals' flying seaward from the shore. At first we only thought of them as having been by chance driven off shore by the wind, but as we noticed more of them from time to time, and as in all probability the same was occurring beyond our range of vision, say fifty yards, it occurred to Mr. Williams that the question had arisen as to the migration of this butterfly. We must have noticed at least a dozen, not more than twenty, and all of them seemed seaward bound, S. or S.E. The time was between twelve and three, the wind light from the N.W. and off shore, with bright sunshine. On the previous day, Sunday, the wind and weather had been the same, as also on the succeeding days, but for some eight days before there had been a strong and persistent easterly inshore wind, culminating on the Saturday in half a gale. Mr. Williams, who is a resident in the neighbourhood, has never noticed many 'Red Admirals' on the cliffs, but at his home three miles inland there are always quantities in the autumn. None of them attempted to settle on the boat, but continued on their flight, and all in the same south-easterly direction."

PYRAMEIS ATALANTA IN 1915.—From my experience of *Pyrameis atalanta* on the south coast this autumn, I cannot help thinking that had Mr. Hugh Scott been able to prolong his stay in the Henley district for two or three weeks longer he would have found the species less rare than would appear from his note (*ante*, p. 266). My own opportunities for observation were confined almost entirely to week-ends, and to little more than a mile of ground almost within the town of Eastbourne; but as they extended over a period from the end of July to November, I was able to note the coming and going of the autumn emergence. The species was not seen at all until quite the end of August, and from then till September 17th only single specimens were noted, but on the 18th several were seen on the parade banks, and in the garden four patches of a species of Michaelmas daisy proved a great attraction, anything from three to half a dozen individuals frequently being on each of the patches. A similar state of things continued until October 10th, but on the 17th only three were seen in the garden, and not more than a couple elsewhere. Then followed a week of unsettled weather, and we saw no more of *P. atalanta*.—R. ADKIN; Lewisham, November, 1915.

ABERRATIONS OF *PYRAMEIS ATALANTA*.—For over thirty years I have each season bred up all the larvæ that I could find, averaging from twenty-five to seventy, in the hope of getting a good aberration of this very constant species. I had no success until last year, when I bred one with the bands of a rusty red, those on the fore wings having their edges beautifully clouded instead of being sharply

defined, and those on the hind wings with the spots very large and triangular, the one nearest the angle containing a blue scale. There is also a large patch of blue scales near the centre of the left hind wing. This year I have bred two with the bands bright orange-vermilion and one in which they are ochreous-yellow, this being the most striking colour variation that I have ever seen. I have found that any colour variation is usually the other way towards carmine, and any tendency towards yellow appears to be extremely rare.—MARTIN J. HARDING; Oakdene, Church Stretton, November 17th, 1915.

NAMES OF THE BRITISH SPECIES OF CHLOROPERLA.—With reference to my notes in 'The Entomologist' of March, 1913, on two British species of *Chloroperla*, it may be well to state that I subsequently submitted to Professor Klupálek specimens of the insect for which the name of *C. venosa* was provisionally used, and discussed with him the nomenclature employed in the 'Süsswasser-fauna Deutschlands.' As a result, and without going into details at present, it seems to me that our British insect should be called *C. griseipennis*, Pict. As I have already used the latter name in correspondence, I think it is desirable to publish this short note to prevent misunderstanding.—KENNETH J. MORTON; 13, Blackford Road, Edinburgh, November 1st, 1915.

EPERMENIA (CHAULIODUS) ILLIGERELLA, Hb., IN GLOUCESTERSHIRE.—When searching for larvæ of *Earias chlorana* in an osier bed near Gloucester on September 6th last I took two specimens of *Epermenia illigerella*, which does not appear to have been recorded from this county before. Several more specimens were observed, but by September 17th they were worn. They were flying on calm evenings between 6 and 7 p.m., and frequently settled on the osier and buckthorn leaves. It is curious that such a striking Tinea should have hitherto escaped observation in this district. I have to thank Mr. Edward Meyrick, F.R.S., F.E.S., for confirming the identity of this species.—C. GRANVILLE CLUTTERBUCK, F.E.S.; 23, Heathville Road, Gloucester, November 14th, 1915.

ECHINOMYIA GROSSA, L., AND OTHER DIPTERA IN CORNWALL AND DEVON.—After collecting Diptera for over twenty years in Devon and Cornwall, I have at last found a spot where *E. grossa*, the largest British dipteran, is plentiful. In a marshy valley near the sea, about three miles from Tintagel, North Cornwall, I saw as many as twenty on August 19th and 20th this year. On August 23rd I saw one flying quite near King Arthur's Castle at Tintagel. I have three specimens, *ex coll.* Bignell (who probably got them from Rev. T. A. Marshall), labelled as follows:—"Cornworthy, Devon, September, 1888; Botus Fleming, E. Cornwall, 1890; Salcombe, S. Devon, July, 1892." The fable of the dog and the shadow was exemplified when on attempting to get a *grossa* and a *Volucella inanis*, L., with one stroke of the net and missed both! I have not seen or taken *inanis* since 1906, when I took a fine pair at Bovey. I took also with the *grossa* several *Fabricia ferox*, L. This is uncommon here; I have only taken them previously at Bovey, also in 1906. *Echino-*

myia fera, L., which resembles it, but is not nearly so handsome, is common in Devon and Cornwall.—C. W. BRACKEN, B.A., F.E.S.; Corporation Grammar School, Plymouth.

GOMPHOCERUS MACULATUS, Thunb., TETRIX SUBULATUS, L., AND CONOCEPHALIS DORSALIS, Latr. —The first-named grasshopper was present in dozens on the slopes of a steep valley at Treborwith, N. Cornwall, last August. The specimens were, almost without exception, of various shades of brown. This species is very local in the south-west and cannot be called common. I have taken it sparingly at Ugborough (S. Devon) and at Lee Woods (N. Devon)—at both these places the insects were nearly all black. *T. bipunctatus* is common everywhere here, but *T. subulatus* rarely occurs. Mr. J. H. Keys has given me one taken at Nodder Bridge, Saltash (near Plymouth, but on Cornish side of Tamar), April 24th, 1915. All my previous captures were made at Bude and Braunton Burrows. After five hours patient sweeping near Churston, S. Devon, on August 26th, 1914, I took three of the rare orthopteron *Conocephalis dorsalis*, Latr., two males and one female. They were captured in exactly the same spot as that in which Mr. G. T. Porritt took them several years ago. It was a pretty sight to see them sunning themselves on the rushes, their antennæ waving like threads of spun glass.—C. W. BRACKEN.

MALPIGHIS GALLS.—I have again taken a few of these rare galls this autumn (October 6th). I can always depend on finding them on one or two trees at Newnham, Plympton, near Plymouth. I took one also at Plym Bridge Woods, October 2nd. The fact may be worth recording, since the late Mr. E. Connold in his 'British Oak Galls' states that he never found but one. I corresponded with him once concerning my specimens, and he agreed they were not *callidoma* but *malpighii*. I find from some memoranda of the late Mr. G. C. Bignell that he took twenty-two of these galls at Bickleigh, near Plymouth, on October 22nd, 1900.—C. W. BRACKEN.

NOTES ON THE EARLY STAGES OF PLUSIA MONETA.—In the 'Entomologist' for 1912 (vol. xlv. pp. 181, 206, 207) several letters appeared relating to the ovipositing and method of hibernation of *Plusia moneta*. The Rev. W. Claxton began by asking in what stage this insect hibernated, and related his experience of finding a larva in the spring which could only have come to him among some seed which he purchased. As *P. moneta* was common in my garden this summer, I spent some time in watching the process of ovipositing, and found the egg was generally laid on the corolla of the flower but sometimes on a leaf. I also captured a few females and enclosed them in muslin bags on the flower-heads. A number of ova were laid, some on the flowers and some on the muslin. These hatched in about a fortnight, and the young larvæ at once ate their way into the young seed-pods, the only visible mark of entry being a tiny hole, or rather spot, about the size of a pin's point. Determined to see whether it was possible for the larvæ to hibernate on the seeds alone, I have since then kept the muslin bags *in situ* on the flower

and seed-heads, and on examining them to-day I find several of the larvæ still there and quite healthy and strong. It is evident, therefore, that the larvæ can and do sometimes hibernate in the seeds, and clearly Mr. Claxton's larva came to him among the seeds which he purchased. But I feel equally sure that what usually happens is that the larvæ leave the seed-pods, or get thrown out of them when the ripe seed is discharged, and that they then enter the ground or the root crowns of the plants, and there hibernate. Mr. Nicholson (vol. xlv. p. 206) states that the insect is double-brooded. This may be so in some cases, but I have never known it to be so here, and my young larvæ which were hatched early in July are even now not more than an eighth of an inch long. The colour is dirty white, covered with black spots, and a black head.—PERCY C. REID; Feering Bury, Kelvedon, November 15th, 1915.

