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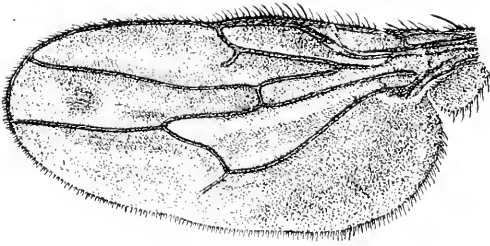
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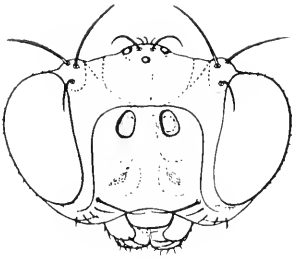
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Figs. 1-2-3. PARYDROPTERA DISCOMYZINA.

Figs. 4-5. PHILYGRIA SEMIALATA.

THE ENTOMOLOGIST

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[No. 596

PARYDROPTERA DISCOMYZINA AND *PHILYGRIA SEMIALATA*; NEW PALÆARCTIC EPHYDRIDÆ (DIPTERA).

By J. E. COLLIN, F.E.S.

(PLATE II.)

A SINGLE specimen of a remarkable Ephydrid in the late Mr. Verrall's collection, bearing a locality label, "Rye, 25.5.02, W. Bennett," had always been a puzzle to me. I was therefore more than pleased to receive from Mr. Claude Morley, in July, and again in September, 1912, several specimens of the same fly, found by him at Southwold (Suffolk), where they occurred on the mud about the roots of the salt-marsh herbage. A study of these specimens convinced me that they must represent not only a new species but a new genus, which I propose to name *Parydroptera discomyzina*, because, though in many respects resembling a *Discomyza*, it has a *Parydra*-like venation.

PARYDROPTERA, n. gen.

Belonging to the subfamily Notiphilinae, and distinguished from *Discomyza* by its less flattened shape, less concave back of head, more rounded ridge between back of head and vertex, by the smooth face without bristles, the only pubescent arista, the absence of the humeral bristle, by the fronto-orbital bristle pointing forwards, not backwards, the smaller mouth-opening and stouter base of proboscis, and by its *Parydra*-like venation.

Parydroptera discomyzina, n. sp.

♂ ♀. A brownish-black species with head and thorax mottled with grey; wings with a very distinctive venation, and when at rest bent over at the tip and closely adpressed over the abdomen.

Head (figs. 2 and 3) broader than long or deep, in profile not much flattened, the jowls and back of head being wide and the face rounded. Eyes with very short scattered microscopic hairs. Frons much wider than long; vertical triangle large, rounded, and reaching forward to frontal margin, brown with a grey central stripe from front ocellus onwards, and a small grey patch at each side of ocellar triangle on the vertex; vertical and fronto-orbital bristles placed

upon a brown patch, but the frontal wedges dull blackish in most lights; the eye margin, from the fronto-orbital bristle to the dull blackish patch below the eye, is grey with a dull brown spot level with the frontal margin. Face grey like the eye margins, with a dull brown depression each side of the most prominent part at the middle. Back of head greyish about the middle above and on a stripe from about the middle of the side of head along lower half of eye margin past the dull blackish patch below the eye to the mouth edge, but brownish and with a row of minute bristles from the vertical bristles round to the middle of the back part of eye, and brownish with a few scattered bristles on the lower back part of jowls. Mouth-opening large, labrum and palpi grey, back part of proboscis stout, strongly chitinized and hairy, somewhat as in *Parydra* or *Pelina*. Antennæ grey with the third joint brownish, second joint with a weak spine above pointing forwards, but without the bristle pointing upwards and outwards so characteristic of all the rest of the *Notiphilinae*. Arista minutely pectinate above and inconspicuously hairy beneath about the base. Chaetotaxy: Two ocellar placed close together at middle of ocellar triangle, the usual two vertical, one fronto-orbital pointing forwards, one vibrissa placed level with lower angle of eye, followed by four to five smaller bristles.

Thorax and scutellum brownish, the former roughly rugose, somewhat as in *Pelina anea*, and with grey patches, of which two large ones in front are the beginning of indistinct stripes down the thorax, and smaller ones on each side (one in front and one behind the suture), form indistinct side stripes, in addition the humeri and notopleural suture are greyish; the upper part of pleuræ is brownish, the lower and hind part greyish; scutellum flattened and somewhat square shaped. Chaetotaxy: Two notopleural, one postalar, one dorso-central right behind, four scutellar (the two basal ones placed well on disc), one small mesopleural, the sternopleural reduced to a fine hair; in addition, the brown part of disc of thorax and the mesopleura bear scattered short bristles.

Abdomen composed of five segments (of which the first two are short), brownish black, smooth and shining, the punctuation very fine, and the pubescence of short fine bristles, scattered; genitalia hidden beneath the last abdominal segment; ventral abdominal plates narrow, clothed with a few scattered hairs.

Legs brownish black with paler tarsi; front tarsi with the extreme base of first and second joints yellowish, middle tarsi yellow with the last one or two joints and the middle of the basal joint brown, hind tarsi like the middle ones, but the darkening is rather more extensive, and includes the middle of the other joints. Middle tibiae with a short terminal spur beneath.

Wings (fig. 1), in life, lapped over one another with the tips bent down, closely following the contour of the abdomen; they are strongly veined, streaked with brown, and with a brown spot between the cubital and discal veins; radial vein short and with a curved veinlet near the tip, as in some species of *Parydra*; postical cross-vein curved and acutely sloped outwards. Squamæ blackish. Halteres brown with yellow stems.

Length, 2-2.25 mm.

The next species is remarkable in possessing abbreviated and narrow wings, but clearly belongs to the genus *Philygria*. I am indebted to Mr. J. Collins, of the Oxford University Museum, for the privilege of being able to examine and describe this species; he caught six specimens close to some sand-martins' burrows in a gravel-pit at Cumnor (Berks) on July 22nd, 1910.

Philygria semialata, n. sp.

♂ ♀. A small brownish species resembling *P. picta*, but with narrow and abbreviated wings.

Head both in shape and colour much resembling that of *picta*, except that the whitish grey eye margins of the frons are not so distinct; the third antennal joint is yellowish beneath and the arista pectinate above, almost exactly as in *picta*.

The dark brownish thorax has faint indications of the two whitish grey stripes of *picta*, and the lower part of pleuræ is distinctly grey, but the scutellum is the same colour as disc of thorax, though when viewed from behind there is a grey patch on each side beneath the basal bristle. Chætotaxy as in *picta*, and differing from the rest of genus in having only two pairs of dorsocentral, and no acrostichal bristles.

Abdomen dull about base, more shining towards tip, but nowhere so brilliantly shining as in *picta*.

Legs dark yellow, with the knees, tips of tarsi, and end of front tibiæ brownish, sometimes the front femora brownish above.

Wings (figs. 4 and 5) short, narrow, and curved, I believe always shorter and narrower in female than in male; venation somewhat variable, the postical vein sometimes rudimentary or continued half-way to wing margin (female), sometimes complete, and the postical cross-vein present (male). Halteres whitish yellow.

Length, 1-1.25 mm.

The shape of the head, the slightly pubescent eyes, and its chætotaxy prove that this species must be placed in the same genus as *P. picta*, which I am inclined to think should be generically separated from *Philygria*.

Dr. Kertesz, in 1910 ('Rovartani Lapok.' xvii. p. 182), has described a Hungarian species (*P. mocsaryi*), which also has abbreviated wings, but which evidently belongs to the other group of the genus having three pairs of dorsocentral and uniserial acrostichal bristles on the thorax; other differences exist in the dark antennæ, legs, and halteres, and in the maculated wings. It was found in heaps of stones near the snow at an altitude of 2000 m.

EXPLANATION OF PLATE II.

- Fig. 1.—Wing of *Parydroptera discomyzina*, ♀, × 30.
 Fig. 2.—Head of " " " " " " × 48.
 Fig. 3.—Profile of head of *P. discomyzina* " " × 48.
 Fig. 4.—Wing of *Philygria semialata*, ♀, × 40.
 Fig. 5.—" " " " ♂, × 40.

ON REARING *PAPILIO MACHAON*.

By E. E. BENTALL, F.E.S.

1910. Early in the year I purchased some Continental *Papilio machaon* pupæ to try a breeding experiment in my butterfly-house, which is a long greenhouse-like building covered partly with glass and partly with perforated zinc arranged in alternate squares, so that air and rain should have free access.

The house was planted with food-plants for larvæ and with flowering plants for butterflies.

The butterflies, having paired, commenced to lay early in June.

On June 15th, having found that the young larvæ which had hatched were being eaten by small spiders, I collected thirty-three that day and put them in leno-covered cages to protect them. I see by my notes that I found three hundred and fourteen between June 13th and July 5th. The whole of this first brood of larvæ were successfully reared, and in due time imagines emerged, some to be transferred to the butterfly-house and others were set free in the garden.

Those in the house paired and laid a quantity of ova, from which larvæ hatched and were brought up in cages as before. This second brood of larvæ commenced suspending on September 9th, and the whole of the pupæ hybernated with practically no loss.

1911. *P. machaon* commenced to emerge on May 12th, and were mostly males, but by May 24th chiefly females emerged. Many were let out into the garden. Of those retained in the house I put Continental males and females in one division of the house, and in another division I placed some English females and some Continental males. I wished to see whether they would pair as freely as the Continental of both sexes do. I found they were quite as ready to do so. In the compartment reserved for the mixed breed I had planted *Peucedanum palustre*, *Daucus carota*, *Skimmia japonica*, and the common garden fennel.

On May 25th I found my English females had commenced to lay eggs, and had selected in the first instance the *Peucedanum* and the *Skimmia*, but the next day they were laying on fennel. In the compartment for the all Continental the food-plants were *Skimmia*, parsnip, parsley, and fennel, and, although I searched carefully, no eggs were found on anything but fennel, but on that there were a very large number.

I let out into the garden about two hundred and fifty *machaon*. Those in the garden paired freely, and while some remained flying about the open over the rough grasses, the majority evidently dispersed. From reports in the Entomological Press and from private information these *machaon* must have distributed themselves over a wide area in all directions.

It was beautiful to see them dashing backwards and forwards over the open spaces, and at the same time to see *Papilio philenor* slowly circling round in the openings among trees. I noticed the latter kept to the trees, while the *machaon* avoided them.

The *machaon* laid sparingly on fennel in the garden where the fennel was dotted about the rough grass. The larvæ on the fennel in the garden did not succeed in growing up, but disappeared when they were about an inch long. I suspect birds.

With reference to birds and *machaon* larvæ, I experimented by putting about one hundred and fifty three-parts-grown larvæ on *Skimmia*, which is growing in large clumps in the open. In three days the larvæ were all gone, and sparrows were seen flying away from the clumps.

The extraordinary number of small birds in Essex must surely be answerable for much of the present-day scarcity of butterflies. In woods crowded with game-birds one can also see a reason for the absence of many species of butterflies one would expect to find.

Second brood.—The first of the second brood emerged on June 8th and all were out by July 28th and mostly set free in the garden. Some remaining in the house laid large quantities of eggs. There being so many larvæ I allowed them to feed on the growing plants in the house, and not, as hitherto, having them fed in leno cages. When nearly full fed I transferred the greater number to cages, as an easier means of collecting the pupæ. Here it is interesting to note that wasps cut holes in the rather old leno, entered the cages, cut up larvæ, and flew off with suitable-sized pieces. Later I found Diptera emerging from *machaon* pupæ suspended in the cages. I removed some pupæ from the cages and put them in a protected box, after having weeded out all those which appeared stung. In October I found another batch of Diptera in the box.

On December 1st I examined one hundred and seventy pupæ in the box and found them all stung, and with the parasitical grubs in various stages of development. This was the end of that brood.

The parasite which destroyed all my *machaon* is a Cheleid belonging to the genus *Pyromelas*, according to Mr. H. Rowland-Brown, who kindly identified them for me. This seems to show that these flies can lay their eggs in pupæ of any age.

One curious fact is that no *machaon* pupæ of the first brood hibernated in either 1910 or 1911. Those of 1910 were all of foreign origin.

Those of 1911 were partly of foreign origin and partly half-breeds, having English mothers and foreign fathers.

The English *machaon* were distinguishable from the foreign by being of darker appearance.

Young larvæ did not thrive on *Skimmia*, but when large the larvæ fed well on it, and did not show any disposition to wander away in search of other foods.

Cottagers round about here found larvæ of *machaon* on carrot and in some cases promptly killed them, thinking to save their vegetables. In other cases they fed them up successfully.

1912.—This year I have heard of some *machaon* being seen in the district. One only was seen in my garden. I conclude circumstances are too strong for this fine species, and he cannot establish himself.

In conclusion, and in confirmation of my last remark, the larvæ which were allowed to fend for themselves in the house and pupated, were all stung, so that not one remains.

It is well known that Continental *machaon* are found in all manner of situations, whether marshy or on dry hills, and the same race should be able to maintain themselves anywhere in the South of England, were it not for their enemies.

The Tower, Heybridge, Essex: Nov. 14th, 1912.

SOME BIOLOGICAL NOTES ON *RAPHIDIA MACULICOLLIS*, STEPH.

By C. B. WILLIAMS, B.A., F.E.S.

DURING March, April, and early May of this year I took larvæ and pupæ of a *Raphidia* in some numbers under the loose bark of pine-stumps on Oxshott and Wisley Commons in Surrey, pupæ being found as early as March 23rd. Some of the pupæ from Oxshott hatched and proved to be *Raphidia maculicollis*, Steph.; those from Wisley unfortunately died through being kept too dry, but I feel confident that they were the same. I found it necessary to keep the pupæ on moist moss to prevent them from drying up.

On May 4th a female *R. maculicollis* emerged from one of the Oxshott pupæ and was put with a male of the same species which I had captured that day at Oxshott. The two were kept in a glass beaker closed with a piece of cloth and were fed daily on rose aphids (*Siphonophora* sp.) which they took quite readily. The mode of feeding was as follows: the aphid was approached slowly and cautiously at first, then captured by a sudden rush and raised aloft in the jaws, the long prothorax of the snake-fly being elevated in the manner characteristic of these insects. The prey was then slowly but completely consumed, the legs and antennæ, which usually stuck on the head of the *Raphidia*, being cleaned off by drawing the tarsus of the front leg forwards over the top of the head. The pieces were in this way transferred to the tarsus which was then drawn downwards between

the mandibles and the last remnants were removed and eaten up. The adults also readily drank drops of water which I put in. During feeding the female frequently wagged her ovipositor as if in appreciation, and after every meal the antennæ were cleaned with the tarsus of the front leg, in a way similar to that described above for the head.

A piece of rotten wood, deeply cut with a knife, was put in with them, and on this the female was seen probing with her ovipositor, from the end of which drops of black excreta were often expelled.

On May 28th the male died (after nearly four weeks), and on June 17th, the female being still alive, the rotten wood was removed and examined for eggs, of which many were found in the cuts in the wood, together with very small larvæ. The eggs were slightly transparent, very pale yellow in colour, and about 1.2 mm. long by 0.3 mm. broad. In shape elongate cylindrical, slightly more pointed at the tail end than at the head; at the head end with a small white globular appendage.* A few eggs which were removed to a microscope slide for examination began to hatch immediately, and I was fortunate in being able to observe the whole process. The shell first split behind the globular appendage and the young larva emerged with the head bent downward along the ventral side of the prothorax. In one case four and a half minutes after the first signs of hatching the head was free, and in three minutes more the larva was walking about on the slide.

The young larvæ were about 1.5 mm. in length and pale brownish white in colour. The head was about 0.25 mm. long, with rather stout three-jointed antennæ of slightly over half its length. Unfortunately all these larvæ have died, but others which I have readily drink water, as did the adults, and will eat killed house-flies as well as aphids, in the former case eating only the softer parts.

On July 11th the original female died, after having lived two and a half months. The whole time that the male was with her she made no attempt to attack it, yet on an occasion when I put two females together for a few hours one of them bit the head off the other and ate its abdomen. The larvæ also are cannibalistic, if given the opportunity, usually leaving only the head of their victim.

Some time during April a parasitic grub came out from a

* Mr. C. T. Lyle, in describing the egg of *Raphidia notata* (Entom. xli. 1908, p. 233), says "the eggs . . . had a very short pedestal at the thicker end. They stood erect on this, and were in contact with one another, as is the case with the eggs of *Sialis*." The eggs which I describe were lying in the cut in the decayed wood and could not be said to stand on any end in particular, but as the "pedestal" is at the head end in these, and in *Sialis* eggs also it is at the apex and not at the base, I think Mr. Lyle must be mistaken in saying that the eggs stood on this end.

lateral hole near the end of the abdomen of one of the Wisley larvæ, which, as I have said, I believe to have been *R. maculicollis*. This grub spun a white elongate cocoon, and on May 7th a female Ophionid emerged, which has been kindly identified by Mr. Claude Morley as *Pyracmon melanurus*, Holmg. Mr. Morley further tells me that this is the first certain confirmation of this species as British, and also is the first definite record of the host of this genus of ichneumons.

The John Innes Horticultural Institution, Merton, Surrey :
November, 1912.

FURTHER NOTES ON HESPERIID CLASSIFICATION.

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

IN some previous notes (Entom. xliii. pp. 306-9, and xlv. pp. 5-7) I made an abstract of the work of some French and Swiss lepidopterists engaged in the task of separating the western palæarctic members of the genus *Hesperia*. With their kind permission I now offer a brief summary of the later discoveries of M. Charles Oberthür, Dr. J. L. Reverdin, and M. Marcel Rehfous, whose publications during the past year have thrown much additional light upon the problem of the specific identity of the "Black-and-White" Skippers.

(i) HESPERIA ALVEUS, Hb., and HESPERIA ARMORICANUS, Obthr.

First comes the announcement that *Hesperia armoricanus*, Obthr., included in my list as a var. of *alveus*, Hb., on the strength of an examination of the male genital armature, is a distinct species, constituting, I think, an epoch-making addition to our knowledge of the group. To M. Oberthür belongs the credit of distinguishing this smaller Hesperiid, which he describes (Lépid. Comparée, fasc. vi. p. 104) as "neither *alveus*, nor *cirsii*, nor *carlinæ*, nor *onopordi*, though bearing a resemblance to all four species." While Dr. Reverdin, with characteristic thoroughness, has worked out the structural as well as the superficial differences of the two butterflies (Bull. Soc. Lépid. Genève, vol. ii. fasc. 3, pp. 141-148). With regard to the structure of the appendages, he professes himself quite satisfied that both species present differences "more or less marked, but constant," and premises his conclusions with a minute diagnosis, illustrated by photographs of dissections.

He then goes on to point out that in size—admittedly not a distinctive character of great value—*armoricanus* is almost invariably the smaller insect. But, while the shape of the wings in both species, especially the elongate anal margin of the hind wings, seems at first sight identical, an examination of parallel

series reveals the fact that the wings of *armoricanus* are less elongate in this respect, and that the butterfly is more compact ("plus ramassé, si l'on me permet cette expression"); the contour of the wings approaching that of *onopordi*, and differing from that of *alveus*.

Upper side, coloration: *armoricanus* less deeply black, and greyer; white spots more conspicuous, especially on the hind wings; median band, hind wings, much accentuated, and the colour pure white or nearly so (more resembling in this respect *cirsii*); while in *alveus* it is brownish or greyish.

Under side, fore wings: In *alveus* more or less blackish, especially outside the "Q" mark; in *armoricanus* grey, and more evenly distributed.

Hind wings: In *alveus*, ground colour yellow-olive-green, uniform, or nearly so; in *armoricanus*, tint at once more variable and less uniform; ground colour greyish, yellowish, or reddish, with deeper brown markings, especially at the costal margin, and outside the median band of spots. Nervures clearly defined either in yellow or pale grey. In *alveus* the nervures do not stand out at all, or much less definitely. Median band relatively much narrower in *armoricanus*. Outer margin slightly convex in *alveus*, thus giving the basal band of spots a broader and more conspicuous appearance than in *armoricanus*.

The fringes, palpi, and antennæ exhibit no appreciable differences, but the abdomen of *armoricanus* is apparently more elongate than that of *alveus*, reaching beyond the anal angle.

Dr. Reverdin also remarks *en passant* that *armoricanus* and *cirsii* have been confused together owing to the prominence in both cases of the nervures on the under side of the hind wings. But though, as M. Oberthür says, the former resembles in some respect the latter insect, the intradiscal spot on the upper side of the fore wings in *alveus* and *armoricanus* is convex towards the outer margin; in *cirsii* it is rectilinear. This peculiarity was discovered by my lamented correspondent, the late M. F. Delahaye, of Angers, and appropriately enough it is designated by M. Marcel Rehfous, "la signe de Delahaye"—"Delahaye's mark."

But for the collector anxious to identify his unnamed Hesperiiids of this group in the field, or (if labelled) in the cabinet, there is an easier method of determination than structural or superficial characteristics, as in the cognate cases (with the additional clue of latitude) of *H. malvæ* and *H. malvoïdes*. For, whereas *armoricanus* is certainly double-brooded in the majority of localities, *alveus* has but one emergence. *Armoricanus* flies in May and June, and the first generation should be exhausted before *alveus* is on the wing from mid-July to the end of August; the second emergence takes place in late August and September, though in normal seasons possibly the laggards of *alveus* overlap the first of the new *armoricanus*.

This phenological evidence M. Rehfous supplements with the significant observation that the food-plants of the two species are different. *Alveus* affects *Helianthemum vulgare*; *armoricanus*, *Potentilla reptans*, and probably also *Fragaria vesca*, as a female was seen to lay an egg on a leaf of this plant (Bull. Soc. Lépid. Genève, 1912, vol. ii. fasc. 3, pp. 149-152). A comparison of the ova and the young larvæ in the early stages reveals also certain characteristic distinctions. But the complete life-history of *Hesperia armoricanus* has yet to be told. Elsewhere I have expressed the opinion that British examples of *H. alveus* recorded by Barrett and other writers will turn out to be *H. armoricanus*, for this reason among others, that where *armoricanus* occurs in Brittany and on the other coasts contiguous to Britain, *alveus* is absent. The published figures of "British" *alveus*, both by their size and markings, further suggest that the species over here has been wrongly—or perhaps, in view of the very recent nature of M. Oberthür's discovery, I should say incorrectly—identified.

(ii) *HESPERIA FRITILLUM*, Hb., and *HESPERIA CIRSI*, Rbr.

Assuming that it is agreed to sink *fritillum*, Rambur, in *malvoides*, Ed. & Elwes, as advised, and accepted by Dr. Reverdin (Bull. Soc. Lépid. Genève, vol. ii. fasc. 2, 1911, cited by me Entom. xlv. p. 5), the doubt still existed as to the specific identity of the female Hesperiid figures by Hübner in his 'Europaischen Schmett.' pl. 92, and numbered 464, 465 (and coincidentally of the males figured by Herrich-Schäffer, Nos. 33 and 34 in his 'Syst. Bearbeitung der Schmet. von Europa,' bande i. Regensburg, 1843).

M. Oberthür (*loc. cit.*) now suggests that Herrich-Schäffer considered *fritillum*, Hb., to be the same butterfly as *cirsii*, Rambur, and a comparison of the "*cirsii*" in his collection (which includes some of the actual Rambur co-types of the species) with Hübner's figures confirms him in the belief that this is the correct view; Dr. Reverdin and Dr. Charles Blachier concurring.

Thus the name *cirsii*, Rbr., falls as a synonym of *fritillum*, Hb., but M. Oberthür, recognizing a constant form of the butterfly in localities near Paris, and on into Touraine, proposes the retention of *cirsii* for this variety, and reconstitutes the nomenclature of the species as follows, with *fritillum*, Hb. (= *cirsii*, Rbr.), for the type form.

Meanwhile, Dr. Reverdin tells me that he has somewhat modified his views upon the specific identity of *cirsii*, Rbr., as a var. of *carlinæ* (*cp. my* "Note on the New Classification of certain Hesperiid Butterflies," Entom. vol. xliii. p. 308). There are certain later discovered differences in the structure of the appendages, and apparently the two insects have different

periods of emergence. I take it, therefore, that the classification of these western palæarctic Hesperiidæ should now be as follows:—

H. CARLINÆ, Rbr.

H. FRITILLUM, Hb. (= CIRSII, Rbr.)

(a) ab. *herrichii*, Obthr.

(b) var. *iberica*, Gr. Gr.

(c) var. *siciliæ*, Obthr.

preceded by H. ALVEUS, Hb.

(a) var. *foulquieri*, Obthr.

(b) var. *ryffélsensis*, Obthr.

(c) var. *numida*, Obthr.

(d) var. ? *ballotæ*, Bsdv.

H. ARMORICANUS, Obthr. (= FRITILLUM, Bsdv., and JACEÆ, Guén. (*in litt.*)).

H. BELLIERI, Obthr.

For it seems that *bellieri*, the butterfly described as a variety of *alveus*, and certainly very distinct superficially from it, will also turn out to be a separate species.

(To be continued.)

THE LEPIDOPTERA OF THE NORWEGIAN PROVINCES OF ODALEN AND FINMARK.

BY W. G. SHELDON, F.E.S.

(Concluded from vol. xlv. p. 340.)

Brenthis polaris.—Schøyen seems to have found this species in abundance in various localities in the Porsanger Fjord in 1878 and 1879, but Herr Bye, who many years since collected a few Lepidoptera, informed me that for years it had been very scarce, and was not at all sanguine as to its present occurrence. I was therefore, perhaps, fortunate to obtain sixteen fine examples near to Kolvik. These were obtained in one small locality of perhaps fifty yards by twenty, although I searched closely miles of similar ground on both sides of the Fjord.

The localities frequented by *B. polaris* in this district are rough dolomite screes, on which the only plants growing are *Dryas octopetala* and occasional tufts of a very dry grass. Schøyen suggests that the larva feeds upon the former plant, and there does not seem to be any other reasonable hypothesis. The imago flies swiftly, irregularly in the case of the male, but steadily in that of the female; only in the brightest sunshine, and after the sun has been shining for some time. At intervals they will settle on the bare scree, always with wings outstretched, but never on anything else, so far as my observations went. I saw one female, which I could not very well follow rapidly, fly over a low belt of birch-scrub growing on the edge of the locality in which the species occurred, and settle on the scree

beyond, within two or three feet of the farther edge of the scrub. The small locality in which I found my specimens is figured on Plate xii.; they flew over the slopes which are in the front of the plate, at a height of from 50 ft. to 300 ft. above the level of the Fjord. The dark patches here are composed entirely of *Dryas octopetala*.

I do not know a good figure of this species, and have therefore given a photograph of it on Plate xiv., figs. 5 and 6, together with its nearest arctic ally *B. freija*, figs. 1, 2, and 3, to which it has a close superficial resemblance; the two can, however, be at once distinguished by the T marks in the outer margins of the inferiors in *B. polaris*.

B. frigga.—This species was common but worn at Laxelv from July 11th onwards. So much so, in fact, that I could have netted two dozen or more examples on July 12th had I been so disposed, but unfortunately the majority were too battered for cabinet specimens, and I had to content myself with about a dozen altogether. The Porsanger examples have the pale central fascia on the under side of the inferiors much more suffused with reddish brown than my Central Sweden specimens; this form is noted by the original describer of the species, Thunberg, whose type-specimens came from Lapland.

Eneis norna.—I found this species just emerging at Bossekop during the last day or two of my stay, and saw three or four specimens. At Kolvik it was common on the rocky lower slopes of the dolomite, and a few worn examples were seen at Laxelv.

Authors, including Kane and Lang, have described the type of this species as having two ocelli on each of the front and one on each of the hind wings. The original description and figure by Thunberg in 'Insecta Suecica,' however, gives three ocelli on each of the front and one on each of the hind wings, and of course this form must thus be taken as the type in nomenclature.

My Porsanger series of fifteen males and twenty-one females includes seven females, but not any males, of this form. Of the three-ocelli form which Kane and Lang have treated as the type, I have six males and three females; for this form I propose the name of *tripupillata* n. ab. Of the forms I obtained last year at Abisko (see 'Entomologist,' vol. xlv. p. 68), the series includes four males and four females of ab. *bipupillata*, Sheldon; one male of ab. *unipupillata*, Sheldon; three males of ab. *obsoleta*, Sheldon; and two females of ab. *pallida* Sheldon; in addition to these I have two ab. *ochracea*, Aurivillius; and one male and three females which have an excess of ocelli over what obtains in Thunberg's type. I believe in certain Scandinavian localities forms with a variable number of ocelli in excess of those of the type are not uncommon, and the most convenient way of dealing with these seems to be to call them all ab. *excessa*, n. ab.

Erebia medusa, var. *polaris*.—One would naturally expect to find this to be one of the most widely distributed of Arctic Diurni, but except at Laxelv I did not see it; there it was common and in good condition at the time of my visit.

E. disa.—This fine species was one of the special objects of my search. At Bossekop Staudinger apparently found it not infrequent, and one forms the opinion on reading his account of the Lepidoptera

of that place, that it chiefly occurred in the large low-lying and very wet swamp behind the church; and acting on this clue I passed the best part of four days therein, pretty well up to my knees in water most of the time, with the result that in that period I obtained one specimen, which was accidentally kicked up on June 14th on a wet moor between the Ebydal Road and the Alten River. On June 19th it occurred to me that either Staudinger's swamp had changed since his visit, or that his account was wrong; and taking a wide sweep I investigated the moors between the Ebydal Road and the Skadavaara Mountain. Here, on this day, I found *E. disa* locally quite common, taking nineteen specimens in perfect condition, and on the following day twenty-six more. It frequented a rather wet track overgrown with *Vaccinium*, with a certain amount of a fine grass much resembling *Aira cespitosa*.

It was fortunate that I stumbled across the species at Bossekop, for although Schöyen appears to have found it common everywhere in the Porsanger Fjord, with the exception of two or three examples seen three or four miles up the valley of the Laxelv, I did not see the species in this district.

My series taken at Bossekop consists of thirty-seven males and nine females. Of these thirty males and six females agree with Thunberg's description of the type in having on each superior four blind ocelli. Four males and three females have an additional ocellus on each superior; for this form I propose the name of ab. *addenda*, n. ab. (Plate xiii., fig. 3); whilst three males have the ocelli very much obscured and reduced in size, ab. *obscura*, n. ab. (Plate xiii., fig. 2.)

E. lappona.—This is probably the most abundant and widely distributed butterfly to be found in Arctic Norway, occurring commonly in every locality I visited. The form is a very bright one, with much brown on the upper surface. In certain examples of my series the brown, of which there is in typical specimens a patch near the apex of the front wings, extends to the bases. This very striking form I have in both sexes from Porsanger and Alten, and propose for it the name of *brunnea*, n. ab. Another form of variation is that two of my Porsanger females have splashes of the brown which is found on the under side of the superiors, on the under side of the left inferior. *E. lappona* was even to be found round Hammerfest. I spent two cloudless days—June 24th and 25th—wandering over the desolate mountains there, during which the only Lepidoptera seen were a few examples of this species.