INJURY TO THE WINGS OF *LYCENA ARION*.—I see by Mr. J. H. Grant's note in the 'Entomologist,' p. 263, that he still is inclined to believe that the injury to the wings of *L. arion* is caused by ants, and adds that he "would like to know if the Cornwall specimens exhibit similar injuries." If the damage was not caused by the means I alluded to (p. 243), as one might suppose from Mr. Grant's statement in his first note (p. 215), that all had similar injuries, it appears hardly likely that it would be the result of either accident or the work of ants. I may say that I have not noticed similar injury to the Cornish *arion*, although I have examined a great number of specimens, considerably over a thousand. There is no butterfly which appears more subject to become injured than *arion*, especially in its Cornish localities, chiefly owing to its habit of taking shelter in furze bushes. From what is known of this butterfly I think the ant theory as regards injury the least likely.—F. W. FROHAWK; November, 1915.

UNRECORDED FOOD-PLANTS OF THE LARVA OF *ORGYIA ANTIQUA*.—In August last I received from a correspondent in Stirling, N.B., a number of eggs, larvæ, and pupæ of *Orgyia antiqua* for identification, together with a note stating that a pond filled with rushes on the moors and surrounded with heather was swarming with the larvæ in "hundreds of thousands" feeding on the rushes, eating them down. Some of the cocoons received were spun up in clusters among the rushes, as well as amongst the heather. I believe this is the first instance known of *antiqua* feeding on rushes and heather. I may add that a large number of minute ichneumon flies emerged from the eggs after they reached me.—F. W. FROHAWK; Nov. 15th, 1915.

RESTING HABIT OF *CENONYMPHA TIPHON* (DAVUS).—This is a species best to "mark down." The ground is usually too treacherous for rushing, therefore keep your eye on the spot and advance to it leisurely. The closed wings of the butterfly assimilate in coloration with the surroundings, but the spots on the exposed under side always give it away. This peculiar resting habit has always been familiar to me in *Hipparchia semele*; but I cannot remember ever having seen it in any other of the "Satyrs," excepting *tiphon*. However, it is an interesting point, and it is to be hoped the readers

of the 'Entomologist' will let us hear more of it.—J. ARKLE; Chester.

IRREGULAR EMERGENCE OF OCHRIA (XANTHIA) AURAGO.—I have often noticed a great difference in the period occupied by different species in emerging, but the experience I have had this year with a batch of *O. aurago* is, I think, worthy of record. The ova hatched fairly evenly in the spring, and all the larvæ were treated identically the same as were also the pupæ. The larvæ were protected from cold, and so fed up a trifle more rapidly than they would have in nature. The cocoons were opened on August 7th, when all but five had pupated, and these changed a few days later. The emergencies of the perfect insects were as follows:—August 9th, two; August 14th, one; August 17th, two; August 25th, one; August 28th, one; August 30th, one; September 4th, two; September 6th, two; from this date to September 20th there were daily emergencies varying between four and fifteen per day; September 21st, two; September 22nd, two; September 23rd, one; September 24th, two. Altogether ever eighty-nine per cent. of the pupæ produced imagines. The notable point is that forty-six days elapsed between the first emergence and the last, despite the fact that the hatching of the larvæ did not extend beyond a few days, and that both larvæ and pupæ had exactly similar treatment. With certain of the *Cucullia* and other species, whose larvæ are to be found for weeks in all stages of development, such variation in emergence is of course usual, but it is the first time I have come across such marked irregularity in a species whose early stages are generally more uniform.—C. RIPPON; Springfield House, Abingdon-on-Thames.

CUCULLIA LYCHNITIS.—Referring to Mr. Spiller's notes on this species in the September 'Entomologist,' I have taken *C. lychnitis* larvæ for many years in the Chiltern Hills, and have frequently seen them in the valleys and low-lying parts. In fact, I have usually found them more abundantly in such situations than in higher and more exposed spots. The larvæ undoubtedly love a warm and sunny situation, and do best when the conditions allow them to feed up rapidly; any situation exposed to cold winds would therefore not be so suitable to their increase as more sheltered quarters. As to larvæ of different sizes being found at the same time, that is practically always the same with *lychnitis*; indeed, more than once I have taken larvæ, and a considerable time after they have pupated I have found other larvæ not a quarter of an inch in length. As the larvæ grow, so their food requires to be more substantial, and I have found it unwise in confinement to give the larger larvæ anything except green seed-pods. With reference to Mr. Nicholson's note in the November 'Entomologist,' I may say that I have never found the larvæ of *C. lychnitis* on anything but *Verbascum nigrum*, though I have found them very ready—too ready for their health—to eat white mullein in confinement. Further, in referring to low-lying parts of the Chilterns, I don't mean to imply that the ground was in any sense marshy, quite the contrary, though I have often found *Verbascum nigrum* flourishing in and near ditches, which must be frequently full of water in the winter months.—C. RIPPON.

THE MACRO-LEPIDOPTERA OF RENFREWSHIRE.—An annotated list of the Lepidoptera, including the Pyralididæ and Pterophoridaæ, occurring in Renfrewshire is published in 'Transactions of the Paisley Naturalists' Society,' vol. ii. pp. 40-60 (1915). The list has been compiled by Mr. Alex. M. Stewart.

COLIAS EDUSA, LYCÆNA CORYDON ab. SEMISYNGRAPHA, HESPERIA MALVÆ ab. TARAS AT BRIGHTON.—With reference to Mr. F. Jay Arnott's report of *C. edusa* in the Dyke Valley, near Brighton, in September, my little daughter, aged twelve, who is a keen entomologist, saw one specimen at the same place on September 3rd. As she assisted me to secure a good number in 1913 she was not likely to be mistaken in the insect. On September 5th, in the same valley, she netted amongst *L. corydon* one ab. *semisyngrapha*. On a former occasion, in another valley, also *H. malvæ* ab. *taras* (*lavateræ*). Knowing the ordinary form of both latter she recognized her catches were unusual, although she was unaware of their rarity. It may be interesting to record that the latter insect was secured in the same short stretch of valley where the late Mr. Neil McArthur took two *L. beticus* in August, 1859, one of which in later years he showed me. With regard to *C. edusa* I made several excursions last year and this to likely places, but not one did I see.—LOUIS MEADEN; Melbourne House, Dyke Road, Preston, Brighton, October 19th, 1915.

COLIAS HYALE NEAR FIRING LINE.—My son has asked me to forward the following note to you for publication:—"To one who has never met with the species before, the sight of half a dozen *Colias hyale* on the wing together near a chalky bank on September 19th, a mile or so behind the firing line, gave great pleasure.—F. NORTON; 11th Welsh Regiment, British Expeditionary Force."

In a previous letter my son referred to the great pleasure he derived from his knowledge and love of natural history, and the relief it afforded him from the tedious monotony of some of his days of training before he proceeded on active service "somewhere in France."—M. A. NORTON; Skirbeck, Whitechurch Road, Cardiff, September 28th, 1915.

BUTTERFLIES IN THE TRENCHES.—Mr. Harrold Sims, of the Entomological Society of Montreal, writes on September 21st from Flanders:—"We have had, on the whole, wonderfully fair weather, and some species of Lepidoptera were very common, even in the trenches. Most kinds have disappeared now, though there are still some late-brood specimens of *P. brassicæ*, *rapi*, *napi*, *V. urticæ*, *P. atalanta*, *L. icarus*, *C. hyale*. When we first went into the trenches, *P. megera* was extremely abundant, and flew about actually in the trenches and 'dugouts.' It was quite the commonest butterfly, although all three 'whites' were very common, and in the waste land just behind the firing line I saw many other species, notably *C. hyale*, *C. edusa* (doubtful), *G. rhamni* (doubtful), *urticæ*, *io*, *polychlorus*, *cardui*, *atalanta*, *egeria*, *maera*, *E. tithonus*, *jurtina*

(doubtful), *C. pamphilus*, *C. phlæas*, *L. icarus*, *bellargus*, *C. argiolus*, *P. machaon*. I saw others but could not with any approach to certainty identify them. This was near Armentiers, but we have since been moved to quite another part of the line."

SPHINX CONVOLVULI IN HAMPSHIRE.—A very large female specimen of *S. convolvuli* was brought to me on September 19th which was found by some boys on Milford Common. It died shortly after I received it, and owing to rough handling was quite useless for the cabinet. I opened the body and carefully removed the ova and counted them; they numbered rather more than eight hundred. All were well formed, though not much larger than those of *Hemaris fuciformis*, and were of a brilliant emerald green colour. Mr. W. J. Lucas, in his book on 'British Hawk Moths,' p. 69, mentions a *convolvuli* that was found to contain "no less than two hundred and twenty perfect eggs"—the Milford specimen goes one (or rather six hundred) better!—SYDNEY WHICHER; Sheen Cottage, Liss, Hants.