Hesperia andromedæ.—I saw a few examples of this species at Kolvik, and captured five. They frequented the same description of ground as *Brenthis polaris*, but higher up; in fact, on the top of the dolomite hills, which rose out of the fjord 500 or 600 ft.

Amongst the Heterocera observed were:—

Anthrocera exulans.—Two specimens taken at Kistrand on July 23rd. These are somewhat worn, and thus one cannot well say what form they represent, but they are rather small examples, with pale red markings.

Pachnobia hyperborea.—A grey Noctua, captured flying freely in

the sun shortly before noon on July 23rd at Kistrand, turned out to be this species. Anyone acquainted only with Scotch specimens would not recognize this one as *P. hyperborea*, but it agrees well with examples from Lapland in the National Collection.

Plusia hohenwarthi.—Common at Laxelv. I did not see it elsewhere.

Anarta melaleuca.—This beautiful little species was abundant everywhere on moors in the Porsanger district, resting on rocks, and flying wildly off as one approached.

A. zetterstedtii.—Abundant on the dolomite screes at Kolvik, flying briskly in the sun, and settling on the bare rock. In dull weather not a specimen could be seen, or even kicked up. The food-plant is no doubt *Dryas octopetala*, which is the only plant except grass growing in its haunts.

A. richardsoni.—Not uncommon in the same locality as the last species, and, like it, flying freely in the sun.

Gnophos sordaria.—A light grey form of this was abundant at Kolvik; the white dolomite rocks were answerable for the colour.

Psodos coracina.—Abundant everywhere in the Porsanger Fjord. The specimens varied from black to almost white, the colour depending upon the nature of the strata the examples frequented.

Larentia cesiata.—Common everywhere.

Melanippe hastata, var. *hastulata*.—Not uncommon at Bossekop.

M. montanata.—Common at Laxelv.

M. fluctuata.—Generally abundant.

Coremia munitata.—Perhaps the most abundant Geometer I saw north of the Arctic Circle, occurring everywhere abundantly; a small form.

Cidaria polata.—A few examples in most localities.

C. frigidaria.—Common at Kolvik.

In the course of my two expeditions to Scandinavia I came across, in more or less abundance, all the Diurni occurring there which are not found in Central Europe, with the exception of two, *Melitea iduna* and *Brenthis chariclea*. As these species are both very local and imperfectly known to lepidopterists, it may not be out of place to say a few words about them.

Melitea iduna is apparently to be got with certainty at Kvikjock, in Swedish Lapland, and has been reported from Abisko, but this latter report requires confirmation. In Arctic Norway it has been taken by various entomologists in the Sydvaranger Fjord, and W. M. Schöyen took one example (a female) at Laxelv, in the Porsanger Fjord, on July 18th, 1879. It is described in Seitz as being found in Lapland and Central and North-east Siberia, where it flies in early July in abundance in barren alpine meadows, at altitudes of from 6–8000 ft., in company with *M. cinxia* and *Brenthis aurinia*.

Brenthis chariclea is one of the rarest, if not the rarest, of European Diurni. The only records I can find are that Staudinger took twelve examples at Alten, July 17th to 26th, 1860, where it was afterwards found by Sandberg. In 1878

one example was taken by Hornemann at Hammerfest, and W. M. Schöyen found one at Karasjok, July 30th, 1879, and some more at Kistrand during the first week in August the same year; these latter, four in number, and the Karasjok specimen, I saw in the National Collection at Christiania in June last.

Herr Sparre Schneider writes that it is the only butterfly occurring in Arctic Norway that he has not taken.

Herr Bye informed me that between twenty and thirty years ago he, with another inhabitant of the Porsanger Fjord, took specimens not infrequently at Kistrand and Laxelv, which were sent to Germany. I have also seen it stated somewhere that specimens have been found in the Kola Peninsula, Russian Lapland.

I recently wrote to Staudinger for an example of the European form, which is distinct from those occurring elsewhere, but was informed by him that it could not be supplied, and that specimens coming into the market in old collections were invariably the American form.

Seitz says that the butterfly flies only at noon, with preference at the foot of rocks which are well warmed by the sun, becoming at once lethargic when struck by the cold wind. The form of this species, known as var. *boisduvalii*, is widely distributed in Arctic America, and var. *arctica* from Greenland and Nova Zembla perhaps extends the farthest north of all butterflies.

Youlgreave, South Croydon: October 12th, 1912.

NOTES AND OBSERVATIONS.

THE NEW DEPARTMENT OF ENTOMOLOGY AT THE NATURAL HISTORY MUSEUM.—The Principal Trustees of the British Museum have appointed Mr. Charles Joseph Gahan, M.A., First Class Assistant in the Department of Zoology, to the newly created post of Keeper of the Department of Entomology. Hitherto, for administrative purposes, there has been an Entomological Section of the Department of Zoology; in future there will be a special Department of Entomology under its own Keeper. Mr. Gahan will take up his new duties at the beginning of the next financial year.—‘The Times,’ December 12th, 1912.

THE NOCTUID GENUS *ALYSIA*.—The New Zealand genus *Alysia* has been revived by Warren, apparently with good reason, but unfortunately *Alysia*, Guen., 1868, is a homonym of *Alysia*, Latr., 1804, a well-known genus of Hymenoptera. The lepidopterous genus may be known as *ALYSINA*, n. n.; type *Alysinia nullifera* (*Agrotis nullifera*, Walker, *Alysia specifica*, Guen.). *Setagrotis* and *Maoria*, Warren (Seitz, ‘Macrolepidoptera, Fauna Indoaustralica’), are also pre-occupied names, and must be changed. For a discussion of the genera related to *Alysinia*, see J. B. Smith, Jn. N. Y. Ent. Soc. 1907, p. 156.—T. D. A. COCKERELL; Boulder, Colorado.

THE HODGES AND HARRISON COLLECTIONS.—On the 12th and 13th November last the collections of British Lepidoptera formed by Mr. Albert J. Hodges and the late Mr. Albert Harrison were disposed of at Stevens's Auction Rooms. Both were modern collections, and the specimens contained in them were practically all labelled with more or less full data. In the Hodges collection, which was sold first, there were several good varieties, and these attracted some little attention; thus, an exceptionally dark *Argynnis aglaia* brought eleven guineas. A lot in which was included two pinkish forms of *Anthrocera filipendulæ* and a yellow variety of *Euchelia jacobææ* realized 47/6; and another containing two yellow *A. filipendulæ* and a confluent yellow *A. trifolii* made three guineas; while an *IVI* variety of *Senta irrorella* with an asymmetrical specimen and sundry other species sold for a guinea. The two specimens of *Abraxas grossulariata* that were figured in the 'Record,' vol. iv. plate c, figs. 13 and 14, and which were catalogued as "magnificent varieties," caused some spirited bidding, the one being knocked down at £6 10s., and the other at £7. Among the rarer species two lots, each containing two specimens of *Sphinx pinastri* with six *S. convoleuli* and three or four *Acherontia atropis*, sold for 27/- each lot; nine *Leucania albipuncta* with three *L. vitellina* and other species for 30/-; five *Hydrilla palustris* for 65/-; and two lots, each containing two fine specimens of *H. palustris* with other species, for 42/- and 35/- each lot. *Drepana sicula (cultraria)* sold in lots of two or three made from 10/6 to 5/- a specimen, according to condition; and *Crymodes erulis* from 13/- to 8/- apiece; while for *Acidalia humiliata*, one of Mr. Hodges's specialities, sold in lots with about seventy other *Acidalias*, brought for a lot containing a dozen 13/-, and for one containing eight 11/-.

The Harrison collection was remarkable for the perfection of the specimens of which the long series were composed, and the exact data with which they were accompanied, rather than for the rarity of the species or any striking varieties, but many of the lots appeared to attract a good deal of attention. Thus a lot containing twenty-seven *Pieris brassicæ*, some of the males of which had small discal spots, and a couple of the females with the spots somewhat confluent, together with thirty-five *P. rapæ* brought 28/-, and a similar lot 20/-; lots of about one hundred *P. rapæ* each realized, for one containing a female with discal spots united, 35/-, and others 20/- and 16/- a lot. A series of forty-two *Argynnis aglaia* from North Cornwall sold for 24/-, lots of about seventy *Melitæa aurinia* from Kent, North Wales, Ireland, &c., for 19/- to 20/-, and lots of about sixty *Eugonia polychloros* and *Aglais urticæ* for 12/- to 18/- a lot. A specimen of *Plebeius ægon*, possibly hermaphrodite, included in a lot of about sixty others, went for a guinea, and the fine series of *Lycæna arion*, about thirty each, from North Cornwall, for from 20/- to 23/- the series. A couple of "golden" males of *Cosmotriche potatoaria* took the lot in which they were included up to a guinea, and another somewhat similar lot made 15/-. The interesting series of *Aplecta nebulosa*, chiefly bred from Delamere Forest, North Cornwall, Epping Forest, and Argyleshire, and including some fine

examples of var. *thompsoni*, were put up in six lots, and brought for the best 47/6, and for the other five from 35/- to 30/- per lot. The long series of *Pieris napi*, on which the late Mr. Harrison in conjunction with Mr. H. Main had expended so much time and attention in their experiments in crossing various local forms, were not included in the sale.—R. A.

DRAGONFLIES BRED IN 1912.—I have bred this year *Cordulegaster annulatus* (one), *Eschna cyanea*, *Libellula quadrimaculata*, *Ischnura elegans*, *Agrion puella*, *Pyrrhosoma nymphula*, *Erythronma naias*. I was able to watch the emergence of an *Eschna cyanea*, which took place about midnight. I noticed a nymph running up and down a stick in apparently great agitation. This was the prelude to emergence. The process, up to the expansion of the wings, took just an hour. The nymph of *C. annulatus* I had had in an aquarium over two years. It was, of course, in but an early stage of growth when I took it from Oberwater stream, in the New Forest, last June two years; but it was not so immature as to suggest that it would remain for more than two years in the nymph stage. The imago finally emerged towards the end of June in this year. I did not take its measurements when I first got it, but, roughly, I should say from memory, it was about a quarter grown. How long had it probably been in the nymph stage already? In all I suppose that stage must have lasted for some two years and a half, seeing that I had it more than twenty-four months. The nymph of this species seems to spend practically its whole life in the mud at the bottom (or in the banks), coming to the surface only occasionally—to change its skin, for instance. But though hidden from view, I have found these nymphs frequently only just below the surface; being near enough to the top to take a worm before it had begun to burrow. They are more deadly accurate in their “shooting” than any others; yet they appear generally to be very sluggish creatures, more so than other nymphs, such as *L. quadrimaculata*, which also live mainly in the mud; and in marked contrast to the liveliness of the *Eschna* nymphs, which go down into the mud only in quite cold weather. This, at least, has been my observation; I speak, of course, of those I have kept. I am puzzled at the extreme uncertainty of finding nymphs. You may “fish” in streams and ponds where dragonflies swarm every summer and hardly find a nymph; they will also be plentiful one season and very scarce the next in the same place. There are places, no doubt, where you can practically make certain of some species, such as *Eschna cyanea*, *Libellula quadrimaculata*, or, amongst the Zygopterids, *Agrion puella*. But even these constant inhabitants vary much in numbers from year to year. Others less common disappear entirely some years. I used to make certain of finding *Cordulia aenea* in the canal near Byfleet. For two or three seasons I have not seen one there; but I am not there more than two or three times in a year. I may have struck bad days. But nothing in this way surprised (and disappointed) me so much as a nymphing expedition to Wicken Fen in the first week of last May, which produced nothing but one or two of the commonest Zygopterids. I wanted especially to get the nymphs of *Brachytron*.

pratense, of which the imago is common in the fen. Maybe I did not go the right way to work. I have not time to take entomology as seriously as I should wish, but I should like to know where I went wrong.—HAROLD HODGE; 9, Highbury Place.

LEPIDOPTERA ATTRACTED TO LIGHT.—The following is a list of Lepidoptera taken at light last year in a room lit by two acetylene lights. The dates are the earliest on which each species was observed:—*Smerinthus populi* (two), May 13th and 22nd; *Euchelia jacobee*, May 13th; *Spilosoma mendica*, May 14th; *S. lubricipeda*, June 5th; *S. menthastris*, May 4th; *Hepialus lupulinus*, Aug. 20th; *Porthesia auriflua*, Aug. 7th; *Dasychira pudibunda*, May 4th; *Pecilocampa populi*, Nov. 18th; *Drepuna lacertinaria*, May 15th and Aug. 7th; *D. falcataria*, Aug. 14th; *D. binaria*, May 4th; *Cilix spinula*, May 4th and Aug. 7th; *Dicranura bifida*, June 17th; *Pterostoma palpina*, May 4th and Aug. 14th; *Lophopteryx camelina*, May 4th and Aug. 7th; *Notodonta dictaeoides*, Aug. 8th; *Clostera reclusa*, April 20th; *Diloba ceruleocephala*, Oct. 20th; *Acronycta psi*, May 4th; *Leucania lithargyria*, June 30th; *L. comma*, June 7th; *L. impura*, June 30th; *L. pallens*, June 30th; *Tapinostola fulva*, Sept. 16th; *Hydrécia nictitans*, Aug. 10th; *H. micacea*, Sept. 4th; *Arglia patris*, June 8th; *Xylophasia rurea*, May 30th; *X. lithoxylea*, June 8th; *X. monoglypha*, June 17th; *Neuronia popularis*, Aug. 27th; *Cerigo cytherea*, Aug. 10th; *Luperina cespitis*, Sept. 5th; *Mamestra sordida*, June 14th; *Apamea didyma*, Aug. 6th; *Miana strigilis*, June 7th; *M. fasciuncula*, May 30th; *Grammesia trigrammica*, May 22nd; *Caradrina morpheus*, June 7th; *C. blanda*, June 10th; *Rusina tenebrosa*, June 7th; *Agrotis puta*, Aug. 7th; *A. segetum*, July 6th; *A. exclamationis*, June 3rd; *A. corticea*, June 29th; *Noctua plecta*, June 17th; *N. festiva*, July 3rd; *N. rubi*, June 26th; *N. umbrosa*, Aug. 16th; *N. xanthographa*, Aug. 16th; *Triphæna ianthina*, Aug. 16th; *T. comes*, Aug. 30th; *T. pronuba*, June 30th; *Amphipyra tragopogonis*, July 29th; *Tenio-campa gothica*, April 10th; *Orthosia lota*, Sept. 28th; *Anchocelis pistacina*, Sept. 27th; *A. lunosa*, Sept. 4th; *Cerastis vacinii*, Oct. 21st; *C. spadicea*, Sept. 23rd; *Scopelosoma satellitia*, Nov. 1st; *Xanthia citrago*, Sept. 4th; *X. flavago*, Sept. 16th; *X. ferruginea*, Oct. 6th; *Calymnia diffinis*, July 10th; *Dianthecia capsineola*, May 30th; *Miselia oxyacanthæ*, Oct. 21st; *Hadena dentina*, May 20th; *Xylocampa lithoriza*, May 4th; *Cucullia umbratica*, June 17th; *Plusia chrysitis*, June 30th; *P. moneta*, June 19th; *P. gamma*, May 23rd; *Catocala nupta*, Sept. 14th; *Owapteryx sambucaria*, June 30th; *Epione apiciaria*, Aug. 14th; *Rumia luteolata*, May 6th; *Angerona prunaria*, July 7th; *Metrocampa margaritaria*, June 17th; *Eurymene dolobraria*, June 7th; *Pericallia syringaria*, July 5th; *Selenia bilunaria*, May 5th; *S. lunaria*, May 30th; *Odontopera bidentata*, May 3rd; *Crocallis elinguaris*, Aug. 14th; *Emmoms alniaria*, Aug. 15th; *E. erosaria*, Sept. 14th; *Himera pennaria*, Sept. 21st; *Hemcrophila abruptaria*, May 3rd; *Boarmia repandata*, June 17th; *B. gemmaria*, June 30th; *B. roboraria*, June 30th; *Tephrosia biundularia*, May 15th; *Geometra papilionaria*, July 10th; *Iodis lactearia*, June 17th; *Ephyra porata*, May 4th; *Acidalia scutulata*, July 2nd; *A. subsericeata*,

June 17th; *A. imitatoria*, June 16th; *A. aversata*, June 17th; *Timandra amatoria*, July 1st; *Cabera pusaria*, June 30th; *C. exanthemata*, May 30th; *Strenia clathrata*, July 10th; *Panagra petrarica*, May 30th; *Lomaspilis marginata*, June 17th; *Hybernia aurantiaria*, Nov. 10th; *H. defoliaria*, Nov. 8th; *Cheimatobia brumata*, Nov. 16th; *C. boreata*, Nov. 15th; *Eupithecia centaureata*, May 30th and Sept. 7th; *E. subfulvata*, July 11th; *E. castigata*, May 30th; *Lobophora sexualisata*, May 30th; *Melanthia ocellata*, Aug. 12th; *Melanippe fluctuata*, April 17th; *Anticlea derivata*, April 10th; *Coremia designata*, May 30th; *C. unidentaria*, May 6th; *Campptogramma bilineata*, Aug. 30th; *Phibalapteryx tersata*, June 7th; *Cidaria miata*, Oct. 4th; *C. russata*, Sept. 8th; *C. dotata*, June 17th; *Anaitis plagiata*, May 22nd.—H. C. JEDDERE FISHER; Apsleytown, East Grinstead.

HYBERNIA AURANTIARIA IN ISLE OF SKYE.—I took two fine specimens of *H. aurantiaria* at a lighted window here last month, and also a third, which I take to be a variety with ill-defined lines and considerable dark purplish speckling or clouding forming a band behind the second line.—(Rev.) ARTHUR S. HOOLE; Kyle House, Kyleakin, Isle of Skye, December 3rd, 1912.

CUCULLIA CHAMOMILLÆ EMERGING IN NOVEMBER.—I took some larvæ of *C. chamomillæ* in June, 1912, which pupated in July, and a perfect specimen emerged on Nov. 9th. The larvæ and the box containing the pupæ, although being kept in an outside frame under glass, have not had any artificial forcing, and as the box containing the pupæ was specially prepared with soil, &c., last season, there is no possible room for any doubt about the record. I cannot hear of any similar record previously, and perhaps it may prove of some interest to the readers of your Journal.—W. A. TYERMAN; Derby Villa, Ainsdale, Southport, November 19th, 1912.

NEMEOBIUS LUCINA EMERGING IN DECEMBER.—When looking in my pupa-cage yesterday (December 1st) I was very surprised to find that a fine dark specimen of *Nemeobius lucina* had emerged. Between forty and fifty pupæ have been kept practically out of doors; and there were two or three very cold frosty nights. This is surely a very unusual occurrence, but why only one out of so many?—R. G. BENTON; Cotswold, 52, Queen's Avenue, Muswell Hill, N.

ENNOMOS AUTUMNARIA AT LITTLEHAMPTON.—On August 25th I picked up on the pavement in Littlehampton a larva, which pupated a day or two later, and from which, on September 22nd, emerged a beautiful female *Ennomos autumnaria*.—W. GIFFORD NASH; Clavering House, Bedford.

TORTRIX PRONUBANA AT EALING.—On December 23rd last, Mr. H. Campion was good enough to give me a Tortrix his sister, Mrs. G. J. Ashby, had found resting on the outside of a window-pane, at 58, Ranelagh Road, Ealing, the previous Saturday. The specimen proved to be a fine female of *Tortrix pronubana*. It was alive in the morning of December 24th, but died sometime later that day.—RICHARD SOUTH.

THE ENTOMOLOGICAL CLUB.—A meeting was held on December 12th, 1912, at the Savage Club, Adelphi Terrace. Mr. H. Rowland-Brown in the chair. Other members present were Mr. R. Adkin, Mr. H. Donisthorpe, and Mr. Sich; and the other guests—Professor Selwyn Image, Dr. Karl Jordan, The Rev. George Wheeler, Hon. N. C. Rothschild, Mr. Bonshell, Mr. F. Gilliat, Mr. A. J. Jones (Hon. Member), and Mr. W. G. Sheldon. Mr. Sich proposed and Mr. Donisthorpe seconded that Professor Selwyn Image be nominated an Honorary Member of the Club. This was carried *nem. con.*

WE are informed that the "Verrall Supper," so successful last year, will again be held at the Holborn Restaurant during the present month.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*Wednesday, October 16th, 1912.*—The Rev. F. D. Morice, M.A., President, in the chair.—The President stated that in pursuance of a suggestion approved by the Council, he had written to most of the surviving ex-Presidents of the Society for their portraits, and had already received several. Thanks were voted to the donors.—The following were elected Fellows of the Society:—Mrs. Ellen M. Waterfield, The Hospital, Port Sudan; Messrs. Patrick Alfred Buxton, M.B.O.U., Fairhill, Tonbridge, and Trinity College, Cambridge; Alfred Noakes, The Hill, Witley, Surrey; Norman Denbigh Riley, 94, Drakefield Road, Upper Tooting, S.W., and British Museum (Natural History), S. Kensington, S.W.; and Henry S. Wallace, 17, Kingsley Place, Heaton-on-Tyne.—Mr. E. B. Ashby exhibited a case of *Rhopalocera* from the French, Swiss, and Italian Alps and from Britain.—Mr. B. Williams, a specimen of an unascertained species of the *Protura*. This order of primitive insects is chiefly remarkable for the absence of antennæ; they use their front pair of legs not as locomotive but as tactile organs, holding them out in front of the head when walking, as if to take the place of the missing antennæ. Various other instances of similar adaptation were mentioned.—Mr. W. J. Lucas, a specimen of *Somatochlora alpestris* from Porsanger Fjord; also a specimen of *Eschna carulea* (= *borealis*), from the same locality. They were captured by Mr. W. G. Sheldon.—Professor Poulton brought forward a note on behalf of the Rev. K. St. Aubyn Rogers, tending to show that occasional migration, due to excessive drought, is sometimes a cause of the spread of butterflies into new localities. He also brought forward a suggestion received from Mr. C. F. M. Swynnerton as to one of the causes which may have operated in the special development of mimicry in forest areas; it is that flying insects are often exceedingly difficult to recognize in forest as against veld. It is by no means easy to at once decide on the coloration of an insect seen flying in a blaze of light against a deep shadow or *vice versa*: also they so frequently disappear behind foliage after having been in view for a few seconds only. Under those circumstances a mere trick of

flight, or the smallest splash of colour in common, had often caused him to take the insect for something that is otherwise utterly unlike it, and such a hesitation would usually cost a bird the insect. He also exhibited, on behalf of Dr. R. C. L. Perkins a male of *Prosopis nubilosa*, Ckll. (Prosopidæ), and of a species of *Halictus* (Andrenidæ) captured by him in the Cairns district of North Queensland (July, 1904). Dr. Perkins had pointed out to the speaker the extremely interesting manner in which the resemblance between these species had been brought about, the hard glistening yellow mark on the black scutellum and post-scutellum of the *Prosopis* and that on its lateral prothoracic tubercles being mimicked by a yellow pubescence occupying the same positions in the *Halictus*. This had been previously noticed by Meyrick, probably in the female of the same species.—The Rev. G. Wheeler, two specimens of a new *Argynnus*, discovered in June last by Mr. Harold Powell, F.E.S., at Lambessa in Algeria. Mons. Oberthür named it *aurantiana*.—Dr. W. A. Lamborn, some cocoons formed by wild larvæ of *Norasuma kolga* under natural conditions, under leaves. They gave a good idea as to the mimicry of Braconid cocoons by the formation of little bosses of yellow silk.—Mr. Donisthorpe: (1) A small incipient colony of *Camponotus ligniperdus* taken at Yvorne, Switzerland. (2) Specimens of a Proctotrupid new to science, *Loxotropa donisthorpei*, Kieffer, taken in a nest of *Lasius flavus* at Blackgang Chine, Isle of Wight, September 9th, 1912. (3) A specimen of *Camponotus abdominalis* var. *atriceps*, Sndt., an American species which probably had come from the hotel at Weybridge, as he was told of the capture of other specimens there on his next visit.—Mr. L. W. Newman: (1) A long and varied series of the hybrid *Smerinthus ocellatus* ♂ × *Amorpha populi* ♀, bred September, 1912, out of doors, from pairing obtained June, 1912, the larvæ pupating in June and early August. (2) Living specimens of the hybrid *Zonosoma pendularia* ♂ × *omicronaria* ♀ (*annulata*). The specimens showed characters of both species well, and vary somewhat in the quantity of pink coloration. (3) A living male specimen of *Metrocampa margaritaria*, taken at rest in Bexley Woods, October 14th, 1912, which points to a second emergence of this species. (4) A male specimen of *S. ocellatus* bred out of doors on September 14th, from larvæ which pupated in June, 1912.—Mr. K. G. Blair, larvæ of two allied species of Malaeoderm from Borneo, brought by Mr. J. C. Moulton. The species to which these larvæ belong are not yet known, although probably belonging to the family Lycidæ.—Mr. H. M. Edelsten, specimens of *Nonagria dissoluta* and var. *arundineta* from East Kent, bred during August, 1912, 75 per cent. from this locality being *dissoluta*.—The following papers were read:—"Notes sur quelques espèces des *Lucanides* dans les Collections du British Museum et de l'Université de Oxford," par M. Henri Boileau, F.E.S. "Synoposematic Resemblance between Aeraïne Larvæ," by G. D. H. Carpenter, B.A., M.B., F.E.S.—GEORGE WHEELER, M.A., *Hon. Secretary*.

RECENT LITERATURE.

Annals of Tropical Medicine and Parasitology. Series T. M., vol. vi. No. 3, B. Liverpool, October, 1912.

THIS periodical is well up to its usual form. There is a note on crude carbolic acid as a larvicide. The chief insects referred to in the various papers are *Glossina palpalis* and *G. morsitans*; certain fleas; and some lice, human and other. Members of the medical profession should find this part specially interesting.

W. J. L.

The Large Larch Sawfly (Nematus erichsonii). By C. GORDON HEWITT, D.Sc. (Entomological Bulletin No. 5, Department of Agriculture, Division of Entomology.) Ottawa, 1912.

THIS is an exhaustive account (pp. 42), fully illustrated, of an insect-pest, British and Canadian, and will be found as useful to those who have to do with the larch in England as it will be to those who are concerned with it in Canada. It is, in fact, treated to a great extent as a British insect.

W. J. L.

Memoirs of the Department of Agriculture in India. Vol. iv. Nos. 1 and 2 (May and August, 1912).

IN No. 1 there is an exhaustive article on "Eri Silk," by H. Maxwell Lefroy, M.A., and C. C. Ghosh, B.A.

Eri silk, the product of the larva of *Attacus ricini*, Boisdu., cannot be reeled off from the cocoon in one thread, as in mulberry silk. In the eri cocoon the silk is spun in layers, and so arranged that the emerging moth can push its way through one end of the cocoon without doing any damage to the fibres; there is therefore no necessity to kill the imago.

No 2 contains a paper by Dr. J. L. Hancock on Tetriginæ (Aeridiinæ) in the Agricultural Research Institute, Pusa, Bihar, with descriptions of new species.

OBITUARY.

THOMAS BOYD, F.E.S.

ON February 5th last there passed away at his residence, Woodvale Lodge, South Norwood, the oldest Fellow of the Entomological Society save one—Lord Avebury. Thomas Boyd was born on August 8th, 1829 (the second son of William Clarke Boyd), in Ely Place, Holborn; his parents died when he was quite young, and eventually he went to live with an aunt at 17, Clapton Square, N.E., then on the edge of the country. There he developed a taste for natural history, and especially for entomology. As a young man he became an active lepidopterist, and he was elected a life member of the Entomological Society in 1852. During the next few years he

made many contributions to the entomological journals of the period, viz., the 'Entomologist's Companion,' the 'Weekly Intelligencer,' and the 'Entomologist's Annual.' He was the intimate friend of Stainton, and was thus led to pay special attention to the Mieros; for the patient study of these his quiet, painstaking nature, and his delicately clever fingers equipped him well; he loved to breed the tiny creatures, and to work out their life-histories for his friend, who was then preparing his great work upon the subject. Thanks to what Stainton calls his "untiring energy," Thomas Boyd was successful in adding eleven new species to the "British List" between 1853 and 1858, five of which were new to Science. The new species were:—

Gelechia ocellatella, Boyd; taken at the Lizard, Cornwall (Weekly Int. vol. iv. p. 143, and Ent. Ann. 1859, p. 151).

Glyphipteryx scharnicolella, Boyd = *fischeriella*, Zell.; bred from the Lizard (Weekly Int. vol. iv. p. 144, and Ent. Ann. 1859, p. 153).

Nepticula prunetorum, Sta.; bred from Loudwater, Bucks (Ent. Ann. 1855, p. 72, second edit.).

Nepticula atricollis, Sta.; bred (Ent. Ann. 1857, p. 112).

Nepticula luteella, Sta.; bred (Ent. Ann. 1857, p. 110, and 1866, p. 37).

And the species new to Britain:—

Diascemia ramburialis, Dup.; taken at Probus, Cornwall (Ent. Ann. 1859, p. 149, with fig.).

Platyptilia zetterstedtii, Zell.; taken at Lynmouth, Devon (Ent. Ann. 1856, p. 44).

Gelechia arundinetella, Sta.; bred from near Hackney (Weekly Int. vol. ii. p. 139, and Ent. Ann. 1858, p. 91).

Gelechia leucomelanella, Zell.; bred from the Lizard, Cornwall (Ent. Ann. 1859, p. 150).

Coleophora limosipennella, Fisch. & F. v. R.; bred (Ent. Comp. p. 133, and Ent. Ann. 1855, p. 67).

Nepticula arcuatella, H. S. = *N. arcuata*, Frey; bred (Ent. Ann. 1858, p. 97).

He also was the first to rear *Coleophora inflatæ*, Sta. (Ent. Ann. 1857, p. 105).

But Thomas Boyd was no narrow specialist; he took a broad view of Nature, the study of which was ever to him "the contemplative man's recreation"; in particular he was also a good field botanist, a conchologist, and a microscopist. And though he never wrote much, soon after the publication of the 'Origin of Species' in 1859, he felt compelled to champion Darwin's theories in an interesting article on the subject, which he contributed to the leading entomological journal of those days, the 'Weekly Intelligencer' (vol. ix. p. 149), because, he says, Darwin "has received such a scant measure of fair play in your pages."

Thomas Boyd married Sarah Harriette Stone (daughter of the Rev. William Stone, M.A.) in 1864, and leaves two sons and three daughters. About thirty years ago he handed over the best things in his collection of Lepidoptera, including the above-named types, to his cousin, the late William Christopher Boyd, of The Grange,

Waltham Cross (Ent. Mo. Mag. vol. xliii. p. 16), in whose cabinets they still remain.—W. G.

PETER CAMERON.

PETER CAMERON is dead, as was announced by most of the halfpenny papers on December 4th. What can we say of his life? Nothing; for it concerns us in no way. What shall we say of his work? Much; for it is entirely ours, and will go down to posterity as probably the most prolific and chaotic output of any individual for many years past. The analogy between his writings and those of Francis Walker is remarkable: both contained excellent, close and conscientious investigations in their earlier stages, and towards the last became the most obvious scourgings of a badly balanced mind. In the latter respect Walker was by far the more blameworthy, for he was a cultured gentleman, and could have no excuse for such lamentable deterioration, whereas in our subject's case one is simply left wondering at the multitudinous, though usually quite short, papers annually found beneath his name in the 'Zoological Record.' Probably his best work is that by which alone he will be known at home, his 'British Phytophagous Hymenoptera,' published by the Ray Society many years ago. But already in the Hymenopterous part of the 'Biologia of Central America' lapses are numerous; and, by the time that Hymenoptera Orientalia appeared, we see him to have quite given up any attempt at systematics, and ignoring all palæartic authors, of whom he never possessed an intimate acquaintance, he launches forth to erect a disjointed classification of his own. From first to last his ignorance of European literature was deplorable, and from one of his first papers upon exotic forms (Trans. Nat. Hist. Soc. Glasgow, 1883, p. 272, in which the abundant European *Ichneumon leucomelas* of Gmelin, 1790, is brought forward as new under the name *Amblyteles ludovicus*) to the last one published before his death (Proc. Linn. Soc. N.S. Wales, 1912, p. 187, in which the South European *Campoplex canescens* of Gravenhorst, 1829, is brought forward as new under the name *Amorphota ephestiae*) synonymy is rife. We trust the powers that he will acquire the hundred and twenty boxes said to have been found in his lodging, since types alone can, and that but slowly, rectify the chaos created.

CLAUDE MORLEY.

WITH much regret we have to announce the death, on November 29th last, of Monsieur GEORGES CÉLESTIN EDOUARD BRABANT, of Cambrai (Nord), in his sixty-fourth year. Although nearly all branches of natural history received his attention, he devoted himself largely to the collection and study of Lepidoptera; he published descriptions of new species, belonging to this order, from French Guinea, one of the many countries that he visited to acquire material and knowledge.

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THE ENTOMOLOGICAL SOCIETY, 11, BEDFORD SQUARE, LONDON, W.1.

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Photo D. P. Betts. Fig. 1.



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Photo J. Sinclair.

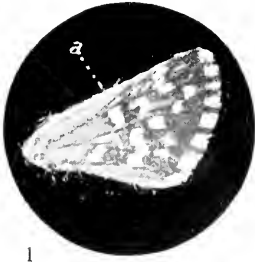
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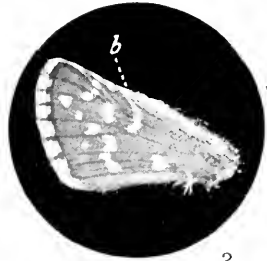
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ABERRATIONS OF BRITISH LEPIDOPTERA.



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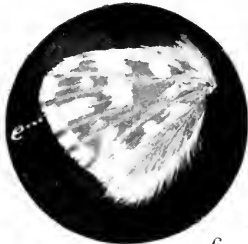
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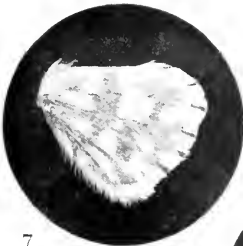
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Phototype, Sadag, Geneva.

West, Newman proc.

DISTINCTIVE WING CHARACTERS OF HESPERIIDÆ.

- | | | |
|-------------------------------|------------------------------|-----------------------------------|
| 1. <i>H. fritillum</i> , Hb. | 2. <i>H. alveus</i> , Hb. | 3. <i>H. armoricanus</i> , Obthr. |
| 4. <i>H. fritillum</i> , Hb. | 5. <i>H. onopordi</i> , Rbr. | 6. <i>H. carlineæ</i> , Rbr. |
| 7. <i>H. serratulæ</i> , Rbr. | 8. <i>H. carthami</i> , Hb. | 9. <i>H. alveus</i> , Hb. |

THE ENTOMOLOGIST

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[No. 597

FURTHER NOTES ON HESPERIID CLASSIFICATION.

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

(Concluded from p. 11.)

(PLATE III.)

WHEN I drew up my table of the genus *Hesperia* (p. 11, *antea*), I had not seen M. Charles Oberthür's contribution on the subject to the 'Feuilles des Jeunes Naturalistes' (December, 1912, pp. 169-170). So far as it concerns this particular group, I note that his conclusions take form and shape very much as I present my own. He maintains *H. alveus* var. *ryffclensis* as a separate species, and brackets *H. bellieri* with var. *foulquieri* as doubtful forms of the same species. But until we know more of the comparative life-histories, the imaginal habits, and the geographical distribution of the three it would be as well to keep them under the several head-species suggested. Meanwhile, M. Oberthür appeals to French naturalists to assist him with facts, and we may hope that he will be successful, though, judging from the paucity of notes on Lepidoptera in the 'Feuilles des Jeunes Naturalistes,' the number of workers, or at all events of those who communicate their views and observations on the subject, is not particularly encouraging. I venture, therefore, to supplement the appeal by a request to English entomologists resident in Switzerland to co-operate with our Swiss colleagues. Good life-histories of nearly all the Continental Hesperiidæ are a desideratum.

To resume the subject of the identification of the respective imagos of the genus *Hesperia*, I have the permission of Prof. J. L. Reverdin, Dr. Charles Blachier, and M. Marcel Rehfous to reproduce for the readers of the 'Entomologist' a plate recently published in the 'Bulletin de la Soc. Lépid. de Genève' (vol. ii. fasc. 3, pp. 171-172, July, 1912), which shows with admirable clearness the most important distinctive characters of the several species under review. I thank these gentlemen most heartily for their generosity, and congratulate them at the

same time upon the success which has attended their investigations. Further, I think that if ever there were a case where the advantage of M. Oberthür's contention in favour of priority in nomenclature by illustration were demonstrated, it is that of these Hesperiidæ. What endless speculations and tangles might have been avoided had the original authors presented their descriptions in each case, with an *accurate* figure showing the distinctive characters of their several species! The Brussels Congress was so far in agreement on the subject of nomenclature as to resolve that "it is desirable that descriptions be accompanied by figures." M. Oberthür, at Oxford, would have us go one step further. In the course of an eloquent speech on the subject, he said:—"Je demande que ce vœu soit complété comme suit; il paraît nécessaire pour empêcher la confusion de la Nomenclature que désormais chaque description d'Espèce soit accompagnée tout-à-moins d'une reproduction photographique, qui devra être publiée au plus tard un an après l'impression du texte de la description."

DISTINCTIVE WING CHARACTERS OF HESPERIIDÆ (Plate III.).

- ALVEUS.—Fore wing, upper side: Intradiscoidal spot concave towards the outer margin (fig. 2, *b*). Hind wing, under side: Prolongation of the anal angle: median band wide; internal edge of the band rectilinear; ground colour olive-yellow, slightly marbled, or unicolorous (fig. 9).
- CARLINE.—Hind wing, under side: Lengthening of the anterior border: extended white marginal rectangle in intraneural spaces 4 and 5 (fig. 6, *e*).
- FRITILLUM (= CIRSI, Rbr.).—Fore wing, upper side: Intradiscoidal spot rectilinear, and often thickened (*Delahaye's mark*, fig. 1, *a*). Hind wing, under side: Reddish, or olivaceous coloration strongly marbled, with deeper coloured spots; nervures very prominent and usually reddish; white spots with pearly reflections (fig. 4).
- ONOPORDI.—Hind wing, under side: Anvil-shaped spot in median band (fig. 5, *c*); hooked spot from outer margin (*Blachier's mark*, fig. 5, *d*).
- ARMORICANUS.—Hind wing, under side: Greyish or reddish tint, lightly marbled, and with deeper coloured spots; median band narrow; nervures clearly distinct (fig. 3).
- SERRATULÆ.—Hind wing, under side: Uniform greenish yellow; white spots very distinct in depth, and without edging or pearly reflection (fig. 7).
- CARTHAMI.—Hind wing, under side: White spots without pearly reflections, and surrounded by fine dark border (fig. 8).

CHIEF POINTS FOR DIFFERENTIATION OF SPECIES.

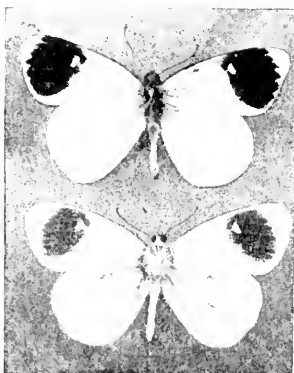
- | | | |
|----|---------------------------|--|
| 1. | <i>alveus</i> | } Pronounced prolongation anal angle hind wing. |
| | <i>armoricanus</i> | |
| | <i>carlinæ</i> | |
| | <i>onopordi</i> | } Less pronounced. |
| | <i>fritillum</i> | |
| | <i>serratulæ</i> | } No prolongation. |
| | <i>carthami</i> | |
| 2. | <i>alveus</i> | } Intradiscal spot, upper side fore wing, crescent-shaped. |
| | <i>carlinæ</i> | |
| | <i>onopordi</i> | |
| | <i>serratulæ</i> | |
| | <i>armoricanus</i> | |
| | <i>carthami</i> | } Rectilinear (<i>Delahaye's mark</i>). |
| | <i>fritillum</i> | |
| 3. | <i>alveus</i> | } Median band, hind wing under side, broad. |
| | <i>carthami</i> | |
| | <i>carlinæ</i> | } Median band narrow. |
| | <i>fritillum</i> | |
| | <i>onopordi</i> | |
| | <i>armoricanus</i> | |
| | <i>serratulæ</i> | |
| 4. | <i>armoricanus</i> | } Internal edge of spot in space 4 5 of the median band, under side hind wing, rectilinear. (Occasional exceptions in <i>alveus</i> and <i>serratulæ</i> .) ₂ |
| | <i>serratulæ</i> | |
| | <i>alveus</i> | } Variable. |
| | <i>fritillum</i> | |
| | <i>carlinæ</i> | } Never rectilinear. |
| | <i>onopordi</i> | |
| | <i>carthami</i> | |
| 5. | <i>alveus</i> (pro parte) | } Under side hind wing, unicolorous. |
| | <i>serratulæ</i> | |
| | <i>fritillum</i> | } Marbled. |
| | <i>carlinæ</i> | |
| | <i>onopordi</i> | |
| | <i>armoricanus</i> | |
| | <i>carthami</i> | |
| | <i>alveus</i> (pro parte) | } Slightly marbled. |
| 6. | <i>fritillum</i> | } Nervures, under side hind wing, very distinct. |
| | <i>carlinæ</i> | |
| | <i>onopordi</i> | } Rather distinct. |
| | <i>armoricanus</i> | |
| | <i>alveus</i> | } Hardly, or at all. |
| | <i>serratulæ</i> | |
| | <i>carthami</i> | |

It will be observed that I have not included, nor do the authors of the papers cited include, the species *Hesperia bellieri*, Obthr., but I understand that there is now material in hand to go to work in the same methodical manner, and that the characteristics of this new-old Hesperiid will be published later.

Harrow Weald: January 4th, 1913.

SOME ABERRATIONS OF BRITISH LEPIDOPTERA.

EUCHLOË CARDAMINES.



THE above curious aberration of *Euchloë cardamines* was taken at Cock Clarks, a village near Danbury, Essex, on June 5th, 1911. It differs from the type by the complete absence of black scales, including the powdering at the base of the fore wings and the typical discal spot. The green mottling on the under side of the hind wings is only just traceable, giving place to yellow. The size is quite normal. With the exception of a small piece out of the hind wing the specimen is quite perfect.

L. C. HOCKING.

6, Royal Mint, Tower Hill, E.

PARARGE MEGÆRA.

(PLATE IV., FIG. 4.)

THE butterfly figured is a somewhat uncommon aberration of female *P. megæra*, taken by myself at Aldbury, near Tring, on August 5th, 1907.

The interesting point about the insect is the large number of ocellated spots on the fore wings. It will be noticed that the

usual eye-spot near the apical angle is distinct and well-marked, and just below it is a smaller spot which shows a tendency to coalesce; while nearer the apex is the small spot which is frequently met with in normal specimens. A fourth well-defined spot lies below the two coalesced spots, and below this lies a dot, which does not show in the photograph. On the under side the four above-mentioned eye-marks are present, while the hind wings present quite a normal appearance both on the upper and under sides. It may be interesting to note that in the allied Continental species, *S. mæra*, the eye-spot on the fore wings has generally two white pupils.

Tutt ('British Butterflies,' p. 393) mentions another aberration, as follows: "On the hind wings there are usually four ocellated spots, sometimes, however, only three, but in one female specimen that we have the spot nearest the anal angle is double, and there are two small spots in the upper fulvous patches of the series, making a total of seven."

D. P. BETTS.

13, First Avenue, Hoe Street, Walthamstow.

PLUSIA MONETA.

(PLATE IV., FIGS. 1, 2, aberration; FIG. 3, typical.)

ABERRATIONS of *P. moneta* are so extremely rare that it may be well to figure those of which I enclose photographs in the 'Entomologist.' As will be seen, there is a general darkening of the ground colour compared with that of typical specimens, but the striking feature of the aberration is the very remarkable wedge-shaped *black* spots in the marginal area.

These specimens were two of twenty-six reared from larvae collected in a garden at Boxmoor, Herts, this year, and they emerged within twenty-four hours of one another.

Mr. Prout tells me that, as far as he knows, this form of aberration has not been known before.

G. H. HEATH.

277, Brockley Road, S.E.

VENILIA MACULATA.

(PLATE IV., FIG. 5.)

I SEND you herewith a photograph of a remarkable aberration of *Venilia maculata*. I caught the moth in Pamber Forest, near Reading, on June 1st, 1905, but the opportunity of having it well photographed did not occur till I was fortunate enough to meet Mr. H. Main down here this summer. Mr. Main, with great courtesy and kindness, expended his well-known skill in taking the photograph which is here reproduced.

The specimen is a female in perfect condition. The entire fore wing, save the hind margin, is suffused with a golden green, rather more golden in colour than the dark spots on the type specimens. The hind wing is slightly darker in colour and the gold dusting is less apparent. On the hind margin of each is just a trace of the ordinary light yellow markings; they appear well on the fore wings in the figure. Without those traces I should have hesitated in finding a name for the moth, which is extremely beautiful.

Fig. 6 represents a typical example of the species.

J. S. CARTER.

Warren Hill Cottage, Eastbourne.

ACIDALIA VIRGULARIA.

(PLATE IV., FIG 7, melanic form; FIG. 8, grey form. $\times 2$.)

In September, 1911, I had the good fortune to capture a melanic specimen of *Acidalia virgularia*, at rest on a fence in one of the south-east suburbs of London. Fortunately the specimen, though unusually small, was a female, and a few ova were obtained. The larvæ were successfully wintered, and twenty-three perfect (and one crippled) specimens emerged at the end of May, 1912.

The grey specimens of this melanic race are perfectly distinct from the melanic forms, and none of those reared so far can properly be called intermediates. There is, however, a stronger or weaker tendency to develop a dark suffusion towards the margin of both wings, giving the outer band the appearance of frosted silver, very different from the usual London type. In other words, the grey forms of this race suggest that the influence of the melanic strain is producing a suffusion of dark scales along the outer border of both wings.

The upper wing area of the melanic specimen is entirely suffused with these dark scales, with the exception of a small but slightly variable area surrounding the dark discoidal spots. The extreme edges of the wings and fringes appear to be white, but of course they show up more vividly than in the type form, owing to contrast.

The spaces between the eyes and the front of the thorax are white, as well as a basal spot on each wing.

The anal tufts and a narrow fringe of scales at the junction of the abdominal segments remain white, but the ventral area of the abdomen is distinctly affected by the melanism, whereas the legs are not noticeably darkened.

The black scaling would produce as black a moth as var. *doubledayaria* of *Pachys betularia* were it not that the wings are

more delicate, and that the scales on the under surface are not black but only slightly darker than in the type-form, producing a greasy effect.

Mr. Prout tells me that this form, though generally less extreme, is known on the Continent as var. *bischoffaria*.

R. T. BAUMANN.

108, Station Road, Chingford, Essex.

[Melanic specimens of *Acidalia marginepunctata* and *A. subsericeata* are figured in the 'Entomologist,' vol. xl. p. i.—ED.]

NEUROPTERA, &c., FROM THE SOUTH OF FRANCE.

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

DR. T. A. CHAPMAN, with his usual kindness, handed over to me a small collection of interesting insects which he took in the South of France in June and July last. No fewer than five Natural Orders are represented by the twenty-three species contained in the collection. For assistance in the identification I have to thank Mr. K. J. Morton and Rev. A. E. Eaton. The insects are:—

Plecoptera.

**Perla cephalotes*. Courmayeur, June 21st–July 8th.

Dictyopteryx alpina. Val d'Isère, July 10th–24th, and Courmayeur.

**Nemoura variegata*. Courmayeur.

**N. inconspicua*. Val d'Isère.

Ephemeroptera.

**Ecdyurus venosus*. A female imago; Brides-les-Bains, June 8th–15th.

Odonata (Paraneuroptera).

**Sympetrum fonscolombii*. Two females; Val d'Isère.

**Orthetrum cærulescens*. One female; Brides-les-Bains.

Neuroptera.

Myrmeleon formicarius. Two; Brides-les-Bains and Courmayeur.

Raphidia flavipes. Two; Courmayeur. Wings not quite typical.

**Hemerobius quadrifasciatus*. Two; Courmayeur.

**Chrysopa perla*. Four; Courmayeur.

Panorpa communis var. *vulgaris*. One male and five females; Courmayeur. Though there was but one male, all apparently should be referred to this species and variety.

Trichoptera.

Drusus muelleri. Male and female; Val d'Isère.

D. melanchætes. Male; Val d'Isère.

D. discolor. Male; Val d'Isère.

- Sericostoma pedemontanum*. Courmayeur.
 **Bercea maurus*. Female; Courmayeur.
 **Hydropsyche pellucidula*. Female; Brides-les-Bains.
 **H. fulvipes*. Female; Brides-les-Bains.
Philopotamus ludificatus. Courmayeur and Brides-les-Bains.
Rhyacophila torrentium. Two males and two females; Val
 d'Isère and Brides-les-Bains.
R. vulgaris. A male; Courmayeur.
R. tristis. A female; Courmayeur.
 Those with an asterisk (*) are found in the British Isles also.
 Kingston-on-Thames: January, 1913.

DIAGNOSES OF SOME AMERICAN ACRÆINÆ.

BY DR. K. JORDAN.

1. *Actinote cressia leptogramma*, subsp. nov. .

- ♂. Alarum anticarum triente vel dimidio apicali nigro fascia maculari aurantiaca notato; alis posticis nigro marginatis.
 ♀. Alis anticis ad basin nigro suffusis; posticis totis nigris.
Hab. Baños, Pastaza, Ecuador.

2. *Actinote desmiala*, sp. nov.

- ♂. Alis anticis nigris, macula magna basali et fascia discali aurantiacis; posticis nigris fascia media aurantiaca antice dilutiore.
Hab. Archidona, Ecuador. Male in Mus. Brit.

3. *Actinote diceus flavibasis*, subsp. nov.

- ♂ ♀. Alis posticis subtus ad basin flavis.
Hab. Eastern Cordillera of Colombia.

4. *Actinote leontine bulis*, subsp. nov.

- ♂. Alis anticis macula cellulari nigra et fascia discali ochraceo-flava; posticis margine exteriori nigro angusto postice tenuissimo. Anticis subtus ad apicem luteo-griseis nigro striatis.
Hab. Zamora and Loja, South-eastern Ecuador (O. T. Baron).

5. *Actinote stratonice æreta*, subsp. nov.

- ♂. Alarum anticarum macula nigra disco-cellularis magna cum margine costali nigra conflua. Posticarum prona facies a basi fere ad medium aurantio-rufo striata, striis in cellula pallidioribus.
Hab. Zamora, South-eastern Ecuador (O. T. Baron).

6. *Actinote alalia conspicua*, subsp. nov.

- ♂. Subspecies major, saturatius colorata, fascia discali alarum anticarum atque margine posticarum nigris latis; alis posticis subtus omnino fulvo-aurantiacis nigro striatis.
Hab. Rio de Janeiro.

7. *Actinote cedestis*, spec. nov.

♂ ♀. Speciei *anteas* dictæ affinis, subtus ut in hac specie absque serie setarum in alarum posticarum cellula; maculis alarum anticarum pallidius stramineis; alis posticis in disco plus minusve fulvis aut totis stramineis, margine sat lato nigro.

Hab. Zamora, South-eastern Ecuador (O. T. Baron).

8. *Actinote crassinia eupelia*, subsp. nov.

♂ ♀. Pallidior quam *A. c. crassinia* et *terpsinoë*, alis posticis fortius nigro striatis; anticis subtus ad apicem colore grisco-luteo alarum posticarum.

Hab. Province Sara, Dept. Santa Cruz de la Sierra, East Bolivia, March-April, 1904 (J. Steinbach).

9. *Actinote parapheles*, spec. nov.

♂ ♀. *A. pyrrehæ* affinis, sed area fulvo-aurantiaca basali alarum anticarum bene expressa, haud obsolescente.

Hab. Rio de Janeiro (E. May).

Ab *A. anteante* differt cellula alarum posticarum subtus semper serie setarum instructa.

10. *Actinote pellenæ crucis*, subsp. nov.

♂ ♀. Signaturis bene expressis, area basali fulvo-aurantiaca alarum anticarum magna antice et extus plus minusve straminea, fascia subapicali quoque straminea.

Hab. Dept. Santa Cruz de la Sierra, Eastern Bolivia (J. Steinbach).

11. *Actinote pellenæ calymma*, subsp. nov.

♂ ♀. Signaturis plus minusve diffusis, arearum nigrarum colore minus saturato quam in *pellenæ* et *cruce*.

Hab. Sapucay, Paraguay (W. Foster).

12. *Actinote perisa*, spec. nov.

♂ ♀. Alis omnino luteis, marginibus angustissime fuscis; anticis macula cellulari et utrisque alis fascia discali nigris notatis, his signaturis ut in *A. surima* positis sed angustioribus.

Hab. Tucuman (J. Steinbach).

All these forms will be figured and more fully dealt with in vol. v. of Seitz's 'Macro-Lepidoptera.' As I should like to include these forms in Wagner's Cat. Lep., subf. Acræinæ, which will probably be issued prior to the fascicles of Seitz's vol. v. containing *Actinote*, the publication of the above short diagnoses is necessary in order to avoid *nomina indeskripta*.

SOME ORIENTAL BEES.

By T. D. A. COCKERELL.

Halictus (Evyteus) kandiensis, sp. n.

♀. Length about or a little over 6 mm., anterior wing slightly over 5 mm.; pure black, the scanty and short hair of head and thorax dull white; head broad-oval, face narrowed below, vertex and cheeks normal, but ocelli remote from eyes; scape long, flagellum very dark brownish beneath; front dull, supraclypeal area and clypeus moderately shining, clypeus produced; mesothorax dullish and granular, but shining at sides; scutellum shining; postscutellum densely tomentose basally; area of metathorax large, covered all over with very fine longitudinal striæ, producing a file-like effect; posterior truncation rather small, its margins above the middle rounded; tegulæ shining dark reddish; wings strongly dusky, reddish, stigma and nervures piceous, stigma large, first r. n. meeting second t. c.; hind spur with a few long teeth; abdomen shining, slightly granular, but a lens shows no punctures; second and third segments with narrow white basal bands, feeble in the middle, but not much broadened at sides; second to fourth segments, except in middle, with thin inconspicuous apical hair-bands; apical margins of segments faintly brownish. Microscopical characters: clypeus minutely roughened, with sparse piliferous punctures; front minutely rugulose, with excessively minute well separated punctures; mesothorax very feebly sculptured, minutely tessellate, with scattered minute punctures; area of metathorax quite dull, the minute striæ (more properly raised lines) very regular; abdomen finely transversely lineolate.

Hab. Kandy, Ceylon, February, 1910 (*E. Comber*). British Museum.

Runs in Bingham's tables (*Fauna Brit. India*) to the vicinity of *H. timidus* (which has a rufo-testaceous abdomen) and *H. gutturosus* (which has a small, rugose, metathoracic area, and clear wings). It is also to be compared with *H. torridus*, Cam., which has clear hyaline wings, with pale nervures. The sculpture of the metathorax suggests *H. ceylonicus*, Cam., which, however, is larger, and has brassy tints.

Allodape picitarsis, Cameron.

Bingham does not record *Allodape* from Ceylon, but Mr. Comber took a female of this genus at Sigiri in that island, March, 1910. It is *A. picitarsis*, described from the Leccadive Islands, as I have determined by means of a cotype of Cameron's species in my collection.

Tetraloniella calidula, sp. n.

♂. Length about 11 mm.; flagellum 8 or almost; anterior wing $7\frac{1}{4}$; black, covered with light fulvo-ochraceous hair, nowhere mixed with black, but ferruginous on inner side of basitarsi; clypeus entirely lemon-yellow, densely rugoso-punctate; labrum yellow; mandibles ferruginous apically, basally black with a very large triangular yellow

patch; malar space a mere line; eyes pale ochraceous; facial quad-angle higher than broad; scape black, reddish apically; flagellum entirely bright ferruginous; third antennal joint about as long as its apical width; mesothorax densely punctured; thorax above, especially the scutellum, with dense hair; tegulae pale ferruginous with a dusky basal spot, their surface covered with short reddish hair; wings rather short, dusky, the basal half evidently reddish, stigma and nervures ferruginous; first r. n. joining second s. m. near end; legs black, densely clothed with ochraceous hair, apical joints of tarsi red; abdomen robust, densely clothed with felt-like fulvo-ochraceous hair; first segment with the usual long hair, but apical part broadly clothed with very short appressed hair, having in some lights a darker, yellowish-brown colour; apical margin of second segment with the same brown colour, but very narrowly; apical plate broad, truncate; fifth and sixth segments with lateral spines, which are not conspicuous.

Hab. Andheri, Salsette, India, Sept. 13th, 1908 (N. B. K.). British Museum. I have not ventured to extract the mouth-parts of the unique type, but the reference to *Tetraloniella* seems safe. The species is nearest to *T. punctata* (Cam.), differing by the larger size, and having the abdomen entirely covered with fulvo-ochraceous hair. The insect reminds one of some of the American species of *Xenoglossodes*, although differing much in detail. The marginal cell is shorter and more obtuse apically than in *Xenoglossodes*.

Nomia nursei, Cameron.

A male collected by Mr. Comber is labelled "Secdbd.," which I take to mean Secunderabad, India.

Nomia parciformis, sp. n.

♂. Length about 8 mm., anterior wing a rather scant 7; black, the head and thorax with rather coarse yellowish-white hair, the dense hair of the face distinctly yellowish; head broad; mandibles rather stout and not especially long, reddish about the middle; front striate; vertex rugulose; scape black, minutely roughened; flagellum long, lively ferruginous beneath; third and fourth antennal joints equal; mesothorax with very fine and close punctures, but shining between; scutellum more shining, the punctures not so close; basal area of metathorax with delicate longitudinal rugæ; postscutellum densely covered with dull white hair; tegulae translucent reddish-testaceous, not enlarged; wings long, reddish hyaline, stigma and nervures ferruginous; second s. m. very small, a little higher than wide, receiving first r. n. beyond the middle; femora black with the knees red, hind femora slender and simple; tibiae red, the middle and especially hind pair broadly suffused with black; hind tibiae simple, the outer side dark, with a bright chestnut-red apical patch, the anterior margin bulging a little before the apex, but without the distinct angle seen in *N. parca*, Kohl; tarsi long, clear ferruginous, the hind basitarsi yellowish-white; abdomen rather broad, inclined to be subclavate, but the basal segment a little broader than long; surface

of abdomen shining, somewhat sericeous, the first segment with evident but excessively minute punctures; hind margins of segments broadly translucent reddish, covered by dense white hair-bands, which in the type are largely abraded in the middle; fourth ventral segment remarkable for a covering of fine tomentum, which in the middle is orange-fulvous; apex of abdomen beneath with fulvous hair.

Hab. Nasik, India (*E. Comber*). British Museum. A species of the group of *N. parca*, Kohl, allied to the Indian *N. parcella*, Ckll., and *halictura*, Ckll. From *parcella* it is known by the larger size, and details of the legs and wings. It cannot well be the undescribed male of *N. halictura*, owing to the differences in venation, &c.; or, at least, the differences are such that it seems quite unsafe to assign it to *halictura*. In Bingham's tables it falls near *N. rustica*, Westwood, which has subtriangular hind tibiæ.

Nomia leucoptera, sp. n.

♀. Length 7 mm., anterior wing about $6\frac{1}{2}$; head and thorax black (metathorax behind, and metapleura, reddish) with greyish-white hair, the fringe on lower edge of clypeus shining and golden-tinted; abdomen rufo-fuscous; tegulæ small, translucent testaceous; wings clear, iridescent, almost milky; the large stigma and the nervures pale testaceous; legs pale brownish-testaceous, with glittering hair. Head large, transversely oval, facial quadrangle very much broader than long, eyes small, cheeks broad; mandibles long, brown in middle; clypeus and front shining, the sides of front obscurely striate; the microscope shows only piliferous punctures on front and face: sides of vertex shining, with minute punctures; scape long, curved, dark brown, fulvous at base; flagellum clear ferruginous beneath, dusky above; mesothorax shining, with sparse extremely minute punctures; scutellum smooth and shining; postscutellum covered with white felt-like hair; area of metathorax scarcely defined, very narrow at sides, with slight indications of ridges; second s. m. square, receiving first r. n. in middle; third s. m. not nearly as long as first; hair on inner side of hind tarsi light golden; abdomen shining, with extremely minute widely separated punctures, the hind margins of segments testaceous, and with thin white hair-bands, obsolete on the first, except at extreme sides, interrupted on the second; middle of apical segment with appressed golden hair.

Hab. Karachi, India (*E. Comber*). British Museum. This looks like another member of the *parca* group, but it differs greatly from *parciformis* by its clear wings and much shorter third submarginal cell. From *N. parcella*, Ckll., it is readily known by the much broader face and paler legs.

Andrena nursei, n. n.

Andrena halictoides, Nurse, Jun., Bombay Nat. Hist. Soc. xv. p. 566 (not of Smith)—Peshin.

FURTHER NOTES ON *METRIOPTERA ROESELII*
[ORTHOPTERA].

BY HERBERT CAMPION.

BRITISH records of *Metrioptera roeselii*, Hagenb., are multiplying rapidly. Since the publication of my remarks in the last volume of this magazine (p. 117), the species has been made known from the North Essex coast (*l. c.* p. 207) and from near Gravesend (p. 224). In addition to these and the other known localities, there are two new ones on the south coast of Essex, where the insect was met with during 1912 by my friend Mr. A. Luvoni, of Westcliff. At one of the new localities it was first noticed on July 21st, when it occurred in some numbers in a place covered with rank vegetation. The captures made on that occasion, which I have seen, included imagines of both sexes, although most of the females were still nymphs. Thereafter, specimens continued to be taken, at intervals, until September 22nd, when the last were obtained. July 21st is the earliest and September 22nd is the latest of the exactly dated records for imagines with which I am acquainted. Two males procured on the last-named date survived in captivity until September 28th and October 12th respectively. At the second of the new Essex habitats, which is well removed from the first, two females were taken on July 24th. Notwithstanding the fact that imagines were met with some time before the end of July, a female nymph was taken at Herne Bay so late in the summer as August 28th.