ACHERONTIA ATROPOS IN LINCOLNSHIRE.—On September 14th last a specimen of *A. atropos* came to light in a kitchen in this town. This is the first record of the imago having occurred in this district, though larvæ and pupæ have occasionally been found.—F. P. II. BIRTWHISTLE; Barton-on-Humber.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—Wednesday, October 6th, 1915.—The Hon. N. Charles Rothschild, M.A., F.Z.S., F.L.S., President, in the chair.—Messrs. Arthur Gibson, Entomological Branch, Dept. of Agriculture, Ottawa, Canada, and Harold Beck Williams, 82, Filey Avenue, Stoke Newington, N., were elected Fellows of the Society.—Capt. Purefoy exhibited young larvæ of *Lycæna arion*, with an accompanying ant.—Dr. Chapman, drawings of various Lycænid larvæ with the Epidiacope.—The Hon. N. C. Rothschild, four specimens of *Chrysophanus dispar*, taken this year in Holland, apparently identical with the extinct British race.—Dr. Chapman, a specimen of a Dipteron, a species of *Nemotelus* (Fam. Stratiomyidæ), which was quite common where the cases of *Luffia ferchaullella* occurred, the cases of *Luffia* being imitated by a spider (*Cyclosa conica*). This Dipteron at rest also closely imitated the *Luffia* cases.—Mr. G. Meade-Waldo, a new aberration of *Euxoa corticea*, Hb., taken in his light-trap at Hever, Kent, in July; the specimen, known as ab. *obsoleta*, shows only the faintest trace of the orbicular and reniform stigmata.—Mr. L. W. Newman, a very long and varied series of *Aplecta nebulosa* and its varieties ab. *robsoni* and *thompsoni* and intermediate forms from a male and female both of the *robsoni* form, the percentages being: *robsoni* (including intermediates) 50 per cent.; typical specimens 26 per cent.; *thompsoni* 24 per cent. Also a series of *Boarmia repandata* var. *conversaria*, from a pairing obtained between a typical light Hunts female crossed with a con-

versaria male, every specimen being var. *conversaria* and every one a female.—Mr. E. E. Green, specimens and drawings of a new British Coccid, discovered at Camberley upon grasses in uncultivated meadows, referable to Signoret's genus *Fairmairia* (now known as *Parafairmairia*).—The Rev. F. D. Morice (1) Gynandromorphous *Hylæus* (*Propolis*) *brevicornis*; (2) *Halictus lævigatus* male. In this specimen there were only two cubital cells in each upper wing, as in *Dufourea*, *Halictoides*, &c.; (3) a larva (in spirit) and numerous imagines—all females—of the Sawfly *Pteronus* (*Lophyrus*) *sertifer* (= "*Tenthredo pectinata rufa*" of Retzius) with cocoons from which they emerged.—Prof. Poulton said that since the June meeting of the Society he had received several interesting letters and boxes of specimens from Dr. Carpenter, some of which he read and exhibited.—Mr. Donisthorpe, a colony of *Myrmecina graminicola*, Latr., which he had kept in captivity for over five years, his object in showing this colony being to call attention to the number of winged females which had been reared in the nest this summer.—The following papers were read: "Observations Completing an Outline of the Life History of *Lycæna arion*, L.," by T. A. Chapman, M.D., F.Z.S., F.E.S.; "Further Observations on the Last Stage of the Larva of *Lycæna arion*," by F. W. Frohawk, M.B.O.U., F.E.S.; "A Contribution to the Life History of *Agriades escheri*, Hb.," by T. A. Chapman, M.D., F.Z.S., F.E.S.; "On the Early Stages of *Latiiorina* (*Lycæna*) *pyrenaica*, Boisd.," by the same; "Notes on the Early Stages of *Scolitantides orion*, Pall.," by the same; "New Lepidoptera from the Schouten Islands," by J. J. Joiecy, F.L.S., F.Z.S., F.E.S., and G. Talbot, F.E.S.; "Some New *Parnassii*," by A. Avinoff, F.E.S.; "A New Micropterygid from Australia," by A. Jefferies Turner, M.D., F.E.S.; "Record of some New Species of the Genus *Teracolus* Occurring in the Northern Territories of the Gold Coast, W. Africa," by G. C. Dudgeon, F.E.S.; "*Glossina morsitans*, Westw., some Notes on the Parasitization of its Pupæ," by Hereward C. Dollman, F.E.S.—GEORGE WHEELER, *Hon. Sec.*

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—October 14th.—Mr. A. E. Tonge, F.E.S., Vice-President, in the chair.—Mr. Sano exhibited a large number of lantern-slides illustrative of the life-history of *Geotrupes stercorarius*, and contributed a series of notes.—Mr. Priske, the seven British species of the genus *Geotrupes*, including a coppery-coloured aberration of *G. stercorarius*.—Mr. Main, cages arranged by himself to watch the method of cell-making by these beetles.—Mr. Newman, a long bred series of *Aplecta nebulosa* from a pairing of v. *robsoni*; of 350 reared 53 per cent. were *robsoni*, 24 per cent. *thompsoni*, and 26 per cent. typical; also a long series of *Boarmia repandata*, the result of crossing a male *conversaria* with female type; most of the brood were reared, every specimen was *conversaria*, and every one a female. Mr. Newman recorded the fact of the ab. *varleyata* of *Abraxas grossulariata* disappearing from a strain which contained it and re-appearing after five years.—Mr. P. A. Buxton communicated, from his brother in the Dardanelles, an instance of a bird—a young Butcher-bird—attacking and capturing a large Hawk-moth.—Mr.

Morford, a number of specimens of *Setinia irrorella*, with *S. aurita* and its aberration *ramosa* sent to him by Prof. Morel, N. Italy.—Mr. Ashby, a long series of the rare Buprestid beetle, *Agrius viridis*, from the New Forest.—Mr. R. Adkin, specimens of *Anthrocera filipendulae* reared from Otford pupæ, including an aberration with only five spots on the fore wings, upper side. Mr. Newman recorded a number of similar specimens from near Brighton.

October 25th.—Mr. R. Adkin, F.E.S., in the chair.—Mr. W. J. Lucas read a paper on "British Cockroaches," and exhibited a large number of lantern-slides illustrative of all the indigenous species and those of occasional occurrence. Instances were subsequently given of one species gradually supplanting another.—Mr. P. A. Buxton, a box of Algerian butterflies, and pointed out that the general faunas was completely European, *Teracolus nouni* being the sole representative of the really African fauna.—Mr. Sich, mines of the rare Tineid *Nepticula tilieæ*, from Dolgelly, in leaves of lime, the trees growing in shady situations near water.—Mr. H. Moore, a living male specimen of the stick-insect, *Linchodes* sp., which was very rarely met with.—Mr. Brooks, specimens of the beautiful blue female of *Plebeius ægon*, known as ab. *masseyi* from Kendal; and also an aberration of *Charcæa graminis*, with the usual dark submarginal wedges on the fore wing almost obsolete.—Mr. B. S. Williams, aberrations of *Mamestra trifolii* (*chenopodii*), including a pale ochreous grey form, a dark greyish fuscous form, and a reddish ochreous form.—Mr. Bowman, a very dark coloured specimen of *Saturnia carpini*, with deep red lower wings; and a cocoon of the same species which, from its shape and size, suggested it was a composite one.

November 11th.—Mr. A. E. Gibbs, F.L.S., Vice-President, in the chair.—Mr. R. Adkin, a short-bred series of *Eupithecia castigata*, reared in May from ova laid by a female captured at Beaconsfield in June, 1914. The larvæ fed almost entirely on the flowers of an Alpine plant (*Campanula pusilla*).—HY. J. TURNER, *Hon. Rep. Sec.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Meeting held at Royal Institution, Liverpool, October 18th, 1915.—Dr. John Cotton, Vice-President, in the chair.—This being the first meeting of the session, it was as usual devoted to an exhibition of the work of the members during the past season.—Mr. F. N. Pierce exhibited, on behalf of the Rev. J. W. Metcalfe and himself, *Peronea fissurana* and *Halonota littoralana*, two new species of Tortrix discovered by examination of the genitalia, and read descriptions of the species; also *Peronea ferrugana*, with its vars. *tripunctana*, *brachiana*, and *multipunctana* from various localities; a long series of *Stigmonota perlepidana* from near Mold, and *Acentropus niveus* from Tansor, Northants, where it had been abundant this year.—Mr. A. W. Hughes had from the Mold district a nice series of *Cidaria suffumata*, some specimens with a tendency to extension of the white ground colour, but none of the melanic form; a series of *Triphæna fimbria* from Delanere, one example being of the scarce mahogany-brown form; from the Wye Valley a number of species, including *Vanessa atalanta*, *V. c-album*, and var. *hutchinsoni*, *V. io*, *Thecla w-album*, *Asthenes blomeri*, and *Abraxas sylvata*.—W. R. Wilding showed long

series of the following: *Vanessa cardui* from Barmouth; *Cœonympha typhon*, *Erebia epiphron*, and *E. æthiops* from Rannoch.—Dr. A. Randall Jackson brought a very interesting exhibit of humble bees and their parasites captured in his garden at Chester, comprising some forty species, and contributed notes.—Mr. H. B. Prince's exhibit contained long series of many local insects, prominent among them being *Bombix trifolii* from the Lancashire coast; *Lycæna corydon* and var. *semi-syngrapha*, *Vanessa urticae*, several specimens having the usual orange-red colour replaced by fuscous-ochreous; and *Carterocephalus palæmon*.—Mr. Wm. Mansbridge showed *Lycæna ægon*, a series from Witherslack with var. *masseyi*, and one male, in which the orange spots on the under side were dark fuscous-ochreous, while the hind wings on the upper side were slaty-grey; from Simonswood several specimens of *Acronycta leporina* var. *melanocephala*; *Hyria muricata*, moss form, and *Ennychia octomaculata* from Witherslack; *Rhodaria sanguinalis* from Wallasey; *Peronea comparana*, *P. variegana*, and *Depressaria assimilella* from Delamere Forest, the last-named being new to the county list.—Mr. W. G. Clutton sent a box of Micro-Lepidoptera collected in the Burnley District, which contained among the usual common kinds a specimen of *Gelechia scabella* taken at Burnley; this insect is new to the county list, and the record shows an extension of its range toward the North.—WM. MANSBRIDGE, Hon. Sec.

THE LONDON NATURAL HISTORY SOCIETY.—March 2nd, 1915.—The President, Dr. E. A. Cockayne, M.A., F.R.C.P., F.E.S., in the chair.—Mr. Herbert Loney, of 354, Goswell Road, E.C., was elected a member.—Dr. Cockayne exhibited *Diplococcus intracellularis meningitidis* of Weichselbaum, the organism which produces epidemic cerebrospinal meningitis (spotted fever).—Mr. H. B. Williams, aberrant forms of *Brenthis euphrosyne* and *Argynnis aglaia*.—Mr. A. W. Mera, two cabinet drawers of "fritillaries," including some fine dark forms of *Brenthis selene* and *Argynnis adippe*.

March 16th, 1915.—The President in the chair.—Mr. W. H. A. Austen, 102, Knightsbridge, S.W., Prof. F. C. Hopkins, M.A., F.R.C.P., F.R.S., 71, Grange Road, Cambridge, Mr. G. T. Porritt, F.L.S., Elm Lea, Dalton, Huddersfield, and Mr. P. Worsley Wood, M.A., Emmanuel College, Cambridge, were elected members of the Society.—Mr. W. E. King exhibited a gynandromorph of *Hybernia marginaria*, right side female, left side male.—Mr. C. Nicholson, a complete type collection of British social wasps, together with a comprehensive collection of insects of other orders in illustration of a paper read by him on "Parasites, Paying Guests, and Mimics of Wasps."

April 20th, 1915.—The President in the chair.—Mr. A. W. Mera exhibited spring insects from Epping Forest, including dark *Phigalia pedaria*, *Ipocheima hispidaria*, and *Hybernia leucophaearia*.—Mr. L. W. Newman, larvæ of *Agrotis ashworthii* from Colwyn Bay.—Mr. Newman read a note on the successful wintering out-of-doors of pupæ of *Pyramis atalanta*, and suggested that all the early (May) imagines seen had passed the winter as pupæ.

May 18th, 1915.—The President in the chair.—Mr. H. W. Wood exhibited the larvæ of *Xanthia fulvago* and *lutea*, and pointed out

the obvious distinctions in them, also larvæ of these two species together with larvæ of *X. ocellaris* and *Ochria aurago*, all of which had been reared on the hybrid *Populus scrotina*.—Mr. C. B. Heath, a long and very varied series of *Peronea hastiana* from South Wales.—Mr. R. W. Robbins, a female *Pieris napi* with the tips of the fore wings exceptionally black and the veins covered with black scales on the outer margins of all the wings.—Dr. E. A. Cockayne, four gynandrous *Amorpha populi* which he had recently dissected, and read a note on them.—Mr. A. W. Mera, dimorphic pupa cases of *Papilio machaon* and *Satyrys megæra*.—Mr. Riches bred *Apamea unanimitis* and *Cymatophora ocularis*.—Mr. Burkill, galls of *Rhabdophaga salicis* and *R. roscaciella*, on *Salix repens* from Esher, and of *Dasyneura sysymbrii* on *Nasturtium amphibium* from Bedford. A paper was read by Mr. A. Sich, F.E.S., on "A Hawthorn Hedge in Middlesex."

June 1st, 1915.—The President, Dr. E. A. Cockayne, M.A., F.R.C.P., F.E.S., in the chair.—Mr. L. W. Newman exhibited a long and varied series of *Pieris napi* from over-wintering Irish pupæ.—Mr. A. W. Mera, dark forms of *Hybernia marginaria* from Epping Forest.—Mr. H. J. Burkill, galls of *Urocystis viola* on *Viola sylvestris* from Ruislip, *Andricus ramuli* on *Quercus robur* from Esher and Oxshott, *Aphilobia radices* on *Quercus robur* from Staffs and Surrey, and *Eriophyes dispar* on *Populus tremula* from near Claygate.—Dr. Cockayne, galls of *E. tri-radiatus* on *Salix fragilis* from Golder's Green.

June 15th, 1915.—The President in the chair.—Mr. H. J. Burkill of 103, Gresham House, E.C., and Mr. Vernon Stuart of West Hill, Putney, were elected members.—A special exhibition of larvæ was held.—Mr. L. W. Newman showed a large number of larvæ of rare and local species, including *Bombyx trifolii*, *Trichiura cratagi*, *Petaria nubeculosa*, *Tenioctampa populeti*, and *Nyssia lapponaria*.—Mr. H. W. Wood, larvæ of *Agriopsis aprilina* and *Dyschorista fissipuncta* from Abbots Wood, all of which were infested with parasitic worms, *Cleora lichenaria*, *Eupithecia abbreviata*, and many others, also nymphs of the Homopteron *Ledra aurita* beaten from oak at Bookham the previous day.—Mr. Mann, *Bombyx neustria* and *Saturnia pavonia*.—Mr. H. B. Williams, *Spilosoma mendica*, *Vanessa urticae*, *Rumicis phlæas*, and *Gonepteryx rhamni*.—Mr. A. W. Mera, *Miselia oxyacanthæ*, *Nola cucullatella* and others, and ova of *Rumia crategata*.—Mr. C. Nicholson, *Orgyia antiqua*, *Cidaria testata*, and *Euproctis chryssorrhæa*.—Mr. L. J. Tremayne, pupa of *Epinephele jurtina*.—Mr. C. H. Williams exhibited a series of females of *Polyommatus icarus* and a suffused *Anaitis plagiata* with the inner line entirely obsolete.—Mr. H. B. Williams recorded *Brenthis euphrosyne* from Wimbledon Common, and Dr. Cockayne *Abraxas ulmata* from Abingdon on June 5th, a very early date.

September 7th, 1915.—Mr. S. Austen in the chair.—Mr. Bernard Cooper exhibited a fine under side variety of *Lycæna ægon* and a series of *Satyrys semele* from the New Forest, which included some very dark males.—Mr. W. E. King, varieties of *Epinephele jurtina* and *Canonympha pamphilus*.—Mr. H. J. Burkill, a small midge gall on *Epilobium angusifolium* which had not been hitherto recorded in

Britain.—Mr. C. H. Williams, a long and varied series of *Vanessa urticae*.

September 21st, 1915.—Mr. R. W. Robbins, Vice-President, in the chair.—Mr. E. A. Aris, 9, Oak Avenue, Hornsey, N., and Mr. C. S. Bayne, 7, Trafalgar Square, Chelsea, S.W., were elected members.—Mr. L. B. Hall exhibited a colony of the red spinning mite *Tetranychus lintearius* from gorse bushes on the cliffs of South Devon.—Mr. A. W. Mera, long and very varied series of "Burnets."—Mr. H. J. Burkill, two rare midge galls, *Perrisia salicariae* on *Lythrum salicaria*, and *P. genisticola* on *Genista tinctoria*.