It will be observed that the new localities which have been discovered recently are all of them situated, like those previously known with certainty, either at the mouth of the Thames or on the East Coast south of the Humber. On the Continent of Europe, however, the species is not a littoral one, and its distribution is very general. Dr. Malcolm Burr is kind enough to write (*in litt.*):—"It usually occurs in grassy meadows. I have taken it in Bosnia, in the mountains of Heregovina, in the Park of Fontainebleand, and at Tübingen in Württemberg, and I have specimens from 6000 ft. in the Caucasus, from the Vosges, and the Carpathians. It occurs practically throughout France, and perhaps crosses the frontier into the Spanish Pyrenees. It occurs as far north as Sweden, and at least as far east as the Urals."

Early in September last Mr. George T. Porritt visited Mr. Wallis Kew's old locality on the Lincolnshire coast, and found the species plentiful there. I learn, through Mr. Porritt's courtesy, that he did not observe a single specimen, of either sex, having the colour of the prothoracic border otherwise than bright grass green.

At the end of August I was fortunately able to renew my own

acquaintance with *M. roeseli* in a state of nature. A visit to a locality near Herne Bay where it occurred many years ago—a slope overgrown with thistle, ragwort, and other plants—resulted in my detecting a few specimens, although the finding and taking of them was a matter of some difficulty.

The coloration of the male seems to be more constant than that of the female, and I have not seen a specimen having the hind femora otherwise than light brown. The most variable characters are the pleural and abdominal spots and the prothoracic border, which may be either bright grass green or bright yellow, or even some intermediate colour. In some specimens the pale brown summit of the head has a median longitudinal line of lighter colour, which may continue across the pronotum, bordered on each side with black.

A note was kept of the coloration of a female taken at Herne Bay on August 28th, which it may be useful to quote here, although, as will appear subsequently, the description did not apply, in several of its details, to other females which were examined in the living state:—

Face dark green. Palpi greenish. Eyes dark chestnut; a large black spot above each, crossed by a narrow line of yellowish running backwards from the eye. Antennæ chestnut. Upper surface of head and prothorax light brown, with a yellowish median longitudinal line, bordered on each side with black. Lateral lobes of prothorax black, edged all round with bright grass green. Elytra light brown, with the principal longitudinal veins black. Three large green spots on each side of the thorax. Tibiæ of the fore and mid-legs greenish. Femora of the fore and mid-legs, and the whole of the hind legs, light brown. External surface of the hind femur with numerous stout transverse black lines. Abdomen above and anal appendages light brown; sides of abdomen greenish; a row of greenish-yellow markings along each side of the abdomen; ventral surface light brown. Ovipositor mostly black.

In some of the adult females which I have seen alive, however, bright green has been very conspicuous in their coloration, especially as regards the femora of the hind legs, whereas in others the preponderating colour has been light brown.

At various times during August and September I succeeded in keeping two males and four females alive in captivity for periods ranging from six to twenty days. All, or nearly all, these specimens underwent a certain amount of change in their coloration, the green of the prothoracic border and of the lateral spots on the thorax and abdomen tending to become yellow, especially in the male, and the greenness of the fore and mid-legs giving place to light brown. In the two Essex males taken on September 22nd the colour of the border, at the time of

capture, was lemon-green. By the time one of them died, six days later, the border had become decidedly yellowish; in the case of the other male, which lived two weeks longer, practically all trace of green disappeared before death. In all instances the transition from green to yellowish began at the posterior margin of the border, and proceeded from behind forwards.

As throwing some light upon the direction taken by colour-development during the process of growth, I may mention that the female nymph obtained at Herne Bay on August 28th was very green indeed, and the green colour on the prothoracic lobe was not only present on the border, but invaded a considerable area of the lobe itself; moreover, the black in the same region was not at all intense or clearly marked off from the green portion. The venter is another region of the body that is subject to considerable variation in respect of colour. In some specimens it is light brown, while in other examples it is golden or light yellow.

All the living specimens which I have had under observation in captivity were enclosed in a large dry fish-globe kept indoors, and it is probable that, if they had been constantly exposed to the light as in a state of nature, the assumption of the fully adult coloration would have been more rapid and more complete. Again, it is not unlikely that the greenness of so many of the individuals taken in 1912 may have been due to the sunless weather which prevailed towards the close of the summer, and also to the circumstance that, during the same period, grass and other vegetation was kept particularly green by the constant rains.

Like Mr. South's Essex male of 1911, all the specimens which were kept alive were fed upon fresh grass, from which they ate readily until it became at all dry. In the evening of September 30th it was noticed that the last female then remaining was moribund or even already dead, but it was not removed at that time. The next morning it was unquestionably dead, and the femora of both hind legs had been partially eaten away, no doubt by the male which was still surviving. When at last the female was removed, it was seen that all the tarsi of the fore and mid-legs had been nibbled away. Similarly, the tarsi of both mid-legs had been eaten by other individuals in the case of a male found dead in the fish-globe on September 28th. That these insects do not mutilate themselves in their last moments is shown by the fact that such individuals as ended their lives in solitude suffered no damage of this kind. It is worthy of note, however, that all the specimens which died in captivity, whether kept with others or not, had their antennæ more or less broken. I have previously recorded instances of cannibalistic feeding on the part of *M. brachyptera*, and it now appears that the same habit is shared by *M. roeselii* also.

I could not discover that oviposition took place in the case of any of the females which I kept in captivity, notwithstanding the fact that one of them was actually observed to pair with a male. Two from Herne Bay were enclosed, either in glass-bottomed boxes, or in the dry fish-globe with grass scattered over the floor. At a later date two Essex females were kept, together with two Essex males, in the same globe after the floor had been covered with an inch or two of dry earth, upon which fresh grass was thrown day by day. At the proper time both the grass and the earth were carefully examined for eggs, but none could be found. One of the captive females was cut open after death, and upwards of a dozen eggs were taken from the abdomen. They were warm brown, elliptical bodies, with a smooth surface, and measuring about 4 mm. in length and 1 mm. in width. An egg-mass extracted by Mr. Luvoni from an Essex female taken on August 18th included several quite colourless eggs, as well as a few brown ones.

In conclusion, I must tender my best thanks to Mr. Luvoni for his readiness in collecting and supplying me with the material upon which much of the present paper is based.

58, Ranelagh Road, Ealing, W.

HIBERNATION OF PYRAMEIS ATALANTA.

By F. W. FROHAWK, M.B.O.U., F.E.S.

HITHERTO there appears to be no authentic instance on record of *P. atalanta* having been found in a state of hibernation in this country; it is, therefore, now a generally recognised belief that this butterfly, like its near ally, *P. cardui*, does not hibernate in the British Isles. But I am now able to place on record for the first time sufficient reliable evidence to prove that *P. atalanta* occasionally does successfully hibernate in Britain.

For the following very interesting facts I am greatly indebted to Captain E. B. Purefoy in supplying me with full data and details, of not only his own observations concerning the hibernation of *atalanta*, but also the most interesting facts of the observations made by Mr. Walter Barnes of Orpington, Kent. I may mention that Mr. Barnes is an experienced entomologist, therefore I give the facts as stated by him in his letter on the subject:—

“Three cases of apparent hibernation have come under my observation. The first and most interesting case is that in which one *atalanta*, two *io*, and two *urticæ*, were discovered quite accidentally by myself.

“In cutting back a rose tree which covered the side of the

house, one Saturday afternoon in February, 1907, two or three slates had become loose, and were hanging partly over the gutter; these I removed, and there were the butterflies in various positions clinging to the woodwork under the slates. *Atalanta* was in a horizontal position, the head only slightly lower than the body, the upper wings nearly covered by the lower pair. From the difficulty in removing it, I should imagine the hooklets and spines were both firmly embedded in the tiny interstices of the wood. The insect showed no signs of movement until it had been in a warm room for some time, when, after a considerable amount of vibration, it flew about the room. For some days it fed freely off moistened sugar, but died before the spring.

"(2) A gardener trimming a thick holly hedge near by in January, brought to me a holly branch on which were two sleeping *G. rhamni*, both males. The hedge was a very old one, and the dead leaves had accumulated in a thick mass through the middle, forming a rainproof covering to the lower portions, from which the *rhamni* were taken. The day following the gardener called me to look at another kind of butterfly in the same hedge. This turned out to be a very fine female *atalanta*, fixed head downwards on a dead leaf under the thick covering already mentioned. At the same time I found a female *rhamni* also attached to a dead leaf, which it very closely resembled. The last time I saw *atalanta* at rest was under the eaves of my house in early November, 1908. A week later when I went to examine it, I found only three wings, the insect had evidently been devoured. All three *atalanta* were females, and the position taken up was different in each case."

The following notes are from Captain Purefoy's observations, with which he has been good enough to supply me.

"The summer and autumn of 1908 were chiefly devoted by us to experimenting with this insect (*atalanta*). Most of October was very warm, and *atalanta* had fine opportunities of feeding up. When the weather turned cold certainly a number of the insects became quite torpid while clinging to bark, which they greatly resembled. They remained very exposed, but not more so than *C. album*. Both at Christmas and in January, and again in March, they met with terrible weather. Twice the whole roof nearly collapsed under the weight of snow, and the temperature dropped to zero. But for the exceptional cold I am sure that at least a dozen insects would have survived our long winter. We started with about a hundred. As it was, two beauties were seen flying strongly in February, and three others actually survived the whole winter. They worked out their own salvation.

"The female *atalanta* is the strongest and most vigorous butterfly I know, and, although our winter climate is unsuited to the species, I am sure that an occasional female does survive.

Very likely these females have paired. It is difficult to prove. The male has not much staying power."

Captain Purefoy also tells me that the *atalanta* under his notice, which were flying about in his garden, declined to use the shelters provided for the hibernating butterflies, but remained throughout the winter quite in the open. After feeding till the end of October, they settled down for hibernation under the water shoots, or under the stouter limbs of trees. When clinging close to the bark of an old plum tree they were extremely difficult to see. Bright days always brought some out, so their numbers became gradually thinned. Two very perfect specimens appeared on a warm day at the end of February, and flew strongly all the morning; in the end we were unable to trace them. The warm days in April found three survivors.

BRITISH ORTHOPTERA IN 1912.

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

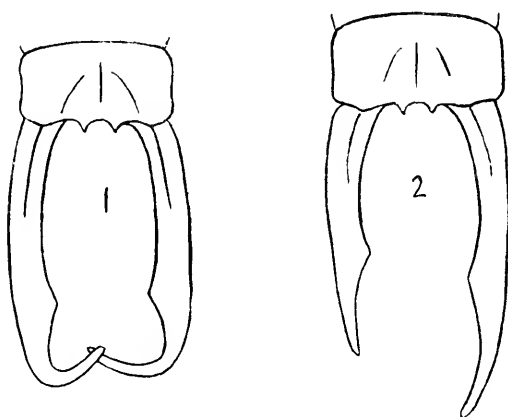
THOUGH no facts of first-rate importance have come to hand in connection with our Orthoptera during the past year, yet a few observations with regard to the habits of these insects have been made, and some little fresh knowledge has been gained as to their distribution in the British Isles. These are recorded in the present short paper.

Forficulodea.—On August 20th myself and a friend, H. G. Eldon, sought for the Great Shore Earwig (*Labidura riparia*) on the coast near Southbourne in Hampshire. After a rather lengthy quest we managed to obtain four, a male and a female from under the same shelter, and two females singly: one of the females was set free. When exposed to the light they all (or most) assumed the "threatening attitude," with callipers thrown forward over the back, and remained still, not trying to escape. In the evening, by artificial light, some nearly raw meat was given them, and the male at least ate of it freely. One of the females was noticed scratching briskly with mid and fore legs in the sand that had been placed in the box with them, as if with intent to burrow. The male, which at some time had received an injury, was moribund on August 24th, and one of the females was in the same state on August 31st; the remaining female was given alive to Mr. G. T. Porritt on September 11th.

On August 26th we again visited the locality, and once more four specimens were found—two by Eldon (a deformed male and a very young nymph) and two by myself (a mature male and a mature female). The deformed specimen had the tips of its callipers bent at an angle and turned inwards (fig. 1), and had

no wing-tips visible, while the wings themselves were either deformed or damaged.* *L. riparia* feeds readily after dark on raw beef, but in the daytime each one remains still in the darkest corner of the box. This clearly points to its being a nocturnal insect.

On August 31st we again found four specimens—a fine female, a small nymph, and two males. One male had the left branch of the callipers considerably shorter than the right one (fig. 2). It was killed on September 1st and mounted.



(× 5)

These insects are often noticed cleaning themselves assiduously, and they sometimes rub their body with their legs as if they were trying to allay irritation. If a little water is put in their box they go to it, and appear to drink it greedily. In the evening they will stand on "tip-toe" as it were, quite still for a long time in the bright light under a table-lamp, whereas in the daytime they like to hide away out of the light as much as possible. On leaving the New Forest early in September two males (caught August 26th and 31st) and a nymph (caught August 26th) were taken alive to Kingston-on-Thames. The nymph died on January 3rd, 1913, but the two males are alive at the time of writing.† Though they drink readily, they seldom now seem to wish to eat. It seems likely that, as Bournemouth extends, these earwigs may become extinct in that district in the near future, and at present we know of no other British locality.

At Eastnor, in Herefordshire, a specimen of *Labia minor* was taken on May 20th, as it settled (O. Whittaker); and Mr. J. R. le B. Tomlin had a male given to him, which was taken at Stoke Edith, in Herefordshire, in September. In the middle of May

* The male taken on August 20th had but one visible wing-tip.

† The male (caught August 31st) died about January 6th, 1913.

Colonel J. W. Yerbury sent me several common earwigs (*Forficula auricularia*)—a female found walking about on the sand at the sand-dunes near Studland, Dorset; and two males and five females from South Haven Point, Dorset, where they were apparently common under fallen soil and roots of heather on the seashore: the males had rather long, slender callipers. Mr. S. E. Brock reports *F. auricularia* as universal in Linlithgowshire. C. Adams sent me from Parkstone, Dorset, early in September, two nymphs of *F. auricularia* and a var. *forcipata* of the same species. Mr. Whittaker reports *F. auricularia* from Coventry, in Warwickshire, as was of course to be expected.

Blattodea.—A specimen of *Ectobius lapponicus* was taken at Penslake, Surrey, on June 15th by Mr. F. M. Carr, on the occasion of the South London Society's excursion. I received a female from Mr. G. T. Lyle, who said it was common at sugar, in Holland's Wood in the New Forest, on July 6th. On July 12th he sent me a male imago, swept from rushes in a damp spot on a heath. There were also two tiny nymphs, which perhaps belonged to the same species. On August 1st an extremely dark *Ectobius panzeri*, var. *nigripes*, was taken at Hinchleslea Bog, in the New Forest. *Blatta orientalis* was one of a few Orthoptera which Mr. O. Whittaker was able to report from Coventry.

Gryllodea.—Mr. C. W. Bracken tells me that a full-grown male example of *Gryllotalpa gryllotalpa* was taken alive on the sandhills at St. Enodoc near St. Minver, North Cornwall, during the week ending December 20th last. This capture is particularly interesting, as it goes to prove that the Mole Cricket hibernates in the perfect form. Both imagines and small nymphs of the Wood Cricket, *Nemobius sylvestris*, were found at Hurst Hill, in the New Forest, on September 8th. This cricket, also, is sometimes found in the winter as an imago.

Locustodea.—On July 9th Colonel J. W. Yerbury found *Conocephalus dorsalis* very immature at Walton-on-the-Naze: they were associated with *Carex* on the land side of the sea-wall. On August 28th Mr. G. T. Lyle found the Great Green Grasshopper, *Phasgonura viridissima*, plentiful and noisy by the side of the Avon at Christchurch, Hants; on September 21st he met with it in bramble bushes at Wyke Regis near Weymouth, and the next day at Osmington Mills on furze bushes at the top of the cliff. Writing on September 10th Mr. G. T. Porritt sent me a living specimen of *Platyceleis roeselii*, which he took at Trusthorpe on the Lincolnshire coast (Wallis Kew's old locality). During the previous fortnight he took a fair number of *P. roeselii* there, notwithstanding the atrocious entomological weather, and would probably have got considerably more had the weather been anything like favourable. All his specimens, without exception, had the semi-circular border round the side flaps of the pronotum

of a bright grass-green colour, whereas the published descriptions of the insect give the colour as yellowish or yellowish-white. Mr. Porritt considers that this opinion was obtained from dried specimens, as he finds the green colour soon disappears after the death of the insect, and, in fact, from some of the earliest caught specimens, then on his setting-boards, the green had already quite faded away. In other respects, also, the colour is slightly different from that in published descriptions. Two specimens were captured on the morning of September 9th, when a strong wintry gale was blowing, one of them being that sent alive to me. The insects occurred amongst very long grasses on the sandhills. Writing later in the same month Mr. F. W. Champion told me that he and Mr. A. Luvoni took the species at two or three places on the coast of Essex and Kent, one of them being Herne Bay, where it has been taken previously. Mr. Champion says that the specimen he described in the 'Entomologist' (vol. xlv. p. 117) certainly had bright yellow borders to the flaps of the pronotum, so that they are not always bright green as Mr. Porritt found them.

Acridiodes.—*Gomphocerus maculatus* was found mature in the New Forest on June 29th. It was taken at Mynydd, in Carnarvonshire, a hill 700 ft. above sea-level, by Mr. E. A. C. Stowell, on August 8th–10th. Mr. S. E. Brock found this species in mid-August very abundant in many spots amongst short heather and bare ground at Kirkcowan, in the south of Wigtonshire. In Linlithgowshire Mr. Brock tells me that he has taken *G. maculatus* at Craigton (alt. about 250 ft.) on a railway bank and waste ground adjoining in great numbers on August 8th. He found it "in song" on June 23rd, 1912, in Linlithgowshire. *G. maculatus* has an almost endless range of colour variation; some are richly spotted with cream, green, red, dark-brown, &c.; some are nearly black; others, when the elytra are closed, have a conspicuous pale stripe right down the back.

Omocestus viridulus was met with on August 8th–10th on Mynydd Hill, in Carnarvonshire (E. A. C. Stowell); in mid-August at Kirkcowan, where it was abundant and widespread, especially along grassy roadsides, and also on the moors (S. E. Brock); Linlithgow and Bathgate Hills, abundant and widely spread all over the district (up to 800 ft.) along roadsides, pasture-land, &c.; the earliest date of the insect "in song" in 1912 was June 23rd (Brock). Mr. Brock has noticed its disappearance within the last few years from one or two spots in the highly cultivated country near Kirkliston, in Linlithgowshire. Mr. Whittaker reports *O. viridulus* from Coventry. *Stauroderus bicolor* was found on August 8th–10th on Mynydd Hill (Stowell); in Cornwall at Sheirock, Port Wrinkle, and Whitesand Bay Hotel, at the beginning of September (Yerbury);

on the railway bank near Kirkcowan Station (Linlithgowshire), where it was very numerous in company with *O. viridulus* (Brock). This last locality is about eight miles from the sea, which is possibly of interest, considering that *S. bicolor* appears to be almost, if not quite, confined to the immediate neighbourhood of the shore in the Edinburgh district and Lothians generally (Brock). *Chorthippus elegans* was taken on July 5th and 6th in a salt marsh at Walton-on-the-Naze, and again at Walton-on-the-Naze on July 21st (Yerbury); it was abundant along the coast of Lincolnshire at Sutton-on-Sea, Trusthorpe, Mablethorpe, &c. (Porritt). *Chorthippus parallelus*. — This species, like its congener, *C. elegans*, appears to be a lover of damp ground. It was taken on August 8th–10th on Mynydd Hill (Stowell); and in Cornwall at Lelant on August 24th, and at Sheirock on September 4th (Yerbury). *Mecostethus grossus* was taken in the New Forest at Silverstream Bog: the first female, a fine large one, was captured on August 1st, and the first male on August 7th; four small ones, three males and a female, were taken at the end of the month. Mr. G. Lamb took a specimen of *Tetrix subulatus* near Milton, Hants, on September 9th; and Colonel Yerbury took the common species, *T. bipunctatus*, at Sheirock, in Cornwall, on the 4th and 10th of the same month.

Kingston-on-Thames: January, 1913.

FIELD NOTES ON BRITISH SAWFLIES.

BY CLAUDE MORLEY, F.Z.S., F.E.S., M.Soc.Ent.France.

(Concluded from vol. xliii. p. 285.)

THE Tenthredinides is the last tribe of the sawflies in the modern grouping; it is mainly remarkable for the large size and conspicuous coloration of its members, and the ubiquity displayed by many of them during the early summer, more especially upon the margin of woods, where they may constantly be seen flitting about in the sun and resting upon the leaves of brambles, &c., apparently always at about three to four feet from the ground. The first genus, *Sciopteryx*, is extremely rare, and I have never seen either of its species; indeed, of one only a single indigenous specimen is known—that recorded by Rev. E. N. Bloomfield from Guestling, where it was captured as early as April 3rd (E.M.M. 1895, p. 24; not p. 22, as misprinted in the Nat. Hist. of Hastings, 3rd Suppl. 1898); it is now in Mr. Morice's collection. The five species of *Rhogo-gaster*, on the other hand, are all of frequent occurrence, though the third and the last occur in most numbers. Chitty and I

have found *R. pictus* (Morice forget to "masculate" the species of this genus) sparingly in the marshes of the Little Ouse at Brandon; it has occurred to me at the Haven Street Woods in the Isle of Wight, and Miss Chawner takes it in the New Forest, always in June, I believe. *R. punctulatus* occurs with the following in woods, and is very liable to be mixed with it, though distinctly rarer; I have it from Norfolk, Suffolk, and the Isle of Wight. *R. viridis*, a beautiful and very pugnacious species (with which bottle no other insect!), is abundant everywhere from May to September; Banchory in the Highlands (Elliott), Ardross in Co. Ross (Gorham), Tuddenham Fen (Chitty), Suffolk, New Forest, Isle of Wight, &c. It is especially common on the flowers of *Heracleum sphondylium*. *R. fulvipes* is confined to May, in my experience; it occurs throughout Suffolk, and is usually taken on bramble-leaves. *R. aucupariæ* is even earlier in its appearance, about April 28th; it is commoner than the last, and only extends to early June. Usually taken by sweeping damp hedge-bottoms; Burwell Fen in Cambs, and Skegness in Lincs (Elliott), common all over Suffolk. Our single species of *Perineura* must be widely distributed, if the female in Capron's collection was from his usual locality, Shere in Surrey, for males are recorded from Cadder in Lanark, but these are the only known indigenous specimens; it is said to occur in May, probably among ferns (besides E. M. M. 1910, p. 236, *cf. l. c.* 1911, p. 103). *Pachyprotasis rape* is one of the commonest British insects in June, continuing to appear sparingly through July and August, even to September in Scotland. All my specimens are from woods, usually by sweeping; Felden in Herts (Piffard), New Forest (Miss Chawner), Banchory (Elliott); abundant in Lincolnshire and Suffolk. *P. antennata* has extremely rarely occurred to me, but is, I believe, common enough about Lyndhurst; Halbert took it at Belclare, on the Mayo coast, in July, 1910, and I once found it at Helpston Heath, near Peterborough, in June.

The deep red and black, often with conspicuous white markings, render *Macrophya* a striking genus, while the rarity of most of its species adds to its interest. Morice says all our species are "mostly fairly common, at least in the southern counties," but I have not found them so. Excepting the two doubtfully British *M. albipuncta* and *M. diversipes*, I have, nevertheless, obtained all our species but *M. rufipes*, known from Swanage, Worthing, Eppingham, and the New Forest. My *M. punctumalbum* were taken at the last locality by Miss Chawner; it is said to frequent privet during May and June. *M. duodecimpunctata* seems much commoner in the fens and broads of the eastern counties than elsewhere; Morice has taken it "occasionally," and suggests an attachment to alder, which is probably correct, for in East Anglian marshes, where that tree abounds,

it is to be met with abundantly, often in such numbers as to become a pest in the sweep-net among reeds and osiers. It is confined here to June 5th–20th, and a diligent search at its headquarters on May 22nd and July 4th revealed none; Wicken Fen in Cambs, Surlingham and Rockland Broads in Norfolk, very rare at Brockenhurst, but always to be found in North-west Suffolk at Barton Mills, Brandon, and Tuddenham Fen. *M. rustica* is more widely distributed, though rarer in the eastern counties. I have only a couple of specimens, taken at Woolpit, in Suffolk, by Rator in July, 1904, and sent by Rev. E. N. Bloomfield, probably from the Hastings district. *M. blanda* is very rare here; I swept a single female from oak in a lane at Wherstead, near Ipswich, on June 16th, 1904. *M. annulata* (*neglecta*, Cam:), on the contrary, is common in Suffolk at Timworth (Col. Nurse), Needham Market (Platten), Bentley, Barton Mills, Bramford, and Moulton; I have also seen it in the New Forest and Isle of Wight. Both *M. albicincta* and *M. ribis* seem rare; the former has been swept in marshes at Brandon and Rockland Broad in early June, the latter at Burwell Fen, and once—only once in twelve years' collecting there—at Belstead, in Suffolk, at the end of May, 1904. Why so few *Allantus* species have turned up, I do not know, unless they be rare; at least one, *A. rossii*, seems doubtfully British, and I have never seen half the remaining nine. *A. scrophulariæ* is a remarkably handsome, vespiform species, always to be met with along with *Vespa germanica* at *Scrophularia nodosa* throughout Suffolk. Sich has given it me from Malvern in Worcester; it is not an early species, but is on the wing from the middle of June to that of August. Of *A. marginellus* and *A. amœnus*, I possess single examples only, presumably captured about Ipswich in 1894, but if such were the case, it is strange they never put in a second appearance. *A. arcuatus* can be accused of no such retiring habits, for it is ubiquitous from June 5th to September upon all sorts of umbelliferous flowers, from which I have frequently seen it chase flies, though I was never so fortunate as to witness a capture; but Elliott has given me a female, which he took at Banchory in the Highlands, in the act of masticating a female *Empis pennipes*, Linn., proving its carnivorous propensities. I have it from Clare Island, Co. Mayo; Glengarriff (Andrews), Skene and Ballater (Elliott), Isle of Wight, Hants, Wilts, Lines, Suffolk, and Northants.

Next we come to the typical and handsome genus *Tenthredo*, all of which have terrible jaws, and must on no account be boxed with other insects. Only *T. mandibularis* of the thirteen indigenous species is unknown to me. *T. maculata* is one of our largest and most striking sawflies, and is beaten from bushes in the middle of sparse woods in the middle of June; I took it this year flying slowly along in the Willingham Woods, near Louth, in Lincoln-

shire (whence *T. fagi* is recorded in E. M. M. 1912, p. 159). It is always rare and of single occurrence in the Bentley Woods, near Ipswich, and Wilverly Inclosure, near Brockenhurst. *T. temula* is a very common species in Isle of Wight, New Forest, Northants, Lincs, and Suffolk, not infrequently flitting about the undergrowth of the garden plantations at Monk Soham; it seems nearly confined to the middle of June. *T. mesomela* is hardly rarer, and is almost invariably taken on umbelliferous flower-heads; I have noted it in the counties given under the last species, and Dr. Cassal has found it at Ashby, near Doncaster. Its active span extends to July 20th, when males occurred to me on *Heracleum sphondylium* on the Southwold cliffs in 1901. Of *T. olivacea*, I possess only a pair, taken by Chitty at Loch Awe during May, 1893. *T. atra*, with its var. *dispar*, is not a very common kind in my experience, and is as often found in August as June, oftener in marshes than in woods; Rockland Broad and Eaton in Norfolk, Bentley and Foxhall in Suffolk, Market Rasen in Lincs, Brockenhurst, and Carramore Lake at Louisburgh in Mayo; and, with it, I once swept *T. moniliata* in the Rockland marshes. *T. livida* occurs everywhere, and both sexes vary a good deal in the extent of their rufescent coloration. It is abroad at the end of May, and extends at Monk Soham to Aug. 26th; Totham in Essex (Prof. Image), Bristol (Charbonnier), Byfleet (Sich), Hereford (Gorham), Sutton in Surrey (Campbell-Taylor), Stradbally in June, 1907 (Andrews), Cannock Chase in June, 1904 (Tomlin), the New Forest, and Northants. My solitary *T. fagi* is a female, from the Bentley Woods, near Ipswich, on June 15th, 1895; my solitary *T. velox* was beaten from hazel at the same place on Aug. 16th, 1904; and a couple of *T. colon* were taken at Matlock early in July, 1900, and at Cannock Chase on June 8th, 1904, by Tomlin. *T. ferruginea* is by no means common; Baylis and I took a pair about Ipswich in 1894; Bradley has given me a female he took at Sutton, near Birmingham, in June, 1899; and Rev. W. F. Johnson captured another at Achill Sound, on the coast of Mayo, in June, 1911, along with a female *T. balteata*, which species I have only met with in the Wilverly Inclosure of the New Forest, where it would not appear to be rare.

Tenthredopsis is treated of at the end of the present group on account of the difficulty attached to the determination of its species, between which there frequently exists a somewhat intangible distinction. The typical form of *T. litterata* is not very common in June; Wainwright has taken it in Wyre Forest, and I have noted it at Betchworth in Surrey, Wilverly and Matley Bog in the New Forest, Brandon in Suffolk, Mablethorpe and Market Rasen in Lincs. All its varieties are rarer, and I have only seen var. *cordata* from Ipswich on June 3rd, 1901, and Point of Aire, in Flintshire, on June 17th, 1904 (Tomlin); var.

femorialis, from Bentley Woods and Cavendish in Suffolk, during early June; and var. *microcephala*, found near Ipswich by Baylis, and recorded by me from Barham (E. M. M. 1897, p. 267). The handsome *T. coqueberti*, with its strong red and white markings, is abundant, and I have a long series from Chatham (de la Garde), Brandon (Elliott), Tostock (Tuck), Stradbally (Andrews), Hereford and Malvern (Gorham), the New Forest, Suffolk, Cambs, and Lincs. *T. excisa* seems rarer, and, besides Louth in Lincs, I have it only from Tostock, Lavenham, Mildenhall, Bentley, and Monk Soham in Suffolk. *T. gynandromorpha* I have not seen, but *T. dorsalis*, Lep., is by no means rarely swept in my paddock here, in the Isle of Wight, New Forest, Wicken Fen, and Andrews has sent it me from Milford Haven, usually in woods; though *T. tiliæ*, Linn., prefers marshes in the New Forest, Earlham near Norwich, in Lincs and Suffolk, usually on sallow; and Musham found it at Lincoln. *T. campestris*, Linn., also occurs in my paddock, Matley Bog, and Wicken Fen; Elliott has swept it at Tuddenham, and Tuck about Bungay in July. Adams has given me a single *T. tristis*, taken in his Lyndhurst garden in the middle of June, 1907; Tuck found a female *T. dorsivittata*, Cam., at Tostock eight years earlier; and I captured what Mr. Morice queries as a female *T. parvida* on a willow-leaf in the garden here at the end of June, 1908. Three males of *T. fenestrata* turned up in the Lincolnshire Market Rasen woods in June, 1912, together with a female of *T. spreta*, the males of which (or *T. thornleyi*) have been found in Matley Bog and my paddock.