October 5th, 1915.—Mr. L. B. Prout, F.E.S., Vice-President, in the chair.—Mr. A. W. Mera exhibited a cabinet drawer of "Agrotids."—Mr. L. W. Newman, a drawer of *Aplecta nebulosa* bred from ab. *robsoni*, parents and representatives of a brood of *Boarmia repandata* ab. *conversaria* from a male ab. *conversaria* × light Hunts female, and read notes on the results obtained.—Mr. C. H. Heath, a long series of *Plutella daella* taken on the south border of Durham in August, those in the extensive variation observed in a small wood.—Mr. J. E. Gardner, a similar series from Epping Forest for comparison.—Mr. C. Nicholson, *Lampyris noctiluca*, *Phylodecta viminalis*, *Creophilus maxillosus*, *Ledra aurita*, *Trisophora vulnerata*, *Dolycoris baccarum*, *Tipula gigantea*, *Ptychoptera contaminata*, *Echinomyia fera*, *Xylota sylvarum*, *Limosina cænosa* bred from a nest of *Vespa germanica*, with a *Phora* from the same nest, identified provisionally by J. E. Collin as *sublugubris* (Wood), *Ammophila campestris*, *Fænus jaculator*, and a worker of *V. vulgaris* which the exhibitor stated was the smallest he had ever seen; attention was called to the disproportionately long antennæ.—Mr. H. W. Wood, a short series of *Agrotis vestigialis* ab. *nigra* (Tutt) from Surrey, *Echinomyia grossa* from Aviemore, and *Physocephala rufipes* from a wasp's nest on Box Hill.—Mr. W. E. King, interesting forms of *Thecla rubi* from Horsley, and *Hecatera serena*, *Dianthæcia conspersa*, *D. carpophaga*, *D. cucubali*, and *D. capsicola* from the same locality.—Mr. L. B. Prout, a box of coast Agrotids mostly from Scotland, including one *A. obelisca* from Stonehaven, a new record for this locality.—Mr. C. H. Williams, varieties of *Agriades corydon*, including abs. *marginata*, *albina*, *fowleri*, *syngrapha*, *semi-syngrapha*, and *obsoleta*.—Dr. G. B. Longstaff, M.D., F.R.C.P., read a paper on "Points to Observe in Common Insects," illustrated by a series of lantern slides from photographs by Mr. Hamm of Oxford.

THE MANCHESTER ENTOMOLOGICAL SOCIETY.—October 6th, 1915.—*Exhibition Evening*.—Mr. R. Tate, Junr., *A. grossulariata* vars., local and from Huddersfield larvæ; *A. ashworthii* and *A. agathina* from Penmaenmawr; *D. mendica* from South Devon.—Mr. J. H. Watson, living specimens and mature laying ova of the great stick insect, *Eurycnema herculeana*, from Java, feeding on evergreen oak.—Mr. W. Mansbridge, *A. leporina* and var. *melanocephala*, *L. ægon*, series of blue females from Westmorland; *E. octomaculalis* and *H. muricata* from Witherslack; *R. sanguinalis* from Wallasey; *P. comparana* and *P. variegana*, series showing variation from Delamere Forest and Speke (Lanes); series of *D. assimilella* from

Delamere.—Mr. L. Nathan, *C. typhon*, *L. ægon*, *D. sanio*, *B. piniaria*, *E. atomaria*, Delamere, June 26th, 1915; series of *D. mendica* from ova from North Wales; *S. carpina* bred from larvæ from Delamere; *S. ocellatus* bred from larvæ from Southport, September, 1914.—Mr. J. H. Shorrocks, specimens of large cochroach, probably *P. americana*.—Mr. B. H. Crabtree, series of *L. ægon* from Witherslack; *A. adippe* and miscellaneous moths taken in the lake district.—Mr. C. F. Johnson, series of *C. typhon* from Delamere, with under sides heavily spotted, two specimens bearing the spots lanceolate instead of round; blue females of *L. ægon* from Witherslack; long series of *X. fulvago* showing a wide variation, bred from fallow catkins collected near Chalford; series of *H. elutata* of the small dark form, taken on the moors near Whaley Bridge.—Mr. J. E. Cope, exotic Lucanidæ from Australia, India, &c., including *Lucanus inclinatus*, *Leptenopterus ibex*, *Lamprima ænea*, *Dorcus unicolor*, *Odontolabris delesserti*, &c.

November 3rd, 1915.—Mr. R. Tate, Junr., gave a very interesting account of an entomological holiday spent in June this year at Burntwood, about four miles from Market Drayton. He exhibited a large number of specimens captured, remarking that the majority were Geometræ, and that the other groups were but poorly represented at Burntwood. Butterflies, too, were scarce. The exhibits included series of *M. notata*, *M. hastata*, *E. punctaria*, and *D. falcataria*, also *E. dolobraria*, *A. leporina*, including black vars., *C. fluctuosa*, *M. albiciliata*, *E. heperata*, *L. hexapterata*, *Z. pendularia*, var. *subroseata*.—Mr. Crabtree showed *B. repandata*, var. *conversaria*, light forms from Monkswood and dark forms from the Wye Valley.—Mr. Buckley, *D. capsicola* taken in Anglesea, and *C. davus* from Delamere.—J. E. COPE, *Hon. Sec. pro. tem.*

OBITUARY.

WITH much regret we have to record the death of our esteemed publisher, THOMAS PRICHARD NEWMAN, in his seventieth year. As many of our older readers will be aware, the 'Entomologist' was founded by his father, the late Edward Newman, in 1840. Although Thomas Newman hardly inherited a keen interest in, and talent for, natural history, he nevertheless continued to publish our magazine and also the 'Zoologist.' The latter journal was his property at the time of his very sudden decease, although its scientific value, and its association with his father's name, were the only inducements to carry it on. Thomas Newman was a keen and very successful amateur gardener, and his large garden at Haslemere was a most attractive spot at almost all times of the year. He was a member of the Society of Friends and devoted much of his time to furthering the ends of Peace and International Arbitration. The outbreak of the war was a very great grief to him, though he still remained convinced of the ultimate triumph of Peace on Earth, and that his labours were not in vain. He was apparently in the best of health when seized with heart failure on November 10th at Haslemere Station.

EXCHANGE.

[The publication of Notices of Exchange, or of Advertisements, in the 'Entomologist' is in no way a guarantee to the British nationality, authenticity, or good condition of the Species. This Notice is not given to throw doubt on the bona fides of Exchangers or Advertisers, but to absolve the Editor from responsibility, in case the liberty allowed should be abused.] *Marked * are bred.*

NOTICES OF EXCHANGE should be received by the 25TH OF EACH MONTH to insure insertion. Not more than SIX LINES can be allowed for each.

Duplicates.—Aglaiia, Blandina, Galathea, Semele, Minima, Aegon, Corydon (varied females), Geryon, Mendica,* Pudibunda,* B. Quercus,* Dominula,* Illustraria,* Carlionaria, Juniperata,* Trilinearia,* Lithoriza.* Pupæ: Mendica, Lanestris, Coryli, Camelina, Prasinana, Hirtaria, Trilinearia, and a few Arcenthata. *Desiderata.*—Ova: P. Populi, Erosaria, Tiliaria, Fuscantaria. Pupæ: Lacertula, Hamula, Trepida, Curtula, Reclusa, Palpina, Versicolor, Prodromaria, Lunaria, &c., not inbred.—A. F. Spiller; *Henley Villa, Chinnor, Wallingford.*

Duplicates.—Chrysidiformis,* Culiciformis,* Suffumata,* Ochrata. *Desiderata.*—Paniscus, Davus, Athalia, Adippe, Salmacis.—W. Austen; 31, Park Street, Folkestone.

Duplicates.—Artemis, Argiolus, Cardamines, Alveolus, Euphrosyne, Z. Trifolii, Bombylifomis (few), Chi, Argentula, Testacea, Spinula, Maculata, Pyraliata, Nanata, Miconaria, Decolorata, Remutata, Palumbaria. *Desiderata.*—Very numerous, particularly Machaon, Iris, Confusalis, Dromedarius, Ridens, Menyanthidis, Trilinearia, Ornata, v. Viretaria.—(Miss) B. A. Coney; *Pucklechurch, Gloucestershire.*

Desiderata.—Two dozen full-grown larvæ of Cossus Ligniperda. Offers to be addressed to (Hon.) N. Charles Rothschild; *Arundel House, Kensington Palace Gardens, W., London.*

Wanted.—Millières 'Catalogue of the Lepidoptera of the Alpes-Maritimes,' Cannes, 1875; with supplement 1883-87.—H. Rowland Brown; *Harrow-Weald, Middlesex.*

Duplicates.—Grand yellow Dominula, Irish Icarus and P. Napi; Pruni (fair not perfection), and almost all the British Lepidoptera; send list of wants; accepted offers only answered. *Desiderata.*—Must be perfection condition, and not old specimens. Adippe, T. Rubi, Malvæ, Atropos, Porcellus, Sphegiformis, Myopiformis, Formiciformis, Ichneumoniformis, Quercana, Prasinana, N. Strigula, Sericea, Russula (females), Ligniperda, Æsculi, B. Trifolii, and a few Noctua and Geometers. Also pupæ. Elpenor, Machaon, Porcellus, Calluna, Trepida, Carmelita, Cucullina, Dictæoides, Dodonea, and many others, as well as ova.—L. W. Newman; *Bexley, Kent.*

MEETINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—11, Chandos Street, Cavendish Square, W.—*January 20th* (Annual Meeting). *February 3rd.* 8 p.m.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—The 2nd and 4th *Thursdays* in each month, 8 p.m., Hibernia Chambers, London Bridge.

LONDON NATURAL HISTORY SOCIETY, Hall 20, Salisbury House, Finsbury Circus, E.C., the 1st and 3rd *Tuesdays* of the month at 7 p.m. *January 5th.*—Presidential Address. Mr. L. B. PROUT, F.E.S. *January 19th.*—"Shore-breeding Birds," W. E. GLEGG and P. J. HANSON. *February 2nd.*—"Botanical and Tramping Reminiscences of a Lakeland Holiday." E. B. BISHOP. Visitors invited.—J. Ross, 18, Queen's Grove Road, Chingford, *Hon. Sec.*

The London Natural History Society will be glad to welcome at its meetings any French or Belgian entomologists now staying in this country, and to give them the benefit of its library and collections. Communications should be addressed to the Secretary, Salisbury House, E.C.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—The 3rd *Monday* in each month, *October to April.*—*Hon. Sec.*, WM. MANSBRIDGE, 4, Norwich Road, Wavertree, Liverpool.

To CORRESPONDENTS.—All notes, papers, books for review, &c., and notices of Exchange should be sent to the Editor—

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Duplicates.—Larvæ and pupæ: Grand Yellow var. *Dominula*, *Repandata* var. *Conversaria*, and many other ova and larvæ. *Specially wanted.*—Larvæ: *Villicia*. Pupæ: *Porcellus*, *B. Quercus*. Ova: *Trepida*, *Dodonea*, *Carmelita*, *Dictæoides*. Live females: *Cardui*, *Edusa*, *Io*, *Prasinana*, *Polychloros*, &c.—*L. W. Newman*; *Bexley, Kent.*

Duplicates.—*Machaon*, *Cardamines*, *Edusa*, *Coridon*, *Elpenor*, *Galii*, *Livornica* (one, fair), *Minos*, *Meliloti*, *Flavicornis*, *Prunaria*, minor forms of *A. Grossulariata*, melanic *E. Autumnaria* (a few). *Desiderata.*—Any species of pupæ and larvæ, also imagines of *Bombylifformis*, *Quercana*, *Æsculi*, *Crategi*, *B. Quercus*, *Versicolor*, *Duplaris*, *Fagi*, *Ulmata*, *Sagittata*.—*Leonard Tatchell*; 23, *The Arcade, Bournemouth.*

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Duplicates.—Ova: *Carpini*. Larvæ: *Carpini*, *Monacha*, *Fuliginosa*, *P. Pöpuli*, *E. Autumnaria*. Pupæ: *Menthastri*, *Prunata* (few). Imagines: *Fuliginosa*,* *Plantaginis*,* *Similis*,* *Dispar*,* *Vittata*, *Ferrugata*, *Immanata*, *Repandata*, *Pilosaria*, *Festiva*, *Popularis*, *Monoglypha* (dark). *Desiderata.*—Very numerous.—*J. P. Robson; Vane Road, Barnard Castle.*

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RICHARD SOUTH, 4, MAPESBURY COURT, SHOOT-UP-HILL, BRONDES-
BURY, N.W.

MEETINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—11, Chandos Street, Cavendish Square, W.—*October 6th* and *October 20th*. 8 p.m.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—The *2nd* and *4th Thursdays* in each month, 8 p.m., Hibernia Chambers, London Bridge.

LONDON NATURAL HISTORY SOCIETY, Hall 20, Salisbury House, Finsbury Circus, E.C., the *1st* and *3rd Tuesdays* of the month at 7 p.m. *September 7th*.—Holiday Exhibits and Notes. Special Exhibit of Holiday Captures arranged by the Lepidoptera Committee. *September 21st*.—"Oology," S. Austin; Exhibition, "The Burnets," arranged by the Lepidoptera Committee. Visitors invited.—J. Ross, 18, Queen's Grove Road, Chingford, N.E., *Hon. Sec.*

The London Natural History Society will be glad to welcome at its meetings any French or Belgian entomologists now staying in this country, and to give them the benefit of its library and collections. Communications should be addressed to the Secretary, Salisbury House, E.C.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—The *3rd Monday* in each month. *October to April*.—*Hon. Sec.*, WM. MANSBRIDGE, 4, Norwich Road, Wavertree, Liverpool.

TO COLLECTORS OF LEPIDOPTERA.—Insects bred from *your own* ova or larvæ for one penny each; well set on black pins, one farthing extra. For full particulars send addressed envelope to—

E. CORNELL, Clifton House, Great Henham, Essex.

LEPIDOPTERA rearing grounds, Chinnor. Ova, Larvæ, and Pupæ of many species on hand during September, including many good local species, at cheapest rates. Many Ova and Pupæ wanted; cash or good exchange. For lists apply to—

A. J. SPILLER, CHINNOR, WALLINGFORD.

EXCHANGE.

British and European Butterflies wanted in exchange for North American Moths.—*G. Chagnon*; P.O. Box 521, Montreal, Canada.

Duplicates.—Larvæ and pupæ: Graud Yellow var. Dominula, Repandata var. Conversaria, and many other ova and larvæ. *Specially wanted*.—Larvæ: Villica. Pupæ: Porcellus, B. Quercus. Ova: Trepida, Dodonea, Carmelita, Dictæoides. Live females: Cardui, Edusa, Io, Prasinana, Polychloros, &c.—*L. W. Newman*; *Bezley, Kent*.

Duplicates.—Edusa, Cardui,* Elpenor,* Galii, Livornica (one), and many others. *Desiderata*.—Larvæ and Pupæ of almost any species.—*Leonard Tatchell*; 23, *The Arcade, Bournemouth*.

Duplicates.—Black Acidalia Virgularia. *Desiderata*.—Numerous.—*R. T. Bowman*; 108, *Station Road, Chingford, Essex*.

Duplicates.—Larvæ of Sinaragdaria. *Desiderata*.—Ova, larvæ, and pupæ of very many species, especially varieties.—*Ronald Martin*; 64, *Hamlet-Court Rd., Westcliff-on-Sea*.

Duplicates.—Ova: Prunata. Larvæ: Gemmaria. Imagines: Carpini (males), Fuliginosa,* Prunata,* O. Dispar,* Similis* (females), Lunaria, Ferrugata, Ocellatus,* Monacha,* Cinxia, Quercinaria,* Quercifolia,* Filipendula, Psi,* Chi,* Aprilina* (1915). *Desiderata*.—Many pupæ and imagines.—*J. P. Robson*; *Vane Road, Barnard Castle*.

Duplicates.—Cinxia,* Artemis,* Ægeria, Illumaria,* Autumnaria* (dark speckled form), Paludis, Vespiformis. *Desiderata*.—Numerous.—*F. Pearson*; *High St., East Cowes, Isle of Wight*.

Duplicates.—Numerous. *Desiderata*.—Pupæ of Machaon, Ocellatus, Tiliæ, Calluna, Carpini, Vinula, Trepida, Dictæoides, &c.—*H. W. Head*; *Burniston, near Scarborough*.

Duplicates.—Expallidata,* Jasionata,* Debiliata,* Pulchellata,* Linariata,* Isogrammaria,* Alternata,* Cucullata,* Tersata,* Suffumata, Sordidata,* Notha, Puta, and Nigra. *Desiderata*.—Cratægi, Athalia, Iris, Betula, Pruni, Bombyliiformis, Sphegiformis, Myopiformis, Ichneumoniformis, Globularia, Strigula, Asella, Dictæoides, Occulta, Glabraria, Viridata, Griseata, and numerous others.—*H. Woodhead*; 26, *Moorland View Terrace, Plympton, S: Devon*.

Duplicates.—Pupæ of Versicolor from wild Scotch larvæ. *Desiderata*.—Sphegiformis, Strigula, Albulalis, Sericea, Asella, Albovenosa, Cannæ, Bondii, Leucophæa, Caliginosa, Xerampelina, Retusa, Capsophila, Chi var. Olivacea, Dipsacea, Albistrigalis, Turfosalis, Glabraria, Muricata, Rubiginata, Asthena, Sylvata, Pygmeata, Irriguata, Sexalisata, Sagittata, Griseata, Pyrales, Plumes, and Crambide.—*Francis C. Woodbridge*; *South Mead, Gerrards Cross, Bucks*.

Duplicates.—Exotic butterflies, set or unset, including many species, Teracolus, Acreas, &c. *Desiderata*.—Butterflies.—*W. Feather*; *Station Grove, Crosshills, near Keighley, Yorks*.