Comparatively few of our three hundred and sixty species are rare, as will be seen by the above account of one who has paid them no especial attention, but at the same time has hardly ever rejected the opportunity of bottling those that have come to his net. The group is a small one with us; Rev. F. D. Morice's admirable 'Help-Notes' have rendered the discrimination of our species a comparatively simple matter; their life-histories are no less interesting than those of the Lepidoptera, are more fascinating because so very much less worked; and the handsome appearance, with facility of capture, which they display, should recommend to everyone the study of our British Tenthredinidæ.

Monk Soham House, Suffolk: Nov. 20th, 1912.

FRIENDS AND FOES OF THE CONIFERÆ.

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

THIS paper is written chiefly for the purpose of drawing attention to a factor in Economic Entomology, which, in spite of its vital importance, seems to have been neglected; this is the value of the various Arachnids and Phalangids in holding in

check enemies too small, or too well protected, to be dealt with by ordinary methods.

Four woods, situated in various parts of the country, have formed the field of my observations. The first of these is a mixed pine and larch wood, although it contains a little alder and birch. The second, in its lower levels, contains larch and alder in approximately equal quantities, but higher up, the alder is replaced by Scotch fir and spruce. The other two are purely coniferous, and contain only spruce, larch, and Scotch fir. The trees in the first wood seem never to have had a reasonable chance of flourishing, for, at the very first, the larches were planted too closely together; and, instead of being strong healthy trees, becoming stronger with each thinning out, they have become sickly, and simply invite the hordes of insect pests they have succeeded in attracting. When I first commenced my work in this wood seven years ago, both pines and larches were attacked by sawflies; the larch by the Larch Sawfly (*Nematus (Lygæonematus) erichsonii*), and the pines by the Pine Sawfly (*Lophyrus pini*); but both of these at the present time, although not exterminated, are negligible quantities, for the attacks of the ichneumon *Mesoleius aulicus*, and, more particularly, the ravages of a white fungus in the soil, have destroyed them in myriads. Helping these agents too, during the winter, are the various ground beetles, belonging to the Carabidæ, and also field voles. Unfortunately, these enemies are no "respecters of persons," and they attack and destroy parasitised cocoons as well as those containing sound larvæ; and it is, therefore, just possible that, when the parasitic ichneumons are becoming powerful enough to cope with the pest, they do more harm than good. It would, therefore, be better to beat the larches when the larvæ of *Nematus erichsonii* are about to descend, and to allow the larvæ thus obtained to pupate under artificial conditions. As the sawflies and any super-parasites emerged they could be destroyed, whilst the ichneumons could be liberated in the woods to continue their good work.

The sawflies were aided in the work of destruction by shoals of lepidopterous larvæ, chief amongst which were those of *Coleophora laricella*, *Phigalia pedaria*, *Gonodontis bidentata*, *Hybernia marginaria*, and *Oporabia autumnata*. All of these, with the exception of *H. marginaria*, were of sufficient importance to need special attention, but a succession of wet seasons has thinned out all except *C. laricella* and *P. pedaria*, both of which, especially *C. laricella*, do untold damage, and therefore demand treatment. Just after the young needles are put forth the hibernated larvæ of *C. laricella* burrow into them and injure them to such an extent that I have seen thousands of trees early in June looking as if blighted by frost. The pines, too, suffered from the attacks of *Panolis piniperda*, the larvæ of which could be beaten out in hundreds. It, too, is gone.

In this wood, as well as in the second, the trees bear crowds of *Lachnus piniicola*, which, however, are kept under control by Ladybirds, chief of which are *Coccinella ocellata*, *Mysia oblongoguttata*, *Adalia obliterated*, and a strong sturdy form of the Seven-spot Ladybird (*Coccinella septempunctata*). This form is larger, and is of a deeper red than the type, and, as I have only seen it in pine woods, I call it var. *pini*. The larvæ of these beetles can be observed in great quantities in some seasons. In spite of the good work done by all these friends, the larches in both woods are being killed off slowly but surely; in the first, *Coleophora laricella* is the culprit, and in the second, the Woolly Larch Louse (*Chermes laricis*). These are not only destructive in themselves, but both so weaken the trees that they cannot resist the attacks of the Larch Fungus (*Peziza willkommii*), the spores of which find an entrance at the injured points. In the end, *Sirex noctilio* singles out the affected trees, and the presence of the huge grub of this insect soon causes their final collapse. I do not think that either *Sirex gigas* or *S. noctilio* ever attacks sound trees, for I have twice seen *S. noctilio* ovipositing, and in each case the tree was in a dying condition. Lastly, all the trees containing *Sirex* larvæ had, when I examined them, been in a poor state for a long time, and consequently bore no low branches.

It seems to me an extraordinary thing that such destructive insects as *Coleophora laricella*, *Chermes laricis*, and *C. abietis* are ever allowed to get into our coniferous woods, for they are not native insects. If all nursery stocks of both spruce and larch were sprayed in April and May, either with petroleum and flour emulsion, or lime sulphur wash * or with any arsenic spray, it would be impossible for these pests to reach new plantations. If preferred, the spraying could be done for two consecutive Springs on the young transplanted larches when the hibernated *Coleophore* larvæ are renewing their cases, and the supply of needles, both for that purpose and for food, is limited. At the same time *Chermes laricis* and its form *C. abietis* are in their most defenceless condition. After the trees are once established the cost of spraying would be prohibitive.

I could not help contrasting the poor state of these larches with the stately larches and spruces in the other two woods. It was not that the various enemies enumerated above were absent, for I could see signs of practically all. It was because they were all under the control of their natural enemies. What, then, are the natural enemies of *Coleophora laricella*, *Chermes laricis*, and its form on the spruce, the Spruce Gall Louse (*Chermes abietis*)? By beating larch, spruce, and juniper, a simple answer was

* This wash if not carefully used would injure the young foliage. Recent experiments, however, on peach trees, have shown that even their delicate blossoms escape unharmed when the spray is in competent hands.

obtained. The branches swarm with spiders, amongst which a "rare" species, *Bolyphantes expunctus*, predominates. Although considered very rare, in these woods it occurs in millions. It is far from being a typical *Bolyphantes*, for instead of being a ground spider like its congeners *Bolyphantes alticeps* and *B. luteolus*, it lives on the twigs of conifers. Spinning no snare, it spends its life devouring Aphids, although in all probability it will not reject other insects if obtainable. Chief amongst the Aphids beaten with it were *Chermes abietis*, *C. laricis*, and *Lachnus piceæ*; the first two in the winged state, and the last as larvæ. The adult and subadult conditions of *B. expunctus* coincide with the assumption of the winged state by *Chermes*. It seems then that, if colonies of this spider were transferred from woods in which it was abundant to woods infested with *Chermes*, an enormous quantity of spruce and larch could be saved. I can confidently state that, in spite of the fewness of its recorded localities, this spider occurs in multitudes in most mixed spruce, larch, and juniper woods in the North of Scotland. In a little over an hour I have beaten enough specimens to supply all the arachnologists in the world several times over.

Struck by the above observations first made in 1908, I have paid special attention to the study of pine wood spiders and their economic value. In the case of those possessing snares, I have examined the contents thereof to see what they preyed on. I was surprised when I examined the woods, in which the trees were in the worst condition, to note that, except for the Microtheridiids, the spider fauna was a scanty one. A few odd *Meta segmentata*, *Zilla 10-notata*, *Drapetisca socialis*, and *Amaurobius fenestralis*, composed the "take," but all of the webmakers of these were evidently of great use. The floccose snares of *A. fenestralis* were full of the wings of aphids, sawflies, and last, but not least, of the elytra of the Pine Weevil (*Hyllobius abietis*), and of the various pine-feeding Scolytids. These useful Arachnids did not compensate for the almost total absence of the larger ground spiders belonging to the Drassidæ and Lycosidæ and the Epeirids. The cause of this absence was plain. When these plantations were made they were formed on an open moor, which was first fired to clear it of gorse and heather, and then surrounded by a stone wall. In this way all the larger spiders were cleared out, and their reintroduction effectually prevented. The "micros," able to colonise new ground by using their floating strands to carry them, got back again. It was possible, too, for winged insect pests to appear, and, together with those brought in with the trees, to increase and multiply without check until the advent of their enemies in the form of ichneumons, &c. Unfortunately, *Coleophora laricella* is but little affected by these insects, although one would have expected it to be the first attacked, for its near relative, *C. cæspitiella*, feeding on the

rushes on the moors near by, is badly infested. *Chermes*, too, escapes to a great extent, for neither Syrphid nor Coccinellid larvæ can get at it in its most destructive stages, and it can, therefore, do enormous damage. It is easy to see that, if one could introduce enemies of these creatures in the form of spiders which would attack them in their most vulnerable stages, and at a time when their destruction would be of most use, they would soon be held in check. It has already been indicated in what way *Bolyphantes expunctus* could be enlisted; but, unfortunately, it only becomes adult in August and September, and its use is limited to attacking *Chermes*. Possibly, as in the case of *Bolyphantes luteolus* and *B. alticeps*, a few adults hibernate and continue the work on *Chermes* in spring, but this does not provide for the summer months. For effective work during summer, therefore, it would be necessary to look out for spiders adult or subadult then. These spiders would have to satisfy the following conditions:—

(1) They must be easily obtained. (2) They must be active and adult when *Coleophora laricella* is in the adult state. (3) Otherwise they should form an unbroken sequence to cope with other pests during the season. (4) They should be of arboreal habits.

(To be continued.)

A MONTH'S COLLECTING IN HUNGARY.

BY GERARD H. GURNEY, F.E.S.

ON Monday, May 13th, I left Ostend in the Orient Express for Budapest for a month's collecting in Hungary. Previous collectors who have visited Hungary have generally done so well and found so many rare and interesting species there that I felt, at any rate, I might reasonably hope for a certain amount of success. It was therefore with great anticipations of good things to come that I sped across Europe, my first entomological observations beginning at the German frontier city of Passau, where the train stopped for nearly an hour, and I saw several apparently fresh specimens of *Papilio podalirius* sailing round some flowering shrubs which grew on either side of the Place in front of the cathedral. From Passau to Vienna the train runs through somewhat uninteresting country, but after leaving the latter city the surroundings become much more varied, with vine-clad slopes running up to the lower spurs of the Little Carpathians, and picturesque valleys which looked as though they might prove to be good collecting ground.

As an entomological centre Budapest is not at all a convenient spot, and it is only because several rare and local

species are found in the vicinity, and that accommodation is impossible nearer to their localities, that one has perforce to stop there. It means quite a journey by tram or train to get anywhere at all, as the town is so large it takes a very long time to get beyond the endless suburbs and ramifications of streets and houses; moreover, this makes discovering fresh ground difficult, and one is apt to go again and again to the two well-known localities—*i. e.* the Schwabenburg and the Budafok marshes, excellent though they both are, instead of seeking fresh ground and perhaps turning up fresh species. I saw from a distance several places I should much liked to have worked, which looked as though they might produce very good results, if one had the time and means to get there.

I had arranged to stay at the Hungaria, but I changed to the Hôtel Bristol, which I found to be equally good, much quieter, and, most important of all, cheaper.

My first day at Budapest, May 15th, was devoted chiefly to settling about the hotel and seeing various officials with regard to an expedition to Pészer, which can now only be visited with special permission, but on the 16th I was early on my way to the celebrated Schwabenburg, and after ten minutes in a steamer, twenty minutes in a tram, and forty minutes in a train, I arrived at the station of Schwabenburg itself, and then had only a short walk before I got to the wooded part of the hill which was the objective of my journey. This hill, which is called in Hungarian Sváb-Hegy, has been so often described by previous writers that it is quite unnecessary for me to further dilate on it; at the top are still large patches of untouched wood, with many open glades and spaces, and here I soon found butterflies to be common, though owing to the day being somewhat dull, with a good deal of wind and not much sun, they were not flying very freely. In the warmest and most sheltered spots the two "skippers," *Hesperia malvæ* and *Pyrgus orbifer* were both quite common and in beautifully fresh condition; the two species were generally flying in the same places, though perhaps *orbifer* was rather more local than the other; at first they are somewhat difficult to distinguish apart on the wing, though one soon sees that *malvæ* is distinctly smaller and darker. *Orbifer* when quite fresh has a beautiful plum-coloured flush on the wings which, however, very quickly wears off; they appeared to be a very pugnacious species, constantly chasing other passing insects, to return again, after driving the intruder away, to the same spot. Flying briskly over the flowery spaces were many fresh *Colias hyale*, but the two commonest species on the wing were *Papilio podalirius* and *Euchloë cardamines*, the latter being extremely abundant, with fine large females. In one or two places *Thais polyxena* was fairly frequent and still in quite good order, and here also newly emerged *Melitæa phœbe* were not uncommon, and a single

Issoria lathonia. Near the top of the hill one fresh specimen of *Parnassius mnemosyne* was taken, and *Cyaniris argiolus*, *Pieris rapæ*, *Leptosia sinapis*, *Gonepteryx rhamni*, *Cænonympha pamphilus* were all of frequent occurrence, while a single specimen of *Polyommatus orion* var. *ornata* appeared to be the first fore-runner of its generation.

The following day was cool and inclined to rain, and I spent a long time trying to find the well-known locality near Budafok for the two "coppers," *Chrysophanus dispar* var. *rutilus* and *C. thersamon*, but went a good deal too far beyond the village and missed it, only having a very long walk through most unpromising-looking country, seeing practically nothing until late in the afternoon, when, coming back along the banks of the Danube, I picked up out of a little swampy dell a fresh male *C. thersamon*, two or three *Melitea cinxia*, and a single specimen of *Rusticus argus* (*ægon*). The next day was wet, and it was not until the 19th that I was really collecting on the marshy ground which stretches from Budafok as far as and beyond the station of Kamaerardo; on these marshes and in the adjoining wood I spent many delightful days, nearly always finding something fresh in this splendid locality, though perhaps butterflies were not generally as plentiful as I had expected. During the eight days I spent at Budapest the weather was anything but propitious—only two days were really fine and hot, the others being wet: moreover, several brilliantly fine days were completely spoilt from an entomological point of view by the tremendously high wind, which made all collecting out of the question.

However, the 19th was one of the perfect days, and I made the most of it, and seldom have I enjoyed a day more; the valley in which I was collecting was still covered with uncut hay, amongst which flowering-plants of all descriptions grew in profusion; the willow trees on either side of the little stream which runs the whole length of the valley were covered with emerald leaves, and among them great numbers of very tame golden orioles piped their flute-like notes. Further on, where there is a small swamp, great patches of yellow iris in full flower added brilliant touches of colour. Flying amongst the uncut hay were plenty of newly emerged *Cænonympha iphis*, with well-marked under sides; fresh *M. phæbe* were also common, with occasional *Brenthis dia*. Sitting on the thyme flowers were fine large *Polyommatus icarus* males and several *R. argus* (*ægon*). Further along *Nomiades cyllarus* was not uncommon, fine large specimens, though not such giants as those I was to take in a fortnight's time at Herkulesbad! Here also were odd examples of *C. phlæas*, several newly emerged *Agriades thetis* males, and a few *Pyrameis cardui*, while *C. hyale* was everywhere abundant and quite fresh. At the corner where the wood joins the meadows I found *T. polyxena* plentiful, but they were mostly

much worn, and there were only very few which could be considered worthy of cabinet rank; here also I took a few fresh *M. cinxia*, smaller and darker than my specimens from the Riviera or Digne, while *E. cardamines* and *Nisoniades tages* were both common. On the way home two *Erynnis alcea* were taken off the path near the farmhouse, and a few minutes afterwards, when I had almost despaired of seeing it, I captured two *C. thersamon*, both males in perfect condition. The following day, on the same marshes, I found *C. thersamon* common, but local, and was able to take a nice series of this lovely "copper." They were very fond of sitting on the white composite flowers of a plant which grew somewhat abundantly by the side of the path, and this was a very convenient habit, as it prevented the necessity of going into the standing hay after them; when sitting with expanded wings to get all the heat from the rays of the afternoon sun they are a beautiful object, and one is easily able to pick out the good specimens and leave the others; the females were scarce and I did not get more than three or four. Several other species were taken which I had not noticed the previous day; *R. argus* (*ægon*) was becoming plentiful, and several fresh *Louveia dorilis* males were netted. In Promontor Wood a very fine dark form of *Pararge mæra* was frequent; this variety was so much like a large *P. hiera* that I at first mistook it for that species. *P. podalirius* and *P. machaon* were both rather common, and single specimens of newly emerged *Aporia crategi*; two very fine large male *P. baton*, and a few *Pontia daplidice* occurred; while a pair of fresh *Melitæa trivia* were secured at the wood. Of the latter species I had hoped to have secured a series on the Schwabenburg, but never saw more than one or two specimens on any of the three days I visited that locality.

The best place near Budapest for *M. trivia* is Csepel, which is a large island in the Danube, a short distance south of the city, which I visited on the afternoon of the 21th, as I was anxious to secure a series of this species. After walking through the village towards the south end of the island for a couple of miles, one comes to a large stretch of virgin forest, which covers the whole of this end of the island; it is mostly composed of small oaks, dwarf poplars, and thick juniper scrub planted on numerous sandhills, the open spaces and glades between them being covered with rushes, coarse grass, and flowering-plants growing very luxuriantly. The soil is very sandy, in fact the conditions here are almost exactly the same as in the forest at Pészer; and probably both localities are untouched remains of the vast primeval forest which in bygone ages stretched for miles over this part of South-eastern Europe. Like Pészer, also, this end of Csepel Island is an extremely prolific locality for butterflies, and I found several species very abundant.

(To be continued.)

NOTES AND OBSERVATIONS.

DURATION IN THE LARVA STATE OF *TROCHILIMUM APIFORMIS*.—In recent volumes of the 'Entomologist' there have been several notes on the earlier stages of this insect, and especially concerning the length of time it remains in the larva state. In the volume for 1911, p. 362, I recorded having seen a female on the bole of a balsam poplar in my garden engaged in ovipositing, dropping her eggs loosely on the ground at the base of the tree. A considerable number of eggs were laid, and after securing a dozen for a correspondent who wished to figure them, I left the rest, which I watched from day to day for some time. But one morning all trace of them had vanished, and I concluded that ants, earwigs, woodlice, or some other predatory beasts had devoured them. On August 2nd, 1912, however, my daughter drew my attention to a fine freshly emerged female moth at the bottom of the tree, and there was an empty pupa case protruding from its cocoon in the earth close by. It is of course possible that this particular moth resulted from an egg laid before 1911, but the tree showed no sign of any previous attack, though it had often been examined on the chance of finding this species or *Saperda carcharias* attacking it in previous years. It seems therefore probable that this moth was produced from one of the eggs which I saw being laid, and, if so, the newly hatched larva must have entered the earth and penetrated the underground portion of the stem or one of the roots. It is of course possible that other larvæ may still be feeding in the roots, though there are no signs of them on the surface; but so far as the evidence goes it seems to indicate that the larva is not always two years in arriving at maturity, as some writers have suggested. Though I have frequently found this insect on the boles of trees and at rest on leaves, I do not remember having seen it on the wing until one morning last July, when several specimens were flying about among the poplars in my small plantation. Getting only a momentary glimpse of the first, I mistook it for a hornet, less from its appearance than from the loud humming sound caused by the vibration of its wings; but there could be no mistake about the sound. A good view of a perfectly fresh specimen flying in the sunshine is a sight to be remembered.—W. H. HARWOOD; 62, Station Road, Colchester, January 4th, 1913.

AN UNUSUAL PARSNIP PEST.—In North Durham last year I was struck by the enormous damage that seemed to have been done to some seeding parsnip plants (*Pastinaca sativa*). The flowers and immature seeds seemed to be spun together in huge masses, through which silk-lined tunnels passed in all directions. I suspected that this was the work of a *Depressaria* larva, but for a long time I failed to find one, as it was late in August when I observed the damage. However, close search on a very large plant yielded two larvæ, which proved to be those of *Depressaria heracliana*. In many cases the plants were quite killed, and no seeds produced. As I knew that *D. heracliana* pupated in the stems of *Heracleum sphondylium*, its more usual food-plant, I examined the stems and sheathing leaves for pupæ, but not a single one could I find. I could see dozens of

places where the larva had eaten in order to penetrate the stem, but in no case had it succeeded in getting inside, and although I pulled whole plants to pieces and dug up the ground near the plants, I never found a single pupa. Where they had pupated was a mystery. It is certain that no mistake was made in the identification of the larvæ, which agreed in every detail with those taken from *Heracleum*. I see that the same species has been reported as affecting beds of seeding parsnips in nursery gardens in Canada. The advice given was to uproot the affected plants and destroy them. It would be a far better plan to destroy the plants of *Heracleum* which are bound to be near by (*Heracleum sphondylium* grows in Canada), and to hand-pick the flowers of the parsnips late in June or early in July. Any damage done previous to that could be neglected. That hand-picking is satisfactory in this case I have ample evidence, for when working at the *Depressaria* some time ago, I took all I could get from one locality, and for two or three years that spot produced none, although they are now as abundant as ever. The attacks of ichneumonids on both *Depressaria heracliana* and its close ally *Depressaria nervosa* are of no importance. Not one per cent. is parasitised. A far more important enemy is the common earwig which destroys hundreds of pupæ.—J. W. H. HARRISON; 181, Abingdon Road, Middlesbrough.

THE JEFFREY AND THE BAXTER COLLECTIONS.—The collection formed by the late Mr. W. Rickman Jeffrey, of Ashford, and which "came under the hammer" at Stevens's Rooms on December 10th last, although by no means an extensive one, had some claims to antiquity. Few lots, however, appeared to attract any great amount of interest, but among those that received some attention may be mentioned a fine male *Chrysophanus dispar* that realized seven guineas, and an equally good female that went for £6 10s.; two pairs of *Lælia canosa*, which, when put up with a former lot that had failed to find a buyer, brought 32/6; and the lot in which a specimen of *Diasemia ramburialis* was included ran up to £2 5s.

The more notable lots in Mr. T. Baxter's collection were a series of forty-one *Luperina*, described as "*nickerlii*, *gueneei*, *baxteri*, v. *iota*, v. *murrayi*, v. *minor*, v. *fusca*, all from St. Anne's, 1911, T. Baxter," for which 30/- was given; a black form of *Anthrocera filipendulæ* (var. *chrysanthemii*) reared from a larva found by Mr. Baxter at Fleetwood in 1888, which realized eleven guineas; a lot in which fourteen *Eupithecia innotata* were included which sold for 30/-; and a couple of rather well-marked varieties of *Abraxas grossulariata*, which brought 26/- and 21/- each respectively. Each of the collections contained four specimens of *Cucullia gnaphalii*, those in the former in a lot with sundry other species realized 20/-, while those in the latter by themselves brought 18/-.

In the same sale were included some sixty odd more or less remarkable varieties of *Abraxas grossulariata* reared during recent years by Mr. Harwood, of Colchester, the result in the majority of cases of selected interbreeding, among which the more important lots were, to quote the catalogue descriptions, among the *lacticolor-lutea* forms—"a combination of *radiata* and *nigro-venata* with broad

yellow band" 20/-, "*nigro-venata*, a magnificent strongly marked female," 30/-, "an exceptionally fine light female with clear yellow ground colour," 32/6, "*nigro-venata*, a large and handsome radiated female," 32/6, and "a somewhat similar specimen suffused with black scales," 22/- . Of other forms, one described as "a magnificent female of *nigro-venata* type with broad orange band," sold for 45/-, and "a wild female deeply suffused with orange-yellow," made 42/- . The majority of the other lots went for a few shillings apiece, the total realized being just under £30 for the sixty-three specimens.—R. A.

TORTRIX PRONUBANA REARED FROM IVY.—Some two or three years ago I reared a couple of specimens of *Tortrix pronubana* from rolled ivy leaves; but, as in the case of others that I have from time to time reared from privet, rose, and even *Chrysanthemum*, the plants on which they were found were growing in very close proximity to hedges of *Euonymus japonica*, on which larvæ were known to be feeding, and the insects were either in the pupal web or had actually turned to pupæ when found, I hesitated to regard the ivy as the food-plant, as there was a possibility that the full-fed larvæ might have been disturbed from the *Euonymus* and spun up in the other plants as the first suitable place that they came upon for pupation. In September last, however, I met with larvæ feeding in ivy leaves far from any *Euonymus*, and not only were many of them by no means full-fed, but were distributed in little patches over the ivy for nearly a mile, and every one that I took produced *T. pronubana*, excepting in the case of two or three, from which a dipterous parasite known to infest that species emerged. We may therefore, I think, now accept ivy as one of the regular food-plants of the species.—ROBERT ADKIN; Lewisham, December, 1912.

SYMPETRUM FLAVEOLUM, L., IN NORFOLK.—A fully mature male example of *Sympetrum flavesculum*, L., has just been submitted to me by the Hon. N. Charles Rothschild. This dragonfly was taken by Mr. J. H. Woodger, who informs me that he found it on the sand-hills of Blakeney Point, North Norfolk, between July 26th and 31st of the current year. I have not heard of the capture of *S. flavesculum* elsewhere in this country during 1912, and in view of the measure of uncertainty which still exists about the status of the species as a British insect, it seems desirable to record all such occurrences.—KENNETH J. MORTON; 13, Blackford Road, Edinburgh, December 18th, 1912.

PYRAMEIS ATALANTA.—My experience differs from that of Mr. Postans (*Entom.* vol. xlv. p. 324). *P. atalanta* larvæ have been abundant here continuously, and in all stages, from the beginning of July until well into November. The last I found was full-fed Nov. 7th, and these pupated two days later. I noticed females laying eggs at the end of May and also in mid-August. Surely there can be no doubt that there are at least two broods of this insect?—C. E. NEWNHAM; Ringwood.

PACHNOBIA RUBRICOSA IN NOVEMBER.—On November 16th last, a moth flew to the window, attracted by my electric light. I opened

the window and the insect flew into the room and was captured. I was greatly surprised to find that it was a freshly emerged specimen of *P. rubricosa*.—PERCY RICHARDS.

PTEROPHORUS PHEODACTYLUS, Hübn., IN YORKSHIRE.—In 'The Naturalist' for January (No. 672) Mr. W. Mansbridge records *P. pheodactylus* as plentiful among *Ononis arvensis* at Sledmere on July 10th, 1902.

FURTHER RECORDS OF COLIAS EDUSA IN BRITAIN, 1912:—

Essex.—Mr. Norman Lott caught a very large female specimen on May 19th. It was flying about a market garden near Maldon. Several others were seen about the same time.—E. E. BENTALL; The Towers, Heybridge.

Isle of Wight.—A fine male was seen near Freshwater on May 13th. It was flying along the edge of the cliff, and passed within a few yards of me.—JOHN B. HICKS; Stoneleigh, Elmfield Road, Bromley, Kent.

Glamorgan.—On June 24th a specimen, in perfect condition, was taken from a flower-head of the common St. John's wort near Cardiff. No other specimen of the species was seen until Sept. 21st, when one was noted at Marshfield.—F. MORTON; 126, Queen Street, Cardiff.

Kent.—*C. edusa* was common here during the latter part of July.—PERCY RICHARDS; Seabrook, Hythe.

Sussex.—Between August 22nd and September 6th I captured ten specimens, all males, at High Down, between Littlehampton and Worthing.—W. GIFFORD NASH; Bedford.

Midlands.—Early in October I saw a beautiful specimen in Sutton Park, Birmingham.—ERIC BIDDLE; Selborne, Western Road, Wylde Green, Birmingham.

Cornwall.—During September and the first week in October I was in West Cornwall, and whilst there saw eight or nine specimens of *C. edusa*, mostly in fresh condition.—HAROLD HODGE; 9, Highbury Place, N.

Ephemeroptera, Plecoptera, and Trichoptera from Central Wales.—The species enumerated in the following list were among the very few insects I obtained at Llandrindod Wells, Radnorshire, last August. For their identification I am indebted to Mr. Eaton (Ephemeroptera) and to Mr. Morton (Plecoptera and Trichoptera). I have also to thank Mr. H. Campion and Mr. Lucas for kind assistance in obtaining this authoritative determination. Three or four species of the Planipennia were also secured, and these will be referred to by Mr. Lucas in his paper on the species of the order noted in Britain during 1912:—

Ephemeroptera.—*Ephemerella ignita*, Poda; *E. notata*, Eaton; *Baëtis rhodani*, Pict.; *Heptogenia sulphurea*, Müll.; *Ecdyurus venosus*, Fab. Disturbed from alder bushes growing on margin of the river Ithon at Shaky Bridge. Nearly all were of the female sex, and in subimago stage. They matured in the pill-boxes, and remained alive for several days.

Plecoptera.—*Chloroperla grammatica*, Poda; only one specimen captured. *Leuctra geniculata*, Steph.; several seen. *L. klapaleki*, Kempny; one specimen.

TRICHOPTERA.—*Limnophilus lunatus*, Curtis (two); *L. auricula*, Curtis (one); *L. sparsus*, Curtis (several); *Lepidostoma hirtum*, Fab. (one); *Hydropsyche lepida*, Hag. (one); *Glossosoma vernale*, Pict. (one). The majority of these insects came to electric lights in house.—RICHARD SOUTH; 96, Drakefield Road, Upper Tooting.

EARLY EMERGENCE OF SELENIA LUNARIA.—A year ago I recorded an early emergence of *S. lunaria*, viz. on January 15th, 1912. I have now to record a still earlier emergence of the same species. On looking at one of my pupa-cages on January 5th I found a female specimen fully developed, which may have emerged several days earlier. The cage had been kept in my dining-room. The mean temperature of the preceding weeks had, of course, been considerably over the average for the time of year.—(REV.) J. E. TARBAT; Fareham, January 16th, 1913.

PIERIS BRASSICÆ LARVÆ IN JANUARY.—In the 'Entomologist,' vol. xli. p. 39, I recorded finding four larvæ of *P. brassicæ* on January 4th, 1908, at Rayleigh, Essex; these were fully grown, and had already begun spinning themselves up for pupation. In the same volume, p. 62, Mr. W. E. Butler states that he found several larvæ of this species in his garden at Reading on January 10th, 1884, a very mild winter. I am now able to again record the appearance of the larvæ of this butterfly in January. On the 12th ult. I received for identification four fully grown larvæ from Mr. W. F. Dale, which he found feeding on brussels sprouts in his garden at Witney, Oxon. In his letter accompanying the specimens he says: "Until recently there were quite a lot of them, and during the past few days they have been crawling up the windows of the house to spin up." One of the four larvæ received has pupated; it spun up on the 13th and pupated 18th, the transformation occupying five days, although kept in a warm room.—F. W. FROHAWK; January 19th, 1913.

NEMEOBIUS LUCINA EMERGING IN DECEMBER.—Seeing Mr. R. G. Benton's note on the above in 'The Entomologist' for January, I examined a few pupæ (eleven) of *N. lucina* which I had kept out of doors, and I found that one imago had emerged and was lying dead but in good condition on the floor of the cage.—G. BERTRAM KER-SHAW; West Wickham, Kent.