Duplicates.—Few fine Connexa, 1915. *Desiderata*.—Very local or scarce insects only.—*Clem Jolley*; 112, *Cheltenham St., Old Basford, Nottingham*.

Duplicates.—Ocellatus × Populi (hybridus), in perfect condition, strongly marked, bred this season; also pupæ of Ocellatus (wild). *Desiderata*.—British pupæ of Atropos, Convolvuli, and Stellatarum, and continental pupa of Livornica.—*Sydney Whicher*; *Westmead, Liss., Hants*.

Duplicates.—Ocellaris and abs. Lineago and Intermedia, bred. *Desiderata*.—Fulvago ab. Flavescens, Gilvago forms other than ab. Suffusa.—*H. W. Wood*; 31, *Agate Road, Hammersmith, W*.

Duplicates.—Irish: Napi, Sinapis, Cardamines (males), Io,* Urticæ,* Typhon, Janira, Hyperanthus, Hæcta, Perla. *Desiderata*.—Numerous, with data.—*L. H. Bonaparte Wyse*; 24, *Granville Gardens, Ealing Common, W*.

Duplicates.—Nebulosa var. Robsoni,* Repandata var. Nigra,* Typhon. *Desiderata*.—Musceida, M. Castanea, Asella, Fluctuosa, Abjecta, Connexa, Pyralina, Contigua, Lychmitis, Rostralis, Salicalis, Unifasciata, Sexalisata, Berberata, Lapidata, Certata, Sagittata, local forms and melanic varieties of many species.—*Wm. Mansbridge*; 4, *Norwich Road, Wavertree, Liverpool*.

Duplicates.—Andreniformis (5), Beinbeciformis (2), Tipuliformis, Confusalis, Fuliginosa, Exulans, Myriæ, Elymi, Rufa, Spinula, Phragmitidis, Geminipuncta, Solidaginis, Rectilinea, Rufina, Gracilis, Silago, Moneata, Chi, Io, Parthenias, Adustata, Leucophæaria, Crepuscularia, Macularia, Punctularia, Rhamnata.

Clathrata, Petrarica, Marginata, Hexapterata, Mensuraria, Lactearia, Linariata, Haworthiata, Coronata, Fulvata. *Desiderata*.—Numerous, especially Vespiforme, Scoliiformis, Formiciformis, Ichneumoniformis; lists invited.—*W. J. Newell*; 22, *Culloden St., Poplar, E.*

Duplicates.—*Edusa*, *Rhamni*,* *Io*,* *Euphrosyne*, *Selene* (N. Wales), *Galatea*, *Semele*, *Hyperanthus*, *C. Rubi*, *Corydon*, *Bellargus*, *Argiolus*, five spot *Filipendulæ*,* *Geryon*, *E. Cæsiata*, *L. Polycommata*, *P. Similis*.* *Desiderata*.—*A. Cratægi*, *Sinapis*, *C. Album*, *Adippe*, *Athalia*, *Cinxia*, *Aurinia*, *Epiphron*, *Blandina*, *Typhon*, *T. Pruni*, *Arion*, *Actæon*, *C. Palæmon*, and many *Noctuidæ* and *Geometridæ*: lists exchanged.—*Louis Meaden*; "*Melbourne*," *Dyke Rd., Preston, Brighton*.

Duplicates.—*Dissimilis*,* *Velleda*, *Fibrosa*, *Ambigua*, *Fulva*, *Lubricipeda** var. *Fasciata*, *Plantaginis*,* *Coracina*, *Captiuncula*, *Mundana*, *Lutosa*, *Fumata* (4), *Valerianata*,* *Togata*, *Cilialis*, *Inquinatellus*, *Caledoniana*, *Variegana* vars., *Geminana*, *Sauciana*, *Osseana*, *Brunnichiana*, *Schulziana*, *Congelatella*, *Occultana*, *Vectisana*, *Incarnata*, *Subocellana*,* *T. Corticalla*, *Cecop*,* *Fulvigutella*, &c. *Desiderata*.—Good *Pyrales*, *Tortrices*, &c.—*T. Ashton Lofthouse*; *The Croft, Linthorpe, Middlesbrough*.

Duplicates.—*Blandina* (Yorks.), *Velleda*, *Fuliginosa*,* *Filigrammaria*,* *Impluviata* (dark), *Cambrica*, *Populata*, *Flaviccinctata* (Yorks, fair), *Fumata*, *Alchemillata*, *Multistrigata*, *Cæsiata*, *Gemmaria** (dark), *Decolorata*, *Captiuncula*, *Pulehrina*, *Chi* (vars.), *Haworthii*, *Fulva*, *Meyanthidis*, *Megacephala*,* *Carpophaga*,* *Maura*,* *Fimbria*,* *Rurea** (dark). *Desiderata*.—Numerous, to renew and extend.—*W. G. Clutton*; 132, *Coal Clough Lane, Burnley, Lancs.*

Duplicates.—*Russula*, *Rubi*,* *Nebulosa*, *Bractea*, *Festucæ*, *Iota*, *Pulchrina*, *Interrogationis*,* *Belgiaria*,* *Piniaria*, *Strigillaria*, *Salicata*, and *Tæniata*; all Irish. *Desiderata*.—Most of the rare and local English species of *Lepidoptera*. Only fine, well set, and fresh specimens exchanged.—*Sir Charles Langham, Bt.*; *Tempo Manor, Co. Fermanagh, Ireland*.

Duplicates.—Ova of *Filigrammaria*, *Autumnata* (black and type), *Dilutata* (black and type), *Filigrammaria* × *Autumnata*, *Autumnata*, male × *Dilutata*, female (and reverse cross), larvæ of *Dromedarius*, *Dictæoides*; imagines of *Salmacis* and many others. (Shall be glad to supply old correspondents). *Desiderata*.—Pupæ of *Hirtaria* and *Zonaria*.—*J. W. H. Harrison*; 181, *Abingdon Road, Middlesbrough*.

Duplicates.—Few of following:—*Edusa* (males), *Valezina*, *Sibylla*, *Hyperanthus*, *Semele*, *T. Rubi*, *Alsus*, *Actæon* (3), *Lucina*, *Fuciformis* (2), *Exulans* (3), *Geryon* (3), *Hera* (fair), *Plantaginis*,* *Littoralis*, *Lucens* (2), *Saponaria* (fair), *Anceps*, *Dominula* (2), *Villica* (2), *Albicolon* (fair), *Basilinea*, *Arcuosa*, *Mendica*, *Trelinea*, *Anomala*, *Ambigua*, *Corticea*, *Cinerea* (2), *Ripæ*, *Præcox* (3), *Neglecta*, *Fimbria*,* *Piniperda*, *Croceago* (1), *Citrago* (2), *Templi*, *Lutulenta* (3), *Dentina*, *Moneta*, *Ænea*, *Parthenias*, *Advenaria*, &c. *Desiderata*.—Numerous, especially early stages.—*A. E. Burras*; 3, *Connaught Road, North End, Portsmouth*.

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LONDON NATURAL HISTORY SOCIETY, Hall 20, Salisbury House, Finsbury Circus, E.C., the 1st and 3rd *Tuesdays* of the month at 7 p.m. *October 5th*.—"Points to Observe in Common Insects," G. B. Longstaff, M.D., F.R.C.P.; Exhibition, "The Coast Agrotids," arranged by the Lepidoptera Committee. *October 19th*.—"Entomological Notes with a Camera in Switzerland," Hugh Mair. *November 2nd*.—Special Exhibition and Discussion; Fam. *Pieridæ*. Short papers by J. A. Simes, F.E.S., L. W. Newman, F.E.S., and Harold B. Williams, LL.B. Visitors invited.—J. Ross, 18, Queen's Grove Road, Chingford, N.E., Hon. Sec.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—The 3rd *Monday* in each month. *October* to *April*.—Hon. Sec., WM. MANSBRIDGE, 4, Norwich Road, Wavertree, Liverpool.

EXCHANGE.

Duplicates.—*Edusa*, *Cardui*,* *Elpenor*,* *Galii*, *Livornica* (one), and many others. *Desiderata*.—Larvæ and Pupæ of almost any species.—*Leonard Tatchell*; 23, *The Arcade, Bournemouth*.

Duplicates.—*Dissimilis*,* *Velleda*. *Fibrosa*, *Ambigua*, *Fulva*, *Lubricipeda** var. *Fasciata*, *Plantaginis*,* *Coracina*, *Captiuncula*, *Mundana*, *Lutosa*, *Fumata* (4), *Valerianata*,* *Togata*, *Ciliatilis*, *Inquinateilus*, *Caledoniana*, *Variegana* vars., *Geminana*, *Sauciana*, *Osseana*, *Brunnichiana*, *Schulziana*, *Congelatella*, *Occultana*, *Veetisana*, *Incarnatana*, *Subocellana*,* *T. Corticilla*, *Æop*,* *Fulvignella*, &c. *Desiderata*.—Good *Pyrales*, *Tortrices*, &c.—*T. Ashton Lofthouse*; *The Croft, Linthorpe, Middlesbrough*.