EUPITHECIA (PUMILATA ?) IN JANUARY.—When staying in Truro I saw, on the evening of January 2nd, a *Eupithecia*, which I believe was *pumilata*, sitting on the drawing-room wall. I had no entomological apparatus with me and so did not box it. It was a perfectly fresh specimen and I do not think I am mistaken in the species.—H. V. PLUM; Kelly College, January 23rd, 1913.

CUCULLIA CHAMOMILLÆ EMERGING IN NOVEMBER.—If Mr. W. A. Tyerman will turn to vol. xxv. of the 'Entomologist,' p. 16, he will see that I there recorded having bred a specimen of this moth on November 5th.—GERVASE F. MATHEW; Lee House, Dovercourt, January 20th, 1913.

'THE REVIEW OF APPLIED ENTOMOLOGY.'—The Committee of the Imperial Bureau of Entomology will issue from January, 1913, a

monthly journal under the title quoted. It will be edited by Mr. Guy A. K. Marshall, and will deal chiefly with insects that are known to be either noxious or useful; a summary of the current literature on the subject from all parts of the world will be given. Further particulars will be furnished by Messrs. Dulau & Co., Soho Square, W.

HEWITSON'S DRAWINGS OF LEPIDOPTERA.—KEY TO THE SPECIES.—In the Hancock Museum, Newcastle-on-Tyne, is to be found an octavo volume of plates painted by Hewitson; not to be seen, however, in the library with the other books of Hewitson, to which museum Mr. Hewitson at death bequeathed the whole of his splendid entomological library; this volume reposes carefully in the safe. It consists of 532 exquisitely painted plates by Mr. Hewitson, with the name of the species opposite each in copper-plate writing; they are magnificent miniatures of the species, not all, however, described by Mr. Hewitson. There 532 plates, averaging five illustrations to a page, with 1,881 specimens, and figuring in all about 1,537 species. They illustrate amongst others the following: Papilionidæ, Pieridæ, Danaidæ, Heliconidæ, and other families. Mr. E. Leonard Gill, the Curator of the museum, first showed me this work during 1911, and I was much struck with the beauty of the drawings and the value as an adjunct of Hewitson's other books. This book indeed appears unknown, and recently when I was over I took the above particulars of it. It is bound with a title-page and notes by Lieutenant-Colonel Adamson as below:—

“This wonderful collection of drawings of Butterflies was made by W. C. Hewitson. It contains 1,537 species, all beautifully coloured, and most of them named by him. It was bequeathed by him to the Natural History Society. April, 1899.”

The title-page is as follows: “A collection of original water-colour drawings of Rhopalocera by Wm. C. Hewitson; was bequeathed by him with his Entomological library to the Natural History Society of Northumberland, Durham, and Newcastle. August 6th, 1901. C. H. E. Adamson, Lt.-Col.”

I think some valuable determinations could be elucidated by a critical examination of this book.—J. HENRY WATSON.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*Wednesday, November 6th, 1912.*—The Rev. F. D. Morice, M.A., President, in the chair.—Dr. Emile Frey-Gessner, La Roseraie, Genève, Switzerland, was elected to the Honorary Fellowship rendered vacant by the death of Prof. Ganglbauer.—Messrs. G. C. Bodkin, Government Entomologist, George Town, British Guiana; C. Talbot Bowring, Acting Commissioner of Customs, Wenchow, China; Frederick Lionel Davis, J.P., M.R.C.S., (Eng.), L.R.C.P. (Lond.), Belize, British Honduras; Dr. John Dewitz, Devant-les-Ponts, Metz, Lorraine; Howard Mountjoy Hallett, 13, Earl Road, Penarth, Glamorgan; A. D. Imms, D.Sc., B.A., F.L.S., Forest Zoologist to the Government of India, Forest Research Institute, Dehra Dun, U.P., India; Nigel Jardine,

2, Castle Street, Ashford, Kent; Harold H. King, Government Entomologist, Gordon College, Khartoum, Sudan; Jal Phirozshah Mullan, M.A., Assistant Professor of Biology, St. Xavier's College, Chunam Kiln Road, Grant Road, Bombay, India; Edward J. Paterson, Fairholme, Crowborough; W. Rait-Smith, 86, Gladstone Street, Abertillery, Monmouthshire; and Dr. Adalbert Seitz, 59, Bismarckstrasse, Darmstadt, Germany, were elected Fellows of the Society.—The Rev. G. Wheeler exhibited, on behalf of the Rev. F. E. Lowe, a series of *Brenthis pales* taken in the Heuthal, Bernina Pass, on June 24th, 27th and 28th, 1912. Some were of the var. *isis* and some of the females of the ab. *napæa*, but the most remarkable were very pronounced examples of the ab. *suffusa*, Wh., both male and female, some of the latter being almost completely black; also, on behalf of Mr. R. M. Prideaux, a series of unusually blue females of *Polyommatus icarus*, taken in the spring of this year in the Westerham district.—Mr. L. W. Newman, a long and constant series of *Melitæa aurinia*, bred from two batches of ova laid by North Cornwall females; the series comprised several hundred specimens and was exhibited to show the very small variation in such a large number of this variable species; also, on behalf of Mr. G. B. Oliver, a varied series of *M. aurinia*, bred by the latter, also from North Cornwall larvæ.—Mr. W. A. Lamborn, two larvæ and two bred imagines with corresponding pupa-cases of the Lycaenid butterfly *Eulphyra mirifica*, Hall. The larvæ were found in a nest of the ant *Cecophylla smaragdina* var. *longinoda*, no less than nineteen being obtained from three.—Professor Poulton read a letter, written May 27th, 1912, from Peradeniya, Ceylon, by Mr. E. E. Green, describing the production of the spherical structures on the cocoons of the Tineid moth *Epicephala chalybacma*, Meyr., and exhibited the cocoons referred to therein.—Mr. J. A. de Gaye, examples of the West African Agaristid moth *Messaga monteironis*, Butler, and its model the Hesperid *Pyrrochalcia iphis*, Drury, captured by him.—Mr. H. M. Edelsten, a living Buprestid larva (species uncertain) which had been found in Messrs. Allen and Hanbury's works at Ware in roots of sandalwood.—Dr. F. A. Dixey made some remarks on the Pierine genus *Pinacopteryx*, illustrating them by exhibiting male and female specimens of most of the species, side by side with which were shown drawings made to scale of the plumules characteristic of each form.—Mr. Donisthorpe exhibited a specimen of *Thorictus foreli* var. *bonnairci*, Wasm., a small beetle, fastened on to the antenna of an ant, *Myrmecocystus bicolor*, F.—Mr. A. Bacot, an Acridiine Orthopteron from the Benguella Plateau, which bore a very perfect resemblance to the scorched grass-stems, on one of which it was resting; also specimens of the Dipteron *Glossina palpalis* var. *welmani*, Austen, from Catumbella River.—Mr. Eltringham, two specimens of an unusually large Lasio-campid larva which had been presented to the Hope Department by Mr. C. A. Foster, who took them in Sierra Leone. Each larva was about seven inches in length. Professor Poulton suggested that the larvæ might perhaps be *Gonometa subfascia* Walk., or *G. regia*, Auriv.—The following papers were read:—"On New Species of Fossorial Hymenoptera from South Africa, chiefly Elidinae," by Rowland E. Turner, F.E.S.; "The Life-History of *Pseudacreea eurytus*

hobleyi, Neave," by G. H. D. Carpenter, B.A., B.M., B.Ch., F.E.S.; "Some Luminous Coleoptera from Ceylon," by E. Ernest Green, F.E.S.

Wednesday, November 20th, 1912.—The Rev. F. D. Morice, M.A., President, in the chair.—The following were elected Fellows of the Society:—Miss Margery H. Briggs, B.Sc., 7, Winterstoke Gardens, Mill Hill, N.W.; Messrs. Edward Ballard, Zomba, Nyassaland; George Trevor Lyle, Bank House, Brockenhurst; Rev. J. W. Metcalfe, The Vicarage, Ottery St. Mary; Kurt, Baron Rosen, Zoologische Staatssammlung, Munich.—The Rev. G. Wheeler, one of the Secretaries, announced that the Council had nominated the following Fellows as Officers and Council for the Session 1913–1914:—President, George T. Bethune-Baker, F.L.S., F.Z.S.; Treasurer, Albert Hugh Jones; Secretaries, Commander J. J. Walker, M.A., R.N., F.L.S., and the Rev. George Wheeler, M.A., F.Z.S.; Librarian, George Charles Champion, A.L.S., F.Z.S. Other members of the Council, Robert Adkin, James E. Collin, John Hartley Durrant, Stanley Edwards, F.L.S., F.Z.S., Harry Eltringham, M.A., F.Z.S., A. E. Gibbs, F.L.S., F.Z.S., Rev. F. D. Morice, M.A., Gilbert W. Nicholson, M.A., M.D., Hon. Nathaniel Charles Rothschild, M.A., F.L.S., F.Z.S., W. E. Sharp, J. R. le B. Tomlin, M.A., Colbran J. Wainwright.—Mr. W. A. Lamborn exhibited (1) a small company of the Nymphaline butterfly *Euphadra ravola*, Hew., which he had bred in August last from larvæ found together under one leaf near Oni Camp, Lagos; (2) two bred families of the Pierine butterfly *Leuceconia arya*, Fabr., with the female parent in each case.—Mr. E. C. Bedwell, specimens of *Lasiosomus nervis*, H.S., one of the rarest of the British Lygæidæ.—Mr. O. E. Janson, specimens of a remarkable Mantid oötheca from Delagoa Bay that had been described and figured by the late Mr. Shelford.—Mr. E. C. Joy, two aberrant specimens of *Colias edusa*, bred from Folkestone in October last.—Dr. K. Jordan, two nests of *Eucheira socialis* recently received from Western Mexico. The caterpillars of this Pierine butterfly live gregariously in an opaque nest of silk, which has an aperture at the lower end. Pupation takes place in the cavity of the nest, the pupæ being suspended by the tail, as in the case of Nymphalidæ.—The following papers were read:—"Notes on Various Central American Coleoptera, with Descriptions of New Genera and Species," by G. C. Champion, A.L.S. F.Z.S., F.E.S.; "The Butterflies of the White Nile, a Study in Geographical Distribution," by G. B. Longstaff, M.A., M.D., F.E.S. A considerable discussion took place on the subject of Dr. Longstaff's paper.

Wednesday, December 4th, 1912.—The Rev. F. D. Morice, M.A. President, in the chair.—Mr. C. A. Foster, Woreestershire Regiment, Beechwood, Iffley, Oxford, was elected a Fellow of the Society.—The President announced the death of Mr. W. F. Kirby, formerly Honorary Secretary of the Society.—Mr. Waterhouse exhibited a diagram of the oötheca of a *Mantis* and read notes upon it.—Mr. W. J. Kaye, a number of butterflies with one moth belonging to the principal Müllerian Association as found in Costa Rica. A number of specimens, both set and unset, of the principal Müllerian group from Caracas, Venezuela, were also shown, to exhibit the far closer resemblance of the under sides than the upper sides.

From Santos, S. E. Brazil, were shown the principal members of a synaposematic group to call attention to a member of the group that had not been previously mentioned. The species was *Pericopsis isse*, a Hypsid moth.—Dr. G. B. Longstaff, a small box of Chrysidids, and started an interesting discussion on the means by which the metallic coloration was produced.—Mr. J. Platt Barrett, series of *Melanargia japygia* and *M. galatea* from Sicily.—Mr. G. T. Porritt, a series of *Platyceles roeselii* taken by himself at Trusthorpe, on the Lincolnshire coast this year.—Mr. W. A. Lamborn supplemented his previous account of two families of bred *Leuceconia argia* by referring to a short series of females taken at Oni between April 1st, 1910, and January 25th, 1911, a period including a whole wet season and a part of two dry seasons.—Mr. J. A. Simes exhibited a short series of *Parnassius apollo* from the Government of Viatka, with a series from the Alps of Dauphiny and Switzerland for comparison.—Professor Poulton said that at his desire Miss Fountaine had kindly prepared an account of the extremely interesting family of *Papilio dardanus* reared by her in 1909—the only Natal family at present known in which *cenea* is other than the most numerous of all the forms. He exhibited a male specimen of *P. arenaria*, taken by Dr. G. D. H. Carpenter on Bugalla, one of the Sesse Islands. *P. arenaria* had been shown by Dr. Karl Jordan to be a pale eastern geographical race of the fulvous *P. consanguinea* of the tropical west coast. It was therefore interesting to find such forms, tending towards an intermediate tint, in an island in the Victoria Nyanza. Professor Poulton also exhibited thirty-seven examples of *Rumicia phleas*, captured on the same bank at Cerne Abbas, Dorset, in the hot August of 1911 and in the cold August of 1912, by Dr. R. C. L. Perkins. Eight out of the fourteen males captured in 1911 were much darker than any of the eight males captured in 1912. The copper tint of the eight 1912 females was more brilliantly lustrous than in the seven 1911 females.—Mr. T. H. L. Grosvenor, a series of *Polyommatus icarus* females principally from various localities on the North Downs, arranged according to the year and emergence to which they belonged.—The Rev. G. Wheeler, on behalf of Mr. R. M. Prideaux, some aberrational forms of *Rumicia phleas* and three female "Blues," consisting of one very dark specimen of *Agriades corydon* and two of *A. thetis*, one being of the ab. *urania*, Gerh., and the other having the fore wings dark and the hind wings symmetrically of a pale fawn-colour. Also the specimens of *Agriades thetis* ab. *urania*, Gerh., to which he had referred at a former meeting. All were taken between Gomshall and Dorking and were first-brood specimens of this year. Also a series of blue females of *Polyommatus icarus*, most of them entirely blue, taken this spring at Notgrove in the Cotswolds, and for comparison the bluest female he had taken there previously, in which the blue scaling was less than the least blue of this spring's captures.—Dr. F. A. Dixey, specimens of *Teracolus ephyia*, Klug, and some allied forms, together with drawings of their respective scent scales.—The following papers were read:—"On some New and little-known Bornean Lycenidæ, with a Revision of the Thecline Genus *Thamala*, Moore," by J. C. Moulton, F.L.S., Curator of the Sarawak Museum; "Descriptions of South

American Micro-Lepidoptera," by E. Meyrick, B.A., F.R.S.; "Synoptic Table of the British Species of *Aleynota* and *Atheta*, Th.," by Malcolm Cameron, M.B., R.N.; "Comparative Notes on *Chilalce galba*, Lea., and *C. phiala*, Gr.-Gr.," by G. T. Bethune-Baker, F.L.S., F.Z.S.; "Notes on the Specific Distinction of Certain Species in the *orbitulus* and *phretiades* Section of the Genus *Plebeius*," by G. T. Bethune-Baker, F.L.S., F.Z.S. Mr. Bethune-Baker exhibited the species referred to in the latter paper, and mentioned the conclusions to which he had come as to their specific value or otherwise.—GEORGE WHEELER, M.A., *Hon. Secretary*.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*October 24th, 1912.*—Mr. A. E. Tonge, F.E.S., President, in the chair.—The Secretary exhibited four specimens of *Abraax grossulariata* ab. *varleyata*, presented to the Society's cabinet by Mr. G. T. Porritt.—Mr. Ashdown, a collection of butterflies made during his holiday in Switzerland in June and July.—Mr. Colthrup, a series of very fine photographs of Lepidoptera at rest, and of famous entomological localities.—Mr. Newman, the one *Colias elusa* and four var. *helice* he had bred this year from a captured var. *helice*; some *Pyrameis atalanta* with smoky-red bands; and a fine series of autumn-bred hybrids, *ocellatus-populi*, showing much variability. These last had not been forced.—Mr. Tonge, a long series of *Tephrosia bistorta*, second brood, bred from a female from Tilgate Forest, captured in the spring.—Mr. Kaye, an uncommon Pyrale, *Aglossa cuprealis*, captured in his house at Surbiton.—Mr. Edwards, the exotic Papilio, *P. caecicus*, from South America, and *P. helleri* and *P. andræmon* from Mexico.—Mr. L. Gibb, a living example of *Polygonia c-album*.—Mr. Adkin, short series of *Eupithecia innotata* and *C. fraxinata*, and initiated a discussion on the specific stability of these as two separate species.—Mr. Grosvenor, two drawers of *Pieris napi*, showing the geographical variation occurring in the British Isles.—Mr. Sheldon, all the species of the genus *Erebia* known to occur in Scandinavia and which he had taken in his trips there during 1911 and 1912.

November 14th, 1912.—Mr. A. E. Tonge, F.E.S., President, in the chair.—Mr. H. W. Martin and Mr. Ronald Marshall, of Bexley, were elected members.—Mr. B. H. Smith presented a large collection of British mosses to the Society's reference collections. The specimens were mounted and contained in thirty-one volumes.—Mr. Newman, twigs of willow extensively attacked by tits for the larvæ of beetles and the mites in the nodules caused by the last; long and variable series of *Polia chi* from Sheffield, mostly dark; and several series of *Melitæa aurinia*, including a very variable series bred at Birmingham, and a very uniform series bred at Bexley, both series originating from the same localities.—Mr. Sheldon, series of the Brenthids taken by him in Lapland this year, viz., *B. frigga*, *B. freija*, *B. polaris* and *B. pales* var. *lapponica*, with series of *Eneis jutta* and *E. norma*, pointing out the extreme variability of the last-named.—Mr. F. H. Grosvenor, a long series of *B. perla* from Deal, where it occurred in abundance in late August.—Mr. Tonge, the same species and a short series of *B. muralis* from the same place, including an

ab. *impar* and a specimen as small as *B. perla*.—Mr. Bacot, a curious mimetic Acridian from Portuguese West Africa, which rested on the charred stumps of vegetation burnt annually, and showed very perfect protective resemblance.—Mr. Gardner, long and varied series of British Lepidoptera, including *Boarmia repandata* from North Devon, with var. *conversaria* and many intermediates; *Hypsipetes sordidata* from Forres, probably bilberry forms, many being very extreme; *Larentia didymata* from many localities indicative of local races, and *Melanippe fluctuata*, including varied London forms and aberrations, with dark Scotch and Shetland forms.—Mr. H. Main, the galls of *Biorhiza aptera* on the rootlets of the oak, some cut open to show the workings, the larvæ, and the parasitic larvæ.—Mr. W. J. Kaye, a fine set of the species of butterflies forming the principal Müllerian association in Costa Rica, including fourteen species of Ithomiinæ, three species of Heliconiinæ, one Pierinæ, one *Eresia*, and a new species of *Castnia*. He also showed a smaller, similar, mimetic group from Caracas, Venezuela.—Mr. Sheldon, the series of *Eupithecia innotata* and *E. fraxinata* referred to by him at the previous meeting.—Lantern slides were exhibited by Mr. W. West (Ashtead), sporangia of Myxomycetes; Dr. Chapman, the delegates to the International Congress; Mr. Tonge, ova of Lepidoptera *in situ*; Mr. Main, life-histories of the snake-fly (*Raphidia*), the alder-fly, and the "jumping" saw-fly (*Phylotoma*); and Mr. Dennis, galls caused by aphids and mites.—HY. J. TURNER, *Hon. Rep. Sec.*

THE MANCHESTER ENTOMOLOGICAL SOCIETY.—The first meeting of the 1912-13 Session was held in the Manchester Museum on October 2nd, 1912.—The following exhibits were made:—Mr. R. Tait, Jr., series of *Agrotis ashworthii* from North Wales, including a number of dark specimens; *Nyssia zonaria* bred from ova laid by a North Wales female; *Melitæa aurinia* bred from Irish larvæ; *Geometra papilionaria* bred from Delamere larvæ; *Tephrosia luridata* bred from Wyre Forest ova; *Cucullia chamomilla* from Carrington Moss, Cheshire; a bred series of *Ennomos autumnaria*. Series from South Devon (taken in June, 1912) of *Leucophasia sinapis*, *Melanippe procellatu*, *Larentia galiata*, *Ligdia adustata*, *Bapta temerata*, and *Colias edusa*; also a variety of *Agrotis exclamationis*. He also showed a fine series of *Boarmia repandata*, including the melanic form from North Wales, a different melanic form from Durham, and a pale form from South Wales.—Mr. W. P. Stocks, F.R.C.S., a large number of species, which included:—From Silverdale: *Nemobius lucina*, *Ino geryon*, *Nola confusalis*, *Grammesia trigrammica*, with var. *bilinea* inclining to var. *obscura*, *Ligdia adustata*, *Bapta temerata*, *Malenydris salicata*, &c. From Baslow: *Xanthorhoë fluctuata* var. *costovata*, a beautiful example; *Bryophila perla*, a series. From Selkirk: *Pygæra pigra*. From Fowey: *Diaphora mendica*.—Mr. C. F. Johnson, series of *Ligdia adustata*, *Ino geryon*, and *Semiothisa alternata*, from Witherslack; *Lophopteryx camelina*, *Tephrosia luridata* and *Pachys strataria*, bred from larvæ beaten in Wyre Forest; a peculiar buff-coloured specimen of *Opisthograptis luteolata*, taken at Stockport.—Mr. W. Mansbridge, series of *Nyssia zonaria*, from Crosby sandhills; *Gonodontis bidentata* with var. *nigra*, from Brad-

ford parents: *Ematurga atomaria*, from Delamere, with melanic variety from Burnley; *Mamestra glauca* with dark variety, and *Coremia ferrugata*, both spring and July forms, showing seasonal variation—from Burnley; blue females of *Lycæna icarus*, from the Crosby sandhills; vars. of *Abraaxas grossulariata* bred from wild Huddersfield larvæ; *Boarmia repandata*, with a pair of var. *nigra*, bred from Delamere Forest—the first var. *nigra* Mr. Mansbridge has taken in that locality; a slaty form of *Boarmia gemmaria* from the Liverpool district; *Aplecta nebulosa* with var. *robsoni* and *Sesia culiciformis*, from Delamere.—Mr. B. H. Crabtree:—From Lakeside, Windermere: bred series of *Dasychira pudilunda* and *Acronycta psi*; series of *Nemeobius lucina*, *Thanaos tages*, and *Argynnis euphrosyne*. A bred series of *Abraaxas grossulariata* from Huddersfield. Varieties of *Arctia caia* from wild Altrincham larvæ.—Mr. A. E. Wright, the following series: *Nyssia zonaria*, from Blackpool; *Cucullia chamomilla*, from St. Anne's-on-Sea; *Hybernia marginaria* var. *fuscata*, from Burnley and St. Anne's-on-Sea; *Lygris testata*, from Burnley, including one dark male; *Anticlea badiata*, from St. Anne's-on-Sea and Burnley; a long series of *Hybernia leucophæaria*, including a number of var. *marmorinaria* from Delamere; *Ligdia adustata*, *Lomasipilis marginata*, and *Nemoria viridaria*, from Witherslack; a fine series of *Ematurga atomaria*, from Witherslack, Delamere, and Burnley, including black forms, both sexes; *Mamestra glauca*, from Burnley and Cannock Chase; *Eupithecia succenturiata*, from Southport.—Mr. W. Buckley, bred series of *Boarmia repandata*, *Agrotis ashworthii*, *A. agathina*, and *Noctua brunnea*, from Penmaenmawr; *Dianthæcia conspersa*, from Anglesea, which had been three winters in pupa.—Mr. L. Nathan, bred *Dasychira fascelina*, from Southport larvæ; *Papilio machaon*, from Wicken Fen, &c.—Mr. J. H. Watson, male and female living leaf-insects, *Pulchryphyllum crurifolium*, from Ceylon, bred by Dr. Russell from ova sent last year; two boxes of *Parnassius apollo*, showing about fifteen subspecies.—Mr. J. E. Cope, the following Coleoptera:—*Carabus glabratus*, *C. granulatus* (dark form) and *C. catenulatus* (small form), taken by Mr. A. W. Boyd in the Lake District, in 1912; *C. catenulatus* and *granulatus* (light form) from Ashton Moss; *Ocyopus olens*, from Ashton Moss; *Melolontha vulgaris*, from Delamere; *Gnorimus nobilis*, from Worcester; also *Phyllotreta nemorum*—the northern turnip-flea.

November 6th, 1912.—Meeting in the Manchester Museum.—Mr. C. F. Johnson exhibited part of a collection of butterflies made in 1912 at Vernet-les-Bains, St. Martin-du-Canigon, and Mont Canigon in the Pyrenees. A number of species were shown, including *Erebia lefebvrei*, *E. epiphron* var. *pyrenaica*, &c., and in some cases the corresponding English form was shown.—Mr. W. Mansbridge showed, on behalf of Mr. R. Tait, Jr., a long and varied series of *Agrotis agathina* bred in 1912 from larvæ from North Wales, including some splendid examples.—Mr. J. H. Watson, living Coleoptera—*Brachycerus paganus*, from Delagoa Bay; specimens of *Hemileuca neu-morgeni* and *H. burnsi*, for comparison; a large number of lepidopterous cocoons, taken from a cargo of Rangoon rice at Birkenhead.—Mr. B. H. Crabtree, a very grey example of *Saturnia carpini* from Essex, with a yellow dash at the tip of the wing.—Mr. J. Ray Hardy

a rare beetle, *Lyctus brunneus*, bred from Sherwood Forest.—A. W. BOYD, M.A., *Hon. Sec.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Meeting held at the Royal Institution, Liverpool, November 18th, 1912.—Dr. P. F. Tinne, Vice-President, in the chair.—Mr. F. C. Burne and Miss Dorith Ida Burne, of New Brighton, were elected members of the Society.—Mr. Wm. Mansbridge read a paper entitled "Moorland Collecting," which dealt with the Lepidoptera to be found on the high moorlands of Lancashire and Yorkshire; a discussion ensued, in which many of the members took part.—Exhibits were as follows:—Mr. W. A. Tyerman, a beautiful series of *Epunda nigra* bred from Devonshire ova.—Mr. F. N. Pierce, a short series of *Melileuca ocellaris* from the Thames valley.—Dr. P. F. Tinne, a small collection of Sphingidæ from British Guiana.—Mr. Wm. Mansbridge, *Thera variata* from Bournemouth, with notes.

The Annual Meeting of the Society was held at the Royal Institution, Colquitt Street, Liverpool, on Monday, December 16th, 1912.—Dr. P. F. Tinne, Vice-President, in the chair.—Mr. Charles Percy Rimmer, Liverpool, was elected a member of the Society.—The following members were elected Officers and Council of the Society for 1913:—President: F. N. Pierce, F.E.S.; Vice-Presidents: R. Wilding, Wm. Webster, Hugh Main, B.Sc., F.E.S.; Treasurer: J. Cotton; Librarian: F. N. Pierce; Hon. Secretary: Wm. Mansbridge, F.E.S.; Council: C. B. Williams, R. T. Cassall, F.E.S., L. West, H. S. Leigh, F.E.S., A. E. Gibbs, F.L.S., F.E.S., A. W. Boyd, M.A., F.E.S., C. E. Stott, F. S. Tinne, M.A.—The Vice-Presidential address by Mr. Claude Morley, F.E.S., entitled "Ichneumons," was read, and a vote of thanks to the author was unanimously carried.—The following exhibits were made, viz.:—Mr. F. N. Pierce, *Dianthecia luteago*, *D. barrettii*, and *D. argillacea*.—Mr. Rimmer, a small collection of Macro- and Micro-Lepidoptera, including *Polyommatus phlæas* var. *schmidtii*, a specimen from Anglesey, and a specimen of *Amphipyra pyramidea* from Carnarvon.—WM. MANSBRIDGE, *Hon. Sec.*

RECENT LITERATURE.

The Beginner's Guide to the Microscope. By CHAS. E. HEATH, F.R.M.S. Percival Marshall & Co. Pp. 1-119.

As a guide to the construction of the microscope this is certainly quite a useful production, dealing with this section of the subject far more fully than does the average beginner's book. The principle of the microscope is explained at some length and useful hints are given as to the care and manipulation of the instrument. Unfortunately the section dealing with the preparation and mounting of objects, though forming quite a helpful general guide and containing much that is essential, seems altogether too short in proportion, occupying, as it does, a bare thirty pages of the text.

N. D. R.

Annals of Tropical Medicine and Parasitology. Series T. M., vol. vi., No. 4. Liverpool, December, 1912.

BESIDES articles of less interest to entomologists, this number contains:—(1) "Experiments on *Cimex lectularius*," by Dr. B. Blacklock. (2) "Three New African Species of *Tabanus*," by H. F. Carter—*T. nagamiensis*, *T. fulvicapillus*, and *T. donaldsoni*. (3) "Sex of Mosquito Larvæ," by Helen A. Adie.

W. J. L.

The Entomologist's Log-Book. A Dictionary of the Life-histories and Food-plants of the British Macro-Lepidoptera. Giving many thousands of Facts and Data connected with the appearance of the Ova, Larvæ, Pupæ, and Imagines; Methods of Capture; Habitats; Food-plants; Authorities; Synonyms, &c., in Latin and English throughout, and interleaved for private notes. By ALFRED GEORGE SCORER, F.E.S., &c. Pp. i.-vii. and 1-374. London: George Routledge & Sons, Limited. 1913.

As will be gathered from the analysis of contents appearing on the title-page, this bulky volume is not only an epitome of recorded facts concerning British Macro-Lepidoptera, but as it is interleaved with blank paper, space is provided for additional matter, new or otherwise, that it may be desirable to enter. In almost every case useful notes in reference to larva and pupa, as well as imago, are given.

As the subjects are arranged alphabetically, there is no difficulty in turning up details of insects or food-plants, even when only their English names are known.

The preparation of a work of this kind is little short of actual drudgery, and we heartily congratulate Mr. Scorer on the highly successful result of his labour. It appeals to all lepidopterists, but will be of the greatest value to the field worker.

United States Department of Agriculture. Bureau of Entomology:—

Bulletin No. 95, Part iv.: The so-called "Curlew Bug" (*Sphenophorus callosus*, Oliv.). By F. M. Webster (April 10th, 1912).

Part v.: The False Wireworms (*Elleodes*) of the Pacific Northwest. By James A. Hyslop (April 22nd, 1912). Part vi.: The Legume Pod Moth (*Etiella zinckenella schisticolor*, Zell.); The Legume Pod Maggot (*Pegomya planipalpis*, Stein.). By James A. Hyslop (May 31st, 1912). Part vii.: The Alfalfa Looper. By James A. Hyslop (October 16th, 1912).

Bulletin No. 96, Part v.: The Broad-bean Weevil (*Larva rufimana*, Boh.). By F. H. Chittenden, Sc.D. (August 6th, 1912). Part vi.: The Cowpea Weevil. By F. H. Chittenden, Sc.D. (Oct. 17, 1912).

Bulletin No. 97, Part vii.: The Grape Scale (*Aspidiotus uvæ*, Comst.). By James F. Zimmer (May 4th, 1912).

Bulletin No. 98: Historical Notes on the Causes of Bee Diseases. By E. F. Phillips, Ph.D., and G. F. White, Ph.D., M.D. (March 26th, 1912).