Duplicates.—Fine specimens of about thirty Geometrid hybrids, named spiders, and un-named specimens of any Order—animal or plant. *Desiderata*.—Named Caddis-flies, Neuroptera and Hemiptera.—*J. W. H. Harrison*; 181, *Abingdon Road, Middlesbrough*.

Duplicates.—Pupæ of *Versicolor* from wild Scotch larvæ, or bred, and *Solidaginis*. *Desiderata*.—As in October exchange list and *Russula* (female), *Irish Mendica*, *S. Urticæ*, *Flexula*, *Citrago*, *Confusalis*, *Leucostigma* and var. *Fibrosa*, and *Micros*.—*Francis C. Woodbridge*; *South Mead, Gerrards Cross, Bucks*.

Duplicates.—Fine bred *Conspicillaris* (Somerset). *Desiderata*.—*Hyale*, *Helice*, *Iris*, *Atropos*, *Scoliiformis*, *Hospita*, *Gonostigma*, *Octogesima*, *Trimacula*, *Fluctuosa*, *Vitellina*, *N. Reticulata*, *Cæsia*, *Albimacula*, *Exulis*, *Atriplicis*, *Semibrunnea*, *Gnaphalii*, *Peltigera*, *Armigera*, *Lapponaria*, *Sagittata*, and many others. Fine condition, black pins and data. *Duplicates*.—Many fairly common species in good condition. *Desiderata*.—Numerous. Lists exchanged.—*W. B. Butler*; *South gate, Wellington Rd., Taunton*.

Duplicates.—*Expallidata*,* *Jasioniata** (few), *Linariata*,* *Capsincola*,* *Rubidata*,* *Tersata*,* *Desiderata*.—Numerous local species.—*H. Woodhead*; 26, *Moorland View Terrace, Plympton, S. Devon*.

Duplicates.—*Andrenæformis*,* *Exigua*,* *Conspicillaris*,* *Fluviata*,* *Desiderata*.—*Iris*, *Strigosa*, *Nubeculosa*, *Galii*, *Fraxini*, or good vars.—*P. P. Milman*; "Cyprina," *Lower Conway Rd., Paignton, S. Devon*.

Duplicates.—Ova: *Prunata*. Pupæ: *Lunaria*. Imagines: *Carpini*,* *Prunata*,* *Fuliginosa*,* *O. Dispar*,* *Similis** *Lunaria*,* *Ocellatus*,* *Monacha*,* *Filipendulæ*,* *Chi*,* *Aprilina** (1915), *Graminis*, *Limitata*, *Sambucaria*,* *Camelina*,* *Atrata*, *Ulmata*, *E. Autumnaria*,* *Mendica*,* *Monoglypha* (dark), *Pendularia*,* *Exapate Congelatella*. *Desiderata*.—Numerous pupæ and imagines.—*J. P. Robson*; *Vane Road, Barnard Castle*.

Duplicates.—*Alveolus*, *Bombyliiformis* (4), *Iota*, *Chrysitis*, *Glyphica*, *Mendica*, *Adusta*, *Omicronaria*, *Trilineararia* (2), *Euphorbiata*, *Hexapterata*, *Black Elutata*, *Juniperata*, *Pusillata*. *Desiderata*.—Numerous; including *Cinxia*, *Uporina*, *Straminea*, *Bondii*, *Australis*, *Anomala*, *Tincta*, *Contigua*, *Roboraria*, *Ornata*, *Notata*, *Alternata*, *Quadrifasciaria*.—(*Miss*) *B. A. Coney*; *Pucklechurch, Glos*.

Duplicates.—*Selene*, *Aurinia*,* *Io*,* *Pavonia*,* *Umbrosa*, *Typica*,* *Munda*, *Æscularia*,* *Testata*,* *Atrata*, and a few of many others. *Desiderata*.—Very numerous, in fine condition to extend and renew.—*G. Fleming*; 9, *Fairview Terrace, Merthyr Tydfil*.

Duplicates.—*Hirtaria*, *Crepuscularia* (2), *Cervinaria*, *Punctularia* (4), *Macinaria*, *Parthenia*, *Gilvaria*, *Ornata*, *Spartata*, *Tilupiformis* (2), *Culiciformis* (1), *Cynipiformis*, *Lutulenta* (4), *Lunosa*, *Maura*, *P. Comma*, &c. All on black pins. *Desiderata*.—Very numerous.—*F. T. Grant*; 37, *Old Road, W., Gravesend*.

Duplicates.—*Napi*, *Irish*, *Dominula* var. *Rossica*, *Repandata* var. *Conversaria*; *Melanic** *Crepuscularia* (*Swansea*), *Alpina*, *Robsoni*, *Barrettii* (all bred), *Corydon* var. *Semisyngrapha*, and many common species; also many ova and pupæ. *Desiderata*.—*Cardamines* (male), *Athalia*, *Sibylla*, *W. Album*, *Ligniperda*, *Æsculi*, *Bombyliiformis*, *Formiciformis*, *Stellatarum*, *Castrensis*, *B. Trifolii*, *Atropos* and many others—perfection only sent and required—also pupæ of many species.—*L. W. Newman*; *Bezley, Kent*.

Duplicates.—*Hyperanthus*, *Ægon* (female), *Io*,* *Bombyliiformis* (2), *Confusalis*, *Complanula* (few), *Fuliginosa*,* *Spinula*, *Coryli*,* *Rufa* (3), *Elymi* (3), *Exulans*, *Phragmitidis* (few), *Geminipuncta*,* *Silago*,* *Rufina*, *Gracilis*, *Solidaginis*, *Moneata*,* *Chi*, *Parthenias*, *Leucophæaria*, *Crepuscularia*, *Macularia*, *Sarcata* (6),

Marginata, Murgaritaria, Mensuraria, Lactearia, Linariata,* Viridaria (few). *Desiderata*.—Numerous; lists invited.—*W. J. Newell*; 22, *Culloden St., Poplar, E.*

Duplicates.—Few *P. Monacha*,* body banded black and yellow. *Desiderata*.—Varieties and scarce or local species. *Duplicates*.—*Bombyliiformis*, *Dominula*,* *Plantaginiis*, *Trepida*,* *Pudorina*, *Sublustris*, *Anceps*, *Agathina*, *Gracilis* v. *Rufescens*,* *Aurago*,* *Tincta*,* *Advena*, *Lychnitis*,* *Syringaria*,* *Angularia*,* *Consortaria*,* *Eu horbiata*,* *Hastata*,* and *Quadrifasciaria*,* *Desiderata*.—Lists of duplicates invited.—*C. Rippon*; *Springfield House, Abingdon*.

Duplicates.—*Cardamines*, *Adippe*, *Euphrosyne*, *Io*,* *Galatea*, *Megara*, *Semele*, *Blandina* (males), *Ægon*, *Bellargus*, *Lucina*,* *Malvæ*, *Tages*, *Thaumas*, *Lineola*, *Comma*, *Sylvanus*, *Jacobææ*,* *Caia*,* *Mendica*,* *Derasa*, *Batis*, *Flavicornis*,* *Impura*, *Pallens*, *Nictitans*, *Graminis*, *Augur*, *Triangulum*, *Brunnea*, *Xanthographa*,* *Comes*,* *Incerta*, *Munda*, *Lota*, *Macelenta*,* *Rufina*, *Pistacina*,* *Lunosa*, *Litura*, *Vaccinii*, *Spadicea*, *Satellitica*, *Oxyacanthæ* v. *Capucina*, *Meticulosa*, *Oleracea*,* *Mi*, *Glyphica*, *Nupta*, *Parthenias*, *Macularia*, *Pedaria*,* *Hirtaria*, *Consonaria*, *Biundularia*, *Crepuscularia*, *Punctularia*, *Pruinata*,* *Piniaria*,* *Gilvaria*, *Adustata*,* *Rupicopraria*, *Leucophearia*, *Aurantaria*, *Marginaria*, *Defoliaria*, *Æscularia*, *Boreata*, *Viridaria*, *Sobrinata*,* *Carpinata*, *Juniperata*,* *Rufata*,* *Living pupæ of Hispidaria*, *Hirtaria*, *Adustata*. *Desiderata*.—*Blandina* (females), *Pruni*, *Artaxerxes*, *Z. Trifolii* (particularly Northern), *Z. Loniceræ* (particularly Southern and Irish) and others.—*A. A. W. Buckstone*; 307a, *Kingston Road, Merton Park, London, S.W.*

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LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—The 3rd *Monday* in each month, *October to April*.—*Hon. Sec.*, *Wm. Mansbridge*, 4, *Norwich Road, Wavertree, Liverpool*.

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