Bulletin No. 100: The Insect Enemies of the Cotton Boll Weevil (*Anthonomus grandis*, Boh.). By Dwight Pierce and others (April 3rd, 1912).

- Bulletin No. 106: The Life History and Bionomics of some North American Ticks. By W. A. Hooker, F. C. Bishopp, and H. P. Wood (September 7th, 1912).
- Bulletin No. 108: Leafhoppers affecting Cereals, Grasses, and Forage Crops. By Herbert Osborn (September 12th, 1912).
- Bulletin No. 109, Part iv.: A Little-known Cutworm (*Porosagrotis vetusta*, Walk.). By F. H. Chittenden, Sc.D. (April 5th, 1912).
Part vi.: The Sugar-Beet Webworm (*Loxostege sticticalis*). By H. O. Marsh (September 16th, 1912).
- Bulletin No. 110: The Spring Grain-Aphis or "Green-bug" (*Toxoptera graminum*). By F. M. Webster (September 6th, 1912).
- Bulletin No. 112: Preliminary Report on the Alfalfa Weevil (*Phytonomus posticus*, Gyll.). By F. M. Webster (May 14th, 1912).
- Bulletin No. 115, Part i.: Life-history Studies of the Codlin Moth (*Carpocapsa pomonella*, L.) in Michigan. By A. G. Hammar (August 9th, 1912).
- Bulletin No. 116, Part i.: Spraying Experiments against the Grape Leafhopper (*Typhlocyba comes*, Say) in the Lake Erie Valley. By Fred Johnson (July 15th, 1912).
- Technical Series:—No. 16, Part vi.: Catalogue of Recently Described Coccidæ. By E. R. Sasser (October 19th, 1912).
No. 19, Part iv.: The Chalcidoid Genus *Perilampus* and its Relations to the Problems of Parasite Introduction. By Harry S. Smith (April 22nd, 1912). Part v.: Experimental Parasitism: a Study of the Biology of *Limnerium validum* (Cresson). By P. H. Timberlake, A.M. (May 29th, 1912).
No. 20, Part v.: A Preliminary Synopsis of Cerambycoid Larvæ. By J. L. Webb (August 14th, 1912).
No. 22: The Structure of Certain Dipterous Larvæ, with Particular Reference to those in Human Foods. By Nathan Banks. (January 10th, 1912).
No. 23, Part i.: Some New Californian and Georgia Thysanoptera. By Paul R. Jones (January 26th, 1912). Part ii.: An Internal Parasite of Thysanoptera. By H. M. Russell (April 27th, 1912).
No. 24: The Life-history of the Alder Blight Aphis (*Prociphilus tessellata*, Fitch). By Theo. Pergande (April 29th, 1912).
No. 25, Part i.: Studies on a New Species of *Toxoptera*, with an Analytical Key to the Genus and Notes on Rearing Methods. By W. J. Phillips and J. J. Davis (May 4th, 1912).

OBITUARY. — The late Rev. J. SANDY BROWN, whose death was noticed in the 'East Anglian Daily Times' of the 19th ult., was the *doyen* of the Norfolk and Norwich Naturalists' Society, now in its forty-third year. He was a good all-round naturalist, clever at photography, and an expert with the microscope, having made a collection of some two thousand specimens of natural history. During his search for these he came across one of our rarest British Hemiptera, *Aphelochirus æstivalis*, in the Norwich River. When I last saw him ten years ago he gave me all his dredging-nets.—W. H. TUCK.

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LARVÆ COLLECTOR'S GUIDE AND CALENDAR, 1911. (For the use of the collector of the larvae of butterflies and moths.)

LEPIDOPTERA COLLECTING. A Manual of the Principles and Practice of the Art.

BIRD STUFFING AND MOUNTING. (For the use of the collector of birds.)

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WITH THE ASSISTANCE OF

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Photo W. J. Lucas

West, Newman proc.

Fig. 1. Appendage of eighth ventral segment of *CHLOROPERLA VENOSA*.
Fig. 2. Appendage of eighth ventral segment of *C. GRAMMATICA*.
Fig. 3. *C. VENOSA*. Fig. 4. *C. GRAMMATICA*.



2



1



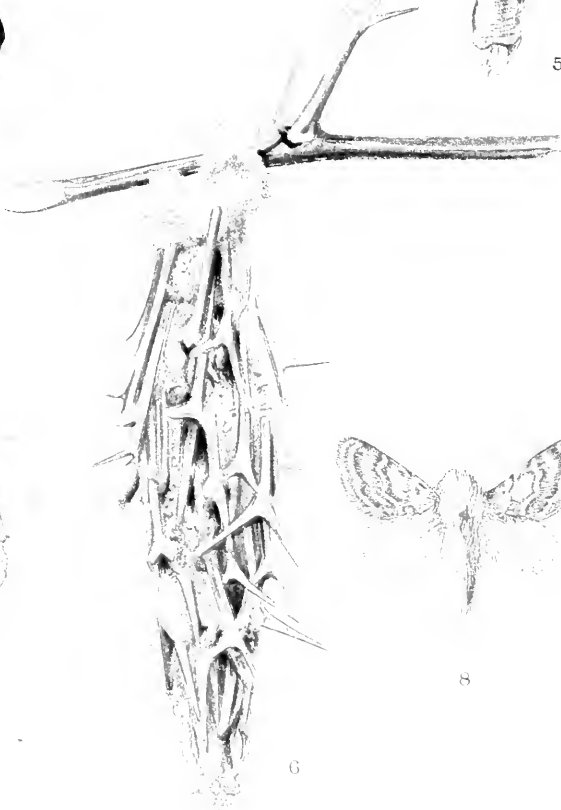
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5



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7



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© J. Cockerell del.

West. Newman chr.

1-6. OIKETICUS TOWNSENDI, *Call.* 7. EPICNAPTEKA DYARI, *Rivers.*
8. TILYPE BRACHICRISTA, *Dyar.*

THE ENTOMOLOGIST

VOL. XLVI.]

MARCH, 1913.

[No. 598

ILLUSTRATIONS OF AMERICAN LEPIDOPTERA.

BY OLIVE J. COCKERELL.*

(PLATE V.)

Oiketiscus townsendi, Cockerell, Ann. Mag. Nat. Hist. 1895, xv. p. 208. Fig. 1.—Male moth. Fig. 2.—Male larva, natural size. Fig. 3.—Anterior end of male larva, enlarged. Fig. 4.—Head and thorax of female larva, enlarged. Fig. 5.—Bag of larva, on apricot tree. Fig. 6.—Bag of larva, on tornillo (*Strombocarpa*).

Fig. 7.—*Epicnaptera dyari* (Rivers), Canad. Entom. 1893, p. 144.

Fig. 8.—*Tolype brevicrista*, Dyar, Canad. Entom. 1895, p. 246. From a cotype.

These were all collected in the Mesilla Valley, New Mexico.

AN ADDITION TO THE LIST OF BRITISH PLECOPTERA: RE-INSTATEMENT OF *CHLOROPERLA VENOSA*.

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

(PLATE VI.)

IN the "Catalogue of British Neuroptera" by McLachlan and Eaton (Ent. Soc. Lond. 1870) two species of *Chloroperla* are listed, viz. *C. rivulorum*, Pict., and *C. grammica*, Poda. The

* My sister Olive Cockerell (1869-1910), when living with me in New Mexico, made a number of drawings for Dr. A. S. Packard, intended to illustrate his volumes on American moths. Two of Dr. Packard's volumes have been published, and on examining the MSS. he left, it is found that a third (Saturniidae and Hemileucidae) can be issued, but beyond this there are only miscellaneous fragments. As the drawings now presented represent hitherto unfigured species, I have sought and obtained Mrs. Packard's kind permission to publish them.—T. D. A. C.

former is a well-known insect in the Alps of Central Europe, where it is common; that it occurs in the British Isles is extremely doubtful. McLachlan himself latterly held this view, and, I think properly, the species has been dropped from our lists.

Stephens applied names to quite a number of forms, but of these, *C. fuscipennis*, *C. lateralis*, *C. media*, and *C. venosa* were all swept by McLachlan without question into the synonymy of *C. grammatica*, while *C. rufescens* of Stephens is also referred to *grammatica* with a mark of interrogation.

During many years I have examined a very large number of British specimens of *Chloroperla*, fresh, dried, and in fluid (spirit and formalin). Although the materials presented a certain amount of variation, there was nothing to seize, and until quite recently I had never seen any British specimens that could have been separated from what has been regarded as *C. grammatica*. However, Prof. J. W. Carr, of University College, Nottingham, recently sent me a rather important lot of Neuropteroid insects for identification, and amongst these are eight examples of *Chloroperla*, which, with one exception, are obviously quite different from *C. grammatica*. Prof. Carr having very kindly given me permission to "mutilate" or otherwise deal with the material as I thought fit, I have been enabled to determine the seven examples referred to as the species to which Klapálek has applied the name of *C. venosa*, Steph. ('Die Süßwasserfauna Deutschlands, 1909; Plecoptera,' p. 48).

Like many of the smaller Plecoptera, the species of *Chloroperla* when dried are usually rather troublesome to determine, and they do not possess the complicated genitalia and armature which in *Nemoura* and *Leuctra* afford splendid characters when these have been revealed after preparation in caustic potash. These greenish Plecoptera appear, as a rule, to have less chitine in their structure, and as they do not stand caustic well they make less satisfactory balsam mounts. It should, however, be possible to separate the two species of *Chloroperla* now under consideration, even in a dried condition, and the following attempt to define the differences may be useful. In this I have not confined myself absolutely to the dried specimens, but have also used balsam mounts and examples preserved in formalin, the last-mentioned kindly mounted for me, without further preparation, by Mr. Martin E. Moseley in cells filled with the same fluid, being specially useful. The form of the appendage of the eighth ventral segment in the male, and of the subgenital plate in the female, are of themselves sufficient to separate the two, but in dried specimens these parts will often be found none too conspicuous.

C. grammatica.

Distance between the hind pair of ocelli considerably less than double the distance between these ocelli and the eyes.

Head ochreous yellow; marking between ocelli horseshoe-shaped; as a rule, clearly defined in the dry insect.

Pronotum ochreous yellow, only the warty portions of the side fields brownish.

Mesonotum chestnut-brown; the præscutum, the two lobes of the scutum and the anterior narrow part of the scutellum lying between the lobes of the scutum yellowish; the three latter parts, being outlined in brown, form a somewhat broadly cordate marking (from examples in formalin).

Neuration yellowish green, not very prominent; in fore wings, costa, outer part of radius, of sector radii, and of median, also outer cross-veins and a part of the anterior cubitus, brownish.

Setæ, as a rule, not distinctly annulated.

Appendage of eighth ventral segment of male broader than long.

Subgenital plate of female rounded.

C. grammatica is a widely spread species and usually common at clear rivers and streams.

Of *C. venosa* I have seen only the specimens sent by Prof. Carr, which bear the following data:—

Stoke Bardolph, May 11th, 1911, F. M. R. One male, one female.

River Trent, Nottingham, May 10th, 1912, H. Mottram. One female.

Nottingham, May 14th, 1912, H. Mottram. One male.

C. venosa.

Distance between the hind pair of ocelli double or rather more than double the distance between these ocelli and the eyes.

Head with the dark markings more extended and more suffused, the yellow between the ocelli often reduced to a mere spot.

Only middle field and outer margins of pronotum yellowish, the remainder usually dark in dried specimens.

Middle of præscutum yellow, the pale colour being continued usually as a rather narrow line on the anterior part of the scutellum, the lobes of the scutum remaining nearly altogether brown (from examples in formalin taken in Norway).

Wings more hyaline; neuration of fore wings rather strong and nearly all brown, excepting the veins at the base, the radius which is pale to the sector, and the subcosta which is yellow throughout.

Setæ rather distinctly annulated.

Appendage longer than broad; chitinized portion coloured in a way that gives the appendage the appearance of being contracted about the middle.

Subgenital plate of female triangular.

Radcliffe-on-Trent, May 25th, 1912, J. W. Carr. One male, one female.

Radcliffe-on-Trent, May 29th, 1912, J. W. Carr. One male.

It seems very probable that confusion exists between this species and *C. griseipennis*, Pict., and that more than one writer, including myself, has recorded from Continental rivers what is here termed *C. venosa* under the name of *griseipennis*. Klapálek has applied the latter name to an insect which is, in some respects, very like *C. venosa*, but which is rather more delicate looking, with less strongly marked neuration and with a sharply defined horseshoe-shaped marking between the ocelli.

With regard to the use of the name of *venosa*, I may say at once that it seems very improbable that Stephens knew anything about the insect now under consideration. I have not access to the *Illus. Brit. Entom. Mandib.* vi. p. 139 (1836), but Mr. Herbert Champion has very kindly sent me a copy of what is there written about *Chloroperla venosa*, and as far as I am able to judge it does not apply to Klapálek's species.

The description is as follows:—

“Sp. 4, *venosa*. *Rufescente-ochracea, oculis atris, collaris lateribus abdominisque dorso nigris, alis flavescente-iridibus nervis fusciscentibus.* (Long. corp. $4\frac{1}{4}$ lin.; exp. alar. $11\frac{1}{4}$ lin.)

Pe. *venosa*. Steph. Catal. 315. No. 3542.

Reddish ochre, with a greenish tinge; eyes and ocelli black; collar with its lateral margins broadly black; abdomen black above, its sides ochreous-green; legs greenish ochre; antennæ dusky ochreous at the base; wings yellowish green with fuscous nervures.

Found in June, near London.”

Mr. Champion has also made a very thorough search in the British collections in the Natural History Museum for anything that might throw light on what Stephens's *venosa* really was. The difficulties and unsatisfactory features of such a search have already been alluded to elsewhere (*Entom.* 1911, p. 82). A specimen, against which Stephens's drawer label “*venosa*” has been placed, was received by the Museum direct from J. C. Dale in 1862, and consequently could not have been Stephens's type; it appears to be *grammatica*. Further, Mr. Champion has practically satisfied himself that none of the examples of *Chloroperla* which he has examined are conspecific with one of Prof. Carr's specimens which I had sent to him for comparison. My best thanks are due to him for his painstaking efforts to solve the difficulties surrounding the identification of Stephens's species.

I suppose that Klapálek, following the *Brit. Mus. Cat.* (*Phryganides-Perlides*, 1852), identified his species with the insect that Pictet had described and figured (*Hist. Nat. Neur. Perl.* 297, 62, pl. 35, fig. 1-3) under the name of *venosa*, Steph.

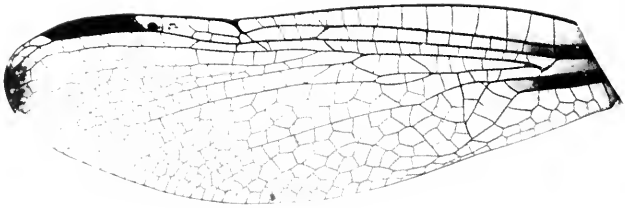


Photo F. W. & H. Champion.

West, Newman proc.

LIBELLULA FULVA. *Mill.*, ♂.

It has already been indicated that there is at present no evidence available to support the view that the latter is the same as Klapálek's *venosa*. Klapálek, however, has clearly defined the insect that he meant, and I follow the course of reinstating the name *Chloroperla venosa* into the British list, although such a course in the circumstances is not very satisfactory.

EXPLANATION OF PLATE VI.—Fig. 1.—Appendage of eighth ventral segment of *Chloroperla venosa*. Fig. 2.—Appendage of eighth ventral segment of *C. grammatica*. Fig. 3.—*C. venosa* (imago). Fig. 4.—*C. grammatica* (imago). For the photographs of the whole insects I am indebted to Mr. Lucas, who has made the very best of rather unsatisfactory subjects.

13, Blackford Road, Edinburgh: December, 1912.

NOTES ON THE DRAGONFLY SEASON OF 1912.

BY F. W. & H. CAMPION.

(PLATE VII.)

ALTHOUGH reports of dragonflies being on the wing reached us well before the end of April, the first imago which we saw alive in 1912 was a rather immature male of *Pyrrhosoma nymphula*, taken at the Black Pond, Surrey, by Mr. Norman D. Riley on the 28th of that month.

Dr. F. F. Laidlaw informs us that he saw several males and females of *Calopteryx virgo* in North Devon before the end of April. Mr. G. Meade-Waldo was kind enough to give us a female from Hever, Kent (May 27th), and a pair (male and female) from Dartmeet, South Devon, dated vi-vii, 1912, all taken by himself. *Calopteryx splendens* was, as usual, common near Huntingdon, and specimens were taken on June 19th and 21st. Dr. Laidlaw writes that the species was also abundant at Uffculme, Devon, in June and July.

On June 27th we again met with *Lestes dryas* at Ramsey, Hunts, in ditches filled with a species of *Carex* (apparently *C. riparia*). By that date only a very few specimens had reached the adult condition, and most of them were still quite teneral. Mr. E. A. Waterhouse re-visited the old *dryas* locality near Hanwell, Middlesex, after an interval of a few years, and found that since his last visit it had been entirely spoiled from an entomological point of view.

A male of *Platynemis pennipes* was taken at Hartford, Hunts, on June 19th, and Dr. Laidlaw reports the capture of two males at Uffculme during July. *Ischnura elegans* var. female *inuscans* occurred at Hartford, near Huntingdon, on June 19th. *Agrion pulchellum* was in good condition at Byfleet, Surrey, on

May 12th (H. J. Watts), and further specimens were taken in Huntingdonshire on June 19th (at Hartford), and June 27th (at Ramsey). On May 26th we took a male of *Agrion puella* at Sudbury, Middlesex. *Erythromma naidis* was met with near Huntingdon on June 19th, 21st, and 22nd. A female taken on the last-named date had the left mid-leg re-grown from the base. The right mid-leg also had the tarsus redeveloped, and possessed only a single claw. It is interesting to recall here another specimen of the same species in which we found a regenerated mid-leg (Entom. xl. p. 213 (1907)). At Byfleet Mr. Watts obtained one specimen of *Pyrrhosoma nymphula* var. female *melanotum* on May 12th, and another on June 9th. We do not recollect any previous occurrence of this form in Surrey. In view of the great extent to which the female of *P. nymphula* was observed to vary at Byfleet in the matter of abdominal coloration, Mr. Watts furnished us with a good number of specimens from that locality, taken on May 26th and June 9th. By arranging these specimens in a long series, with the extremely bronzed form (var. *melanotum*) at one end, and the extremely crimson form (var. *fulvipes*) at the other end, we obtained an almost complete set of intermediate forms, with the normal one occupying about the central position. It would appear, therefore, that the female of this species is polymorphic rather than trimorphic, and that the forms called *melanotum* and *fulvipes* are not really well-defined varieties, but are merely the extreme expressions of variation in opposite directions.

At Fittleworth, Sussex, a female of *Gomphus vulgatissimus* was secured by Mr. Watts on May 19th. At the time of capture, he tells us, it was quite teneral, but it assumed the fully adult condition after being kept alive in captivity for a few days.

At Byfleet, on May 12th, Mr. Watts found numerous nymphskins of *Brachytron hafniense* left clinging to freshly grown vegetation. Of eleven skins which we were given an opportunity of examining, five had belonged to males and six to females. On July 12th the species was met with again by the same collector at Potter Heigham, Norfolk. From other sources we received a male of *Aeschna grandis*, captured at Sudbury, Suffolk, on August 4th, and a female of *A. cyanea*, taken at Horsenden Hill, near Sudbury, Middlesex, on August 1st. Of *A. isosceles* we have seen two slightly worn males from Stalham, Norfolk, one taken on July 15th, and the other on July 16th (Watts).

On May 29th we found *Cordulia aenea* flying in some numbers on Oxshott Heath, Surrey, far away from any sheet of water, and one individual was still on the wing as late in the afternoon as 5.30. The next day males were captured, both on the Heath and near the Black Pond.

A female of *Orthetrum carulescens* was obtained at Uffculme on June 30th (Laidlaw).

On June 22nd, near Huntingdon, a few males of *Libellula fulva* were taken, and in one of them the left fore wing was in a singularly aberrant condition, as will be seen from the accompanying Plate. Not only is it shorter and broader than the corresponding wing on the right side, but the venation is altogether abnormal. Indeed, the homology of some of the veins can hardly be made out at all; but, apart from this, the wing presents several remarkable characters for which parallels can be found in other groups of Odonata. Thus, the pterostigma is very long, and fills as many as three cells: a "false" pterostigma of this kind is present normally in some Zygoptera. The subcosta is prolonged considerably beyond the nodus, as in certain recent *Æschniinae* and in the extinct *Æschnidiidæ*. The triangle is of the "*Pentathemis*" form, and the anal vein, instead of appearing to attach itself in the usual manner to the upper portion of the triangle, takes a downward course towards the hind margin of the wing, as in the *Æschnidiæ*. In connection with abnormalities of this kind, Prof. Philip P. Calvert has kindly drawn our attention to Dr. Viktor Janda's valuable paper on regenerated appendages in the Odonata ('Sitzungsber. K. Böhmisches Gesell.,' 1909). Several wings of *Æschna* and *Libellula* in various stages of re-growth are figured therein, but none of them are quite so remarkable in their venational peculiarities as the wing of *L. fulva* now under consideration. A living female of *Libellula depressa* from Horeham Road, near Heathfield, Sussex (May 12th), was given to us by Mr. Riley, and Dr. Laidlaw records (*in litt.*) the taking of a male at Uffculme on May 31st. Mr. R. South gave us two females of *Sympetrum striolatum*, taken by himself at Llandrindod Wells, Radnorshire. He came across them, with others, one afternoon in mid-August, during a brief interval of sunshine. Owing, no doubt, to the general prevalence of sunless weather, this was the only occasion upon which dragonflies of any kind were observed by Mr. South during some weeks' residence at the Wells. Males and females of *Sympetrum sanguineum*, in teneral condition, were met with at Ramsey, Hunts, on June 27th. Mr. A. Luvoni showed us an immature male which he had taken at Westcliff, Essex, on July 14th.

Several of the commoner species were met with again in localities recorded for them in previous years, and for that reason they have not been noticed on the present occasion. It may be added that the Huntingdonshire dragonflies mentioned herein were obtained by Mr. J. Peck and ourselves.

EXPLANATION OF PLATE VII.—Upper figure. *Libellula fulva*, Müll., male, with teratological left fore wing, taken near Huntingdon, June 22nd, 1912. Slightly reduced.—Lower figure. The teratological wing, enlarged two and a half times, showing aberrant venation.

A CONTRIBUTION TO THE LIFE-HISTORY OF
BRENTHIS FRIGGA.

BY W. G. SHELDON, F.E.S.



Photo H. Main

Egg-shell of *Brenthis frigga*, magnified 20 diameters.

So far as I am aware, the only particulars that are known of the earlier stages of this species are that a lepidopterist named Schilde in 1871 obtained ova from captured females, and found that the resultant larvæ would feed upon *Rubus chamæmorus*, and that they would also eat birch. These larvæ were not reared.

On July 12th last I obtained several worn females at Laxelv, in the Porsanger Fjord, which, when confined in the sun under gauze, deposited ova thereon freely, in preference to laying them on the various plants growing in the locality in which the females were captured, and which including *Rubus chamæmorus*, *Vaccinium* of three species, willow, birch, and *Empytrum nigrum*, I had placed under the gauze. Of these ova I kept the major portion, but forwarded some to Mr. H. Main, to whom I gave a list of all the plants, found where the females were captured, that I knew the names of.

The first of my larvæ emerged on July 28th, and the remainder on the following two days. I was then journeying home, but had a supply of *R. chamæmorus* with me, and supplied the larvæ with leaves of this plant, together with those of raspberry, which I found growing wild at Trondhjem, somewhat to my surprise and greatly to my concern, the larvæ—although one or two slightly nibbled the leaves of both these plants—would not eat them at all freely, and by the time I got home on August 4th they were all dead, or nearly so. Fortu-

nately Mr. Main, not having my knowledge of the supposed predilection of the larvæ for *Rubus*, took a wider survey of the food-plant question, and gave them, amongst other plants, sallow, to which rather unlikely pabulum for a Brenthid they took freely, changing into the second stage about a week after emerging from the ova.

On August 12th Mr. Main handed over to me three of his larvæ, which were then in the second stage, retaining himself four, which comprised his remaining stock. Of the three larvæ which I had in charge two refused to feed further, and were evidently prepared to hybernate at once. The remaining one fed upon sallow slowly until August 25th, when it also ceased to feed.

Early in September I placed my larvæ in a cool cellar to pass the winter, but from the first I was doubtful of the treatment being successful, for they commenced at once to shrink in size, and in early October had disappeared from the sides of the flower-pot in which they were placed, and to which they had attached themselves. At the end of January I turned out the pot, and found that the larvæ were dead, and on communicating with Mr. Main, he informed me that his larvæ, which were kept in the open air, had met with a similar fate.

The egg is 1 mm. in height, .85 mm. broad. It has vertical ribs, about twenty-four in number, which are irregular in outline, and are crossed by numerous shallow transverse ribs. The micropylar area is not distinctly separated from the surrounding surface; it consists of a number of shallow cells, not noticeably depressed. The egg is highly glazed and opalescent; it is attached to the object it is deposited on by the female, and is straw-coloured at first, becoming of a leaden hue shortly before the larva emerges.

The larva emerges by eating an irregularly shaped hole at the side of the ovum near the apex. Immediately after emergence it is 2.5 mm. long; head jet black and highly glabrous, the remainder of the segments are deep grey-green and very spiny; each segment is prominent in outline, and contains a row of eight shining black tubercles, each of which emits three light-coloured spines, which are in length about three times the diameter of the tubercle. The head is thickly covered with spines.

In the second stage the larva has a much darker general area, and the tubercles are much more prominent and produced to a sharp point; each tubercle emits a number of black spines (ten or twelve).

February 3rd, 1913.

NOTES ON THE WINGS OF COLEOPTERA.

I. THE BRITISH SPECIES OF PTEROSTICHUS.

By D. SHARP, M.A., F.R.S.

I HAVE been for many years interested in the questions connected with the flight of Coleoptera, which are very peculiar, owing to the fact that the anterior wings are passive, so that the posterior are entrusted with the chief part of aerial locomotion. Some very curious points arise from this unusual entomological condition, but they cannot be profitably discussed till we have much more information on the subject. The fragment I here offer is very small, but may be of some use.

I have to thank several friends for assisting me with material, in response to an appeal I made several years ago. Mr. Champion, Mr. Donisthorpe, Dr. Perkins, Mr. W. E. Sharp, and Commander Walker kindly responded to that appeal, and to their assistance is largely due any value these notes may possess.

I have used the arrangement and nomenclature of Fowler's 'British Coleoptera.'

1. *P. (Pœcilus) cupreus*, L.—Fully winged. Wings 10–11 mm. long and 4 mm. wide; elytra, $7\frac{1}{2}$ mm. long. Six examined, all very similar, and all from the South of England.

2. *P. (Pœcilus) cœrulescens*, L.—Fully winged, but the wings comparatively small, $6\frac{3}{4}$ – $7\frac{1}{2}$ mm. long, and $2\frac{7}{8}$ –3 mm. wide; elytra, $6\frac{3}{4}$ –7 mm. long. Three examples seen: one from Scotland—the larger individual—one from Sheppey, and one from Wimbledon; this last is the smaller, and the reduction in size of the wings is very marked. Captured April 16th, 1864.

P. cupreus and *cœrulescens* are very closely allied, and as they are each variable, it is often difficult to distinguish them. The smaller size of the wings and metathorax in *cœrulescens* seems to be the most important distinction. The male characters of the two are very similar.

3. *P. (Pœcilus) dimidiatus*, Ol.—Fully winged. One specimen examined. Wing, 11 mm. by 4 mm.

4. *P. (Pœcilus) lepidus*, Fabr. — Flightless. The vestigial wings small. Four specimens examined: two from Glasgow, August, 1864; two from Nethy Bridge, June, 1907; length $1\frac{1}{2}$ to fully 2 mm.; of elytra, $7\frac{1}{2}$ –8 mm. The size differs a little in each specimen, and in each of the two pairs the female has the more elongate wings.

5. *P. (Steropus) madidus*, Fabr.—Flightless. The vestigial wings minute, $\frac{1}{2}$ – $\frac{3}{4}$ mm. long, and about $\frac{1}{2}$ mm. wide. Three specimens examined. The vestigial wings are slightly different in each. In this species the metanotum is very short, and the elytra become soldered together at the suture when the insect is

thoroughly mature, so that they can only be taken off as a single plate. This is the case with two of the specimens examined (of the red-legged form from the New Forest). In the other example (var. *concinus*, from Beattock), the elytra readily separated at the suture.

6. *P. (Steropus) ethiops*, Panz.—Flightless. I have examined only one specimen, a female (taken by Brewer in Wales in 1867). The vestigial wings are rather long and narrow, fully 2 mm. long, and about $\frac{3}{4}$ mm. wide at the base. The elytra are not soldered, and the metanotum is considerably longer than in *P. madidus*.

7. *P. (Platysma) oblongopunctatus*, F.—Fully winged, $7\frac{1}{4}$ mm. by $2\frac{1}{2}$ mm. wide; elytra about 7 mm. long. Six specimens examined from New Forest, Forest of Dean, and Bradfield, Berks. There is no noticeable distinction in their wings.

8. *P. (Platysma) orinomus*, Steph. (? *vitreus*, Dej.).—Fully winged. Wings, 9–10 mm. long by 4 mm. wide; elytra, $7\frac{1}{4}$ mm. long. Three specimens examined, all from Northern Scotland. I am not aware that our species has ever been satisfactorily proved to be the same as the Arctic *P. vitreus*, Dej.

9. *P. cristatus*, Duf.—Flightless. Vestigial wings only 1 mm. long; elytra, $9\frac{1}{2}$ mm. I have only examined one specimen (a female) of this rare species.

10. *P. (Lyperus) aterrimus*, Payk.—Fully winged. Wings, $12\frac{1}{2}$ mm. long by $4\frac{1}{2}$ mm. wide; elytra, 8 mm. long. This appears to be the most amply winged of all our species, but I have examined only one example (a male), taken, I believe, at Whittlesea by Wollaston, upwards of sixty years ago.

11. *P. (Omasus) niger*, Schall. — Fully winged. Wings, $13\frac{1}{2}$ mm. by 5 mm.; elytra, $12\frac{1}{2}$ mm. long. These measurements are those of a large female from Brockenhurst. The species varies a good deal in size. I have examined six other examples from Braemar, &c., and the wings apparently do not vary more than the elytra. In the New Forest this species is frequently unable to fly, although so amply winged, in consequence of a sticky exudation rendering it difficult to unfold the wings.

12. *P. (Omasus) vulgaris*, L. — Flightless. The vestigial wings take the form of long narrow slips, 4 or $4\frac{1}{2}$ mm. by 1 mm. wide; elytra, 11 mm. long. I have examined three specimens, two from Brockenhurst, one from Nethy Bridge. The vestigial wings are considerably larger in the southern examples. Schaum says (Ins. Deutschlands, i. 456) that *pennatus*, Dej., is a fully winged form of this species, and this opinion is repeated by others, but I have not met with any statement of the evidence on which it is based.

13. *P. (Omasus) anthracinus*, Ill.—Flightless. The vestigial

wings rather large and of peculiar form, $4\frac{1}{4}$ mm. long by $1\frac{1}{4}$ mm. wide; the greatest width is near the tip, and they are again broader near the base, so that the hind margin is broadly emarginate. I have examined a male and a female taken at Hammersmith fifty years ago. The wings are very slightly larger in the female. A male taken recently at Brockenhurst agrees with the Hammersmith male, except that the wings are slightly shorter, and not so distinctly lobed near the tip.

14. *P. (Omascus) nigrinus*, F. — Fully winged. Wings, 7– $10\frac{1}{2}$ mm. long by $3\frac{3}{4}$ – $4\frac{1}{4}$ mm. wide; elytra, $5\frac{1}{2}$ – $6\frac{1}{2}$ mm. long.

In this common species the wings vary a good deal in expanse. There is also considerable difference in the size of the individuals, but this difference is exaggerated in the wings. The specimens from the Scotch mountains are probably the form found in Switzerland and called *rhaeticus* by Heer (*cf.* Schaum, *Ins. Deutschl. i.* 458); they are considerably smaller than the type, and in five specimens I have examined the wings are uniformly reduced to the minimum mentioned. This depauperated form is not, however, confined to the hill regions, as Commander Walker has sent me a specimen, taken at Oxford, which scarcely differs from the hill individuals in size and in the wings.

It should be noted that, though the wings differ considerably in expanse, they are all of normal shape, and apparently there is no tendency to assume the peculiar shape of the functionless wings of *P. anthracinus*.

I have examined eighteen examples, five of them from the Scottish hills.

15. *P. (Omascus) gracilis*, Dej.—Fully winged. Wings, 9 mm. by $3\frac{1}{4}$ mm.; elytra, 5 mm. I have examined two individuals, both males (Wicken, Donisthorpe, April 22nd, 1910, and New Forest, May 29th, 1909). The wings are remarkably ample.

16. *P. (Omascus) minor*, Gyll. — Dimorphic; either fully winged or with functionless wings, there being a great gap between the two forms, the wings being in one case about 6 mm. by $2\frac{1}{2}$ mm., and in the other case about 3 mm. by $1\frac{1}{2}$ mm. I have examined sixty specimens of this interesting case, and the numbers of the two forms are about equal. Probably the fully winged form is really the more abundant, as I wished to see a good many of the reduced form, and exercised some selection to facilitate this. Considering, first, the fully winged condition: the largest wing is quite $6\frac{1}{2}$ mm. long, and the smallest $5\frac{1}{2}$ mm., the length of elytra being about 5 mm. by 4 mm. respectively. The wings are of the usual pointed form, and the nervures are well developed and dark, except that in immature examples there is but little pigmentation.

The reduced form has a rounded-truncate apex of the wing, and the organ does not extend beyond the stigma, the apical

part of the wing being absent, and the stigma much reduced. The nervuration of the basal part of the wing is normal, except for the small size. The vestigial wings vary from about $2\frac{1}{2}$ – $3\frac{1}{2}$ mm. in length, and the width varies to a somewhat greater degree.

I see no reason for doubting that the two forms are really one species, although the gap between them is so wide. Both the vestigial wings and those fully developed vary somewhat in size, and the one individual having the largest vestiges (about $3\frac{1}{2}$ mm. long) is particularly interesting, because in it the wings have not only developed in size beyond the stage of usual arrest, but have also the beginning of the peculiar folding and creasing that is so remarkable in the wings of Coleoptera.

I have no evidence that the two forms are distributionally isolated. *P. minor* is a very abundant insect in the South of England, but in Scotland it becomes rare. I have only six Scottish specimens, taken at different times at Thornhill about forty years ago, and they are all of the short winged form.

From Wicken Fen (Donisthorpe, April 22nd, 1910), I have examined eleven specimens; ten are of the fully winged form, and one of the short winged. Chobham (Champion, May 14th, 1910), four specimens, two of each kind. Oxford (Walker, November, 1909), four examples, three long winged, one short. Freshwater, Isle of Wight, one with long, four with short wings. In the New Forest the two forms seem to be about equally common.

It seems to be not improbable that the preponderance of short winged forms in the Scottish fauna suggested by the above may prove to be real.

17. *P. (Argutor) strenuus*, Panz.—Flightless. The vestigial wings varying from 1–2 mm. in length; elytra, 4 mm. long. I have examined twenty-five specimens. The great majority have the vestigial wings just about 1 mm. long. Twenty-two specimens are in this state, fifteen of them being from the New Forest. Two examples have the vestiges about $1\frac{1}{2}$ mm. long. (Wicken, Donisthorpe, April 22nd, 1910; and Boar's Hill, Oxford, Donisthorpe, April, 1910.) Only one individual has the wing about 2 mm. long (Wicken, Donisthorpe, April 22nd, 1910).

The size has possibly in this case something to do with locality, as all the New Forest examples have the wings minute, while the two examples from Wicken have them in one case of the largest size, and in the other of the intermediate size. Boar's Hill has yielded two specimens of small size, and one of intermediate.

18. *P. (Argutor) diligens*, Sturm.—Flightless. The vestigial wings minute, $\frac{1}{2}$ – $\frac{3}{4}$ mm. long; elytra, $3\frac{1}{2}$ mm. long. I have examined thirty individuals, and find but little variation. The localities range from the New Forest to Braemar.

19. *P. (Adelosia) picimanus*, Duftschm. — Fully winged. Wings, 10 mm. by 4 mm.; elytra, $7\frac{1}{4}$ mm. long. Two specimens examined (Sheppey, Commander Walker).

20. *P. (Pediis) inæqualis*, Marsh. — Flightless. Vestigial wings minute, scarcely $\frac{1}{2}$ mm. long; elytra almost 4 mm. long. One specimen (Southend, February 14th, 1863).

21. *P. (Lagarus) vernalis*, Gyll. — Fully winged. Wings, $4-5\frac{1}{8}$ mm. long, $1\frac{1}{2}-2\frac{1}{4}$ mm. wide; elytra, 4 mm. long.

This is an interesting form, the wings being rather small in proportion to the elytra, and subject to considerable diminution, which, however, occurs rather on the axillary part of the wing, not on the apical part.

I have examined sixteen specimens. Seven from Paignton (Perkins, November 5th, 1909), five of which have the wings conspicuously less than full size, while the other two have very nearly the full length of wing, but with the axillary portion small in size. Five individuals from Wicken (Donisthorpe, April 22nd, 1910) have the wings of full size (slightly over or slightly under 5 mm.). One example (Oxford, November, 1909, Walker) has the wings quite of full amplitude. Two from Boar's Hill, Oxford (Donisthorpe, April, 1909) differ distinctly, one having the wings nearly of full size, while in the other they are markedly reduced, being a little less than $4\frac{1}{2}$ mm. long. One specimen from the New Forest (May 1st, 1912) has the wings very nearly of full amplitude.

The variation in this species would appear to be peculiar, as though the wings exhibit frequently considerable reduction in amplitude, there is no production of a second form of wing such as exists in *P. minor*. The variation, too, appears to be more affected by locality than it is in other species. But it must be admitted that the number of specimens examined is not enough on which to base any important conclusions.

22. *P. (Abax) striola*.—Flightless. The vestigial wings reduced to small rudiments about $\frac{1}{2}$ mm. long. The metanotum very short, the elytra soldered. The nearest of all our *Pterostichus* to a really apterous state.

The number of species is twenty-two; ten of them are flightless, eleven are fully winged, while one is dimorphic, having about half its individuals in one or other of the two conditions.

The wings are always present, though in some species the vestiges are quite minute. The vestigial wings, though quite different in shape from the normal wings, exhibit shapes characteristic according to the species. Both normal wings and vestigial wings are apt to exhibit considerable variation—the variation is perhaps greater in the case of the vestiges; this is a point difficult of determination.

Variation does not appear to be connected with sex, and only

in one or two cases with locality. In the peculiar dimorphic *P. minor* I have not found any inkling as to the conditions that determine the resultant form. Those species that are flightless have a more contracted metathorax than the winged forms, and I have suspected that slight differences of this sort exist in the dimorphic species, but it is a difficult point to prove. After dissection the capacity of the metathorax cannot be determined with any certainty.

To prevent misconception, I may add that *Pterostichus* includes an unusually large proportion of flightless forms.

THE BUTTERFLIES OF THE CSÉHTELEK DISTRICT OF CENTRAL HUNGARY.

BY THE HON. N. CHARLES ROTHSCHILD, M.A., F.L.S., and
CHARLOTTE DE WERTHEIMSTEIN.

So little has been published about the Lepidoptera of Hungary, even in that country itself, that these few notes may possibly be of interest.

Cséhtelek is a village in the Margitta district of the County of Bihar, in Hungary, and is already considerably east of the great plain or alföld, which, however, extends to Margitta. It is, therefore, perhaps superfluous to point out that the real alföld fauna is missing from this district. Cséhtelek is situated in the valley of the Bisztra, a small river rising in the Réz Mountains, some ten kilometres south-east of the village, and flowing from its source for some twenty kilometres in a north-westerly direction, where it joins the Berettyó River near Margitta. The country presents three more or less distinct types of vegetation, all of which intergrade. They are designated in our list by the numbers I., II., III., respectively. The first of these is found on the land bordering the river, which is liable to floods in the spring and more rarely in the autumn. The country here consists of wet, grassy fields, in no sense swamps, used both for hay and grazing. Here *Chrysophanus dispar* var. *rutilus* is found, and many other of the commoner species, such as *Argynnis selene*, *Lycena argiades*, *L. argus*, and *L. argyrognomon*.

The second type occurs on the sandy hills which border the north side of the river for about two-thirds of its length from the point at which the Bisztra leaves the forest-clad mountains. These hills form the edge of a high plateau which lies between the Bisztra and the upper waters of the Berettyó. At one time much of this land was devoted to plum-orchards, planted in the old style, and consequently the original vegetation was retained. Now but few uncultivated patches remain, though these possess a flora and insect fauna of quite remarkable richness.

Among plants may be mentioned the rare *Cytisus horniflorus*, two species of *Gentiana* (*Gentiana cruciata* and *G. pneumonanthe*), the latter flourishing on dry sandstone! Numerous orchids: *Aster amellus*, *Physalis alkekengi*, and many others.

Among the Lepidoptera are *Colias myrmidone*, *Thecla acaciæ*, *Lycæna alcon*, *L. coretas* var. *decolorata*, *Syrichthus lavateræ*, *Hesperia sidæ*, and others.

Finally, there is the forest region, which at one time approached, and, in fact, mingled with, the two previously mentioned types of country. Forest still clothes much of the Réz Mountains and some of the more flat country, and two small patches exist on the sandy hills. The forests are all used as grazing places for cows and pigs, with the result that the flora is gradually changing, and most of the Lepidoptera are exceedingly rare.

Neptis aceris, *Argynnis laodice*, *Satyrus circe*, *S. dryas*, *Erebia blandina*, *Epinephle tithonus*, and *Heteropterus morpheus* may all be cited as typical of the forest region, as well as some others.

Ninety-eight species and local races are recorded in this list, which is almost certainly very incomplete, as many widely distributed insects are missing from it.

Papilio podalirius, *P. machaon*. II., and in gardens; common.

Thais polyxena. I., II. Common.

Aporia crataegi. I., II., and in gardens; abundant.

Pieris brassicæ, *P. rapæ*, *P. napi*, *P. daplidice*. I., II., III. Generally abundant.

Euchloë cardamines. II.

Leptidia sinapis. II., III. Common.

Colias hyalæ, *C. edusa*. I., II. Common.—*C. myrmidone*. II., III. Rather scarce.

Gonepteryx rhamni. II., III. Common.

Thecla spini. II. Rare.—*T. w-album*. III. Rare.—*T. ilicis*. II., III. Common.—*T. acaciæ*. II. Rather common.

Callophrys rubi. II. Rare.

Zephyrus quercus. II., III. Common.—*Z. betulæ*. Common.

Chrysophanus thersamon. I., II., III. Rather common in moist spots.—*C. rutilus (dispar)*. I., III. Common. Cf. Ent. Rec. vol. xxi. p. 13, 1909.—*C. phlæas*. I., II., III. Common.—*C. dorilis*. II., III. Rather rare.

Lycæna argiadæ. I. II. Common.—*L. coretas*. II.—Var. *decolorata*. II.—*L. argus*, *L. argyrognomon*. I., II.—*L. baton*, *L. orion*. II. Rare.—*L. astrarche*. II.—*L. icarus*. I., II., III. Common.—*L. meleager*, *L. bellargus*. II.—*L. corydon*. II. Very rare!—*L. semiargus*, *L. cyllarus*. II.—*L. alcon*. II. Rare. Here the larva feeds on *Gentiana cruciata*.—*L. arion*. II., III. Rare.

Cyaniris argiolus. II. Common.

Nemeobius lucina. II., III. Common.

Apatura iris. III. Rare; only in the Réz Mountains.—*A. ilia*. I., II., III. Common. The larva on *Salix* and *Populus*.

Neptis aceris. II., III. Rather common.

- Pyrameis atalanta*, *P. cardui*. Generally common.
Vanessa antiopa. I., II., III. Rather rare.—*V. io*, *V. urticae*.
 Generally common.—*V. polychloros*. I., II. Rather rare.
Polygonia l-album. III. Very rare in the Réz Mountains.—*P. c-album*. I., II. Common.
Arachnia levana. I., III. Rare.
Melitæa cinxia. II. Rare. Larvæ on *Veronica spicata*.—*M. phæbe*. II. Rare.—*M. didyma*. I., II. Common.—*M. trivia*. II. Rare.—*M. athalia*. I., II., III. Common.—*M. aurelia*. II. Common.—*M. dictynna*. II. Rare.
Argynnis selene, *A. dia*. I. Common.—*A. hecate*. II. Rare among *Spiræa filipendula*.—*A. daphne*. III. Rare in the Réz Mountains.—*A. latonia*. I., II., III. Common.—*A. aglaia*, III.—*A. adippe*. II., III.—*A. paphia*. III. Common.—*A. laodice*. III. Rare. Single examples occur all over the Réz Mountains, and in some of the woods at lower elevations, always in wet places. The butterflies are especially fond of the blossoms of *Eupatorium*. Cf. Entom. vol. xlii. pp. 49-54 and p. 258, 1909.
Melanargia galatea. II.
Erebia æthiops. III. Common. In the Réz Mountains only.
Satyrus circe. III. Common.—*S. hermione*. II., III. Rare.—*S. semele*. II., III.—*S. dryas*. III.
Pararge egeria, *P. megæra*. II.—*P. mæra*. II. Very rare.
Aphantopus hyperanthus. II., III.
Epinephele jurtina. I., II., III. Common.—*E. tithonus*. III. Very rare.
Cenonympha iphis. I., II., III.—*C. arcania*. II., III.—*C. pamphilus*. Common everywhere.
Heteropterus morpheus. III. Rare and disappearing.
Adopæa lincola, *A. thaumus*. I., II.
Augiades comma, *A. sylvanus*. I., II.
Charcharodius lavateræ. II. Rare.—*C. alceæ*. I. Rare.
Hesperia silæ. II. Rare. The larva probably feeds here on *Potentilla recta*. Cf. Rovartani Lapok. vol. xv. p. 147, 1908.—*H. alveus*. II., III.—Var. *fritillum*. III.—*H. malvæ*. II., III.
Thanaos tages. II. Common.

CALLOPHRYS AVIS IN SOUTH FRANCE.

BY GODFREY A. FOLJAMBE.

To those readers of the 'Entomologist' to whom the study of European Rhopalocera is an interest, the following notes concerning this as yet comparatively little-known butterfly may prove not unwelcome.

During a temporary respite from the rigours of an English spring, I found myself, towards Easter last, on the Mediterranean coast, in the neighbourhood of a spot reputed to be the haunt of *Callophrys avis*. An expedition thither on the first suitable day seemed the obvious duty of a collector to whom the

ordinary spring butterflies of the Riviera have, alas! lost their charm of novelty.

On arriving at the locality, it at once became clear that a long-handled net was an indispensable adjunct to success, as several "*Thecla*" were to be observed disporting themselves on the summits of the cork-oaks and lofty arbutus shrubs which there constitute, in entomological parlance, "the ground."

A stout stem of *Arundo donax*, some 10 ft. in length, having been pressed into service, I proceeded to business. For the first two or three hours, examples of *C. rubi*, in unvarying and monotonous succession, alone rewarded my efforts. Towards noon, however, I noticed a "*Thecla*" in possession of a sunny perch on a cork-oak far out of reach of my improvised weapon. By dint of diligent stoning, it was at length induced to pursue a descending pebble far enough to bring itself within range, and a lucky shot secured it.

On examination it proved, to my great delight, to be an unmistakable male *C. avis* in first class condition. No further success was mine on this day, but during the following week I managed to obtain, by similar methods in most instances, some fifteen specimens, three of which were female, and nearly all freshly emerged.

I was unfortunately unable to remain long enough in the district to observe the females ovipositing, but the conjecture that "*Arbutus unedo*" is an alternative food-plant to "*Coriaria myrtifolia*" would appear to be well founded (Dr. Chapman). I could find no trace of the latter plant (nor, from the nature of the soil, did I expect to), and the imagines never seemed to leave the arbutus trees, except for the purpose, common to others of the genus, of sunning themselves on a leaf of a cork-oak, or of driving off intruders.

As regards the characteristics and appearance of the insects, their flight struck me as somewhat heavier than that of *C. rubi*, while, on the few occasions on which they descended to ordinary levels, the tawny shade of the upper side was distinctly noticeable.

A very distinct difference between *C. avis* and *C. rubi*, in addition to those noted by Dr. Chapman, is, in my specimens, the colour of the under side of the abdomen. In *rubi* it is slaty-grey, in *avis* nearly pure white. The white line on under side in *avis* appears to vary greatly in intensity, being well marked and continuous in some cases, in others almost invisible, though the insect in each instance appears quite fresh. Again in "*avis*," the white circles round the eyes of *rubi* are effaced, or replaced, by thick reddish brown hair, and this peculiarity makes it easily recognisable when handled, or when the insect can be approached sufficiently close while at rest.

From my experience it would seem that the habitat of *C. avis*

is extremely restricted; all my captures were made within a space of two hundred yards or so, and though there were plenty of equally likely-looking spots in the immediate vicinity, I found no specimens outside this area.

It remains for those entomologists who have sufficient time and leisure to investigate more fully the life-history of this interesting little butterfly, and to settle definitely whether or no the arbutus is, in the absence of *Coriaria myrtifolia*, the food-plant of its larva. Personally, I have little doubt that it is, and I am not without hope that these few rough notes may elicit a scientific confirmation from some zealous Aurelian who has successfully piloted *C. avis* from ovum to imago, by the judicious exhibition of the foliage of *Arbutus unedo*!

Maes Court, Tenbury.

CÆNONYMPHA TIPHON, Rott., IN NORTH WALES.

By J. ARKLE.

Soon after accepting an invitation to visit my friend Mr. W. J. Kerr, at Maesmor, his residence in North Wales, I received a letter from Mr. H. Rowland-Brown, asking for information respecting *Cænonympha tiphon* (*lavus*), and especially with reference to its supposed haunts, recorded a hundred years ago, but never, I am told, since verified, in the mountain region "between Bala and Festiniog," in the county of Merioneth. I had not seen or taken the butterfly in North Wales, and the only clue I possessed was a recollection that Mr. Kerr had observed it more than once, and, further, that Mr. A. O. Walker, in his 'Macrolepidoptera of the Chester District,' records the butterfly on Minera Mountain, in the county of Denbighshire. However, I informed Mr. Rowland-Brown of my projected visit, assuring him that the chief entomological object of my stay would be the rediscovery of *C. tiphon*, if possible, in its alleged haunts of long ago.

Mr. Kerr entered into the project with enthusiasm, and it is entirely owing to him and his powerful motor-car that our efforts were at length crowned with success, though hardly ever was there a more deplorable July than that of 1912 for butterfly hunting, with its cool north-east airs, its cloudy skies, and wintry gleams.

I reached Maesmor on July 1st, after a railway journey through one of the loveliest regions on earth—the Vale of Llan-gollen. Our search for *C. tiphon* began next day, and in succeeding days, I may add, we failed to find it anywhere in likely places on Mr. Kerr's estate, such as a snipe bog, the grouse moors, &c., although often favoured with increased warmth and fitful sunshine.

But before these days were over we had come upon *tiphon* elsewhere, and in at least one of its romantic haunts on the historic ground "between Bala and Festiniog." It was on July 2nd that we found the butterfly. Our route for some miles lay along the Maesmor Valley and by its babbling stream, with hedges on either side of the road decorated with wild roses. Turning to the left, we began the ascent to the Bala-Festiniog Road, finally reaching a height of some 1200 ft. above sea-level. The forest-belt of oak was now left below, the roses had disappeared, and were replaced by two forms of *Spiraea*—one with a profusion of pink flowers, the other white. Foxgloves of a deep red nestled in the hedge-banks, and suggested thoughts of *Eupithecia pulchellata*. On the mountain slopes were big yellow violas, differing from those on the mountains on the other side of the valley, which were blue.

We were now where the sounds of population failed, and our plan was to halt when likely bogs, clad in heather and cotton-grass, appeared on either side, leave the car in charge of our chauffeur, and search for the butterfly. The day was almost sunless and the search laborious, but at last we came upon a freshly emerged female, stiffening its wings on a grass-stem. The empty pupa-case, however, was not discovered.

We had thus the key to the situation; so, returning to the car, we soon covered the twenty miles that lay between us and home.

July 3rd was a better day, so, taking advantage of it, we paid a second visit to the spot, and netted altogether eighteen males, all in fine condition. On the 15th Mr. Kerr found the butterfly flying freely (both sexes), but much worn; and it was difficult to get half a dozen in really good condition.

Comparing the Welsh form* with that of North Lancashire, and especially with the one at Delamere, the Welsh insect suffers in the comparison. The specimens caught showed a golden

* I am greatly indebted to Mr. Arkle and Mr. Kerr for much valuable information on the subject of these welcome new-found Welsh *tiphon*. This I have incorporated in a monograph upon *Cænonympha tiphon*, Rott., shortly to appear in the 'Etudes de Lépidoptérologie Comparée,' published by M. Charles Oberthür, of Rennes. Mr. Arkle was good enough to send me three perfect male specimens on the day of their capture, and two at least will be figured in colour by M. J. Culot among the thirty-six selected for illustration from localities throughout the United Kingdom. The Merioneth *tiphon* is decidedly typical, though somewhat smaller than the run of examples from Northumberland, Yorkshire, and elsewhere (Buckell's middle form). It has apparently little relation with the *philoxenus* found in its at present nearest-known haunts in Shropshire, in Delamere Forest, and in the mosses of Lancashire (southern form). Mr. Walker's record in Denbighshire suggests that the connecting link between the marsh and the mountain *tiphon* hereabouts may yet be discovered in the intervening areas, some of which still retain land well adapted to the life-habits of the species.—H. R.-B.

tawny on the upper wing surfaces, common perhaps to all when fresh out, but it soon fades, probably owing to the cessation of respiration and consequent loss of oxygen. The most noticeable features in the comparison are the smallness of the spots and the broad antemarginal suffusion, ashy-grey on the under sides, which is more pronounced than on any other specimens I have seen.

Judged by the gradual darkening of greys and browns of the following forms of *tiphon* in my collection, as well as by the gradual increase in number, size, clearness, and development of the ocellated and other spots, I have arranged them as follows:—

(1) PERTSHIRE (= *laidion*, Bkh.).—Pale; spots few and small, indistinctly ocellated, sometimes absent from the upper wing surfaces, which are margined with whitish grey.

(2) MERIONETHSHIRE (= *tiphon*, Rott.).—Spots more numerous, larger, and usually clearly ocellated. Upper wing surfaces edged with ashy-grey.

(3) NORTH LANCASHIRE (= *philoxenus*, Esp.).—Spots still larger, and clearly ocellated. One specimen (a male) is sooty-brown.

(4) CHESHIRE, DELAMERE (= *philoxenus*, Esp.).—Darkest. Spots largest, and clearly ocellated, the whitish encircling rings on the lower wings (under sides) often touching each other. One male is very sooty-brown.

I have four specimens from this locality with the spots on both sides lanceolated. For reference purposes, some years ago, I proposed the varietal name of *lanceolatus* for this uncommon form.

The only other butterfly we saw was *C. pamphilus*. One specimen captured was unusually large. The experience of other collectors may not support my observation, but I have no recollection of seeing *pamphilus* on exactly the same ground as *tiphon*, whatever the character of the locality might be.

Chester: Dec. 23rd, 1912.

EARLY AUGUST AMONG THE ALPS.

BY F. A. OLDAKER, M.A., F.E.S.

I SPENT the first fortnight of August, 1912, among the Alps, and since the weather, during the first week at any rate, was good enough to enable me to capture nearly two hundred butterflies, a short account of the trip may be of interest.

I reached Lucerne in a deluge of rain about noon on August 2nd, and went by boat right through to Fluelen, seeing practically nothing all the way but an occasional blur of mountain through the mist. I had intended to start walking from Fluelen towards the St. Gothard, but decided to take the train as far as Göschenen. When I arrived there it had partially cleared,

though it was still raining, but I walked over the Devil's Bridge and through Andermatt to Hospenthal that night, in order to get on my way betimes the next morning over the Pass. Fortunately, August 3rd was fine, though in the early morning it was dull and misty. But when I was well past the top of the Pass, and had negotiated several of the zigzags on the way down, the sun came out, and the rest of the day was brilliantly fine. I soon saw *Pontia callidice* flying very fast over difficult ground, but I managed to secure a male in very fine condition, and at the same altitude I took *Brenthis pales*, *Melitæa athalia*, including a nice banded form, and some good mountain forms of *Erebia goante*. The number of species multiplied as I descended towards Airolo, and among others I took or saw *Papilio machaon*, *Parnassius apollo* (very plentiful), *Aporia crategi*, *Issoria lathonia*, *Argynnis aglaia* (swarming), *Pararge mæra* (much brighter than those I took in the Martigny-Chamonix district three years previously), *Cænonympha satyrion*, *Erebia pronoe*, *E. epiphron* var. *cassiope*, *E. melampus*, *E. pharte*, *E. tyndarus*, *Melanargia galatea*, *Chrysophanus virgaureæ* (including two fine females, one with the black spots on the upper wings developed into streaks and a tendency to streaks on the lower wings, and the other with similar markings on the lower wings, but the upper wings normal), *C. hippothö*, *C. dorilis* var. *subalpina*, *Nomiades semiargus* (very common), *Polyommatus corydon* (swarming), and *P. pheretes*. Some of the grass slopes by the side of the road were literally alive with *P. apollo*, *A. aglaia*, *P. mæra*, *C. virgaureæ*, *N. semiargus*, and *P. corydon*. I walked on through Airolo, as far as Rodi-Fiesso Station, but by about 3.30 the butterflies were disappearing, and I caught nothing more worth noting. I then took the train to Bellinzona, where I stayed the night, and started off towards Magadino, on the north-east shore of Lake Maggiore, in the early morning of August 4th. This was also a brilliantly hot day, and by about 9 a.m. the butterflies began to appear.

One of the first I took was *Leptosia sinapis*, and on the grassy slopes along the roadside by the lake I saw *Pieris rapæ*, *Melitæa athalia*, *Nemeobius lucina*, *Epinephele tithonus*, *Erebia aethiops*, *Celastrina argiolus* var. *argyphontes*, *Polyommatus icarus*, and *Rusticus argyrognomon*. Having walked to Luino, I took the boat to Laveno *en route* for Milan. On the morning of Aug. 5th I left Milan early for Laveno, whence I went across the Lake to Pallanza. From there I walked *viâ* Fondo and Suna to Gravelona, Toce and Domo d'Ossola, and during the first half of the time it was rather uncomfortably hot. However, I soon got among the butterflies, for I was hardly out of Pallanza when I saw *Papilio machaon*, *Pyrameis atalanta*, and males of *Colias edusa*, flying at a great pace between the road and the Lake. *Rusticus argyrognomon* was plentiful on the road, and kept settling among the scanty herbage between the tram-lines. I soon came

to more open country, and was having a good time in a field of uncut hay by the roadside, when an irate peasant drove up in a diminutive cart and ordered me off, but not before I had netted a fine female *Colias edusa* and several males of *C. hyale*, as well as *Leptosia sinapis*, *Polyommatus baton*, *Carcharodus alceæ*, *Epinephele jurina*, and a nice variety of *Cænonympha pamphilus*, with a dark border and large apical spot on the upper wing. I then passed some extensive granite quarries, and here I took a lovely specimen of *Apatura ilia* var. *eos*, which kept settling on horse-droppings in the road just in front of me, and it was fully ten minutes before I succeeded in netting it. *Melitæa athalia* and *Rusticus argyrognomon* were very plentiful here, and *Polyommatus icarus* and *Chrysophanus phleas* were also present in some numbers. At Domo d'Ossola I took the train to Iselle, where I slept the night, and walked over the Simplon to Brigue on Aug. 6th.

High up on the Pass I got *Erebia tyndarus*, *E. mnestra*, *E. gorge*, *E. æthiops*, and *E. euryale*, and between Simplon village and Bérisal *Pararge mæra*, *Polyommatus corydon*, *P. medon* (including a rare variety in which the first two spots of the hind wing are in a line with the others instead of being advanced), *Rusticus argyrognomon*, and *Pamphila comma* were plentiful. At Bérisal and just beyond it *Melitæa athalia* was very common, and I took *M. didyma*, *Brenthis pales* var. *arsilache*, *Cænonympha satyrion*, *Erebia melampus*, and *Polyommatus damon*; further on towards Brigue, *Argynnis aglaia*, *Pararge mæra*, and *Pamphila comma* were very plentiful. About two miles from Brigue I came upon numbers of *Polyommatus damon* and *P. corydon* settled on the grass and flower-heads for the night, and I selected a few nice examples of both species. I arrived at Brigue about 6.15 p.m., having walked practically all the time since 7 a.m.

On the following day (Aug. 7th) I started off up the Rhone Valley towards Gletsch. It was misty and threatening rain, and by the time I had reached Fiesch a steady downpour had set in, so I took refuge in the Hôtel des Alpes, where I stayed about four hours. The result of this was that I only reached Ulrichen that night instead of Gletsch, as I had intended. It was very heavy going on the muddy road, and I arrived at the primitive little Hotel Glacier de Gries wet and tired, with, of course, no addition to my bag for that day. Aug. 8th promised better, and I started at 6.45 for Gletsch and the Grimsel. A thick mist obscured everything from just above Gletsch until I reached almost the top of the Pass, and it was extremely cold and unpleasant. But it was a new experience to me to see flowers peeping up through the snow, and from the top of the Pass to the Hospice it rapidly became warmer and the atmosphere clearer, till by the time I reached the Handegg Falls it was a brilliant afternoon, though I saw no butterflies except *Erebia melampus*. By way of Guttannen and Innertkirchen, I arrived

at Meiringen soon after six, having done about thirty miles. It was a glorious day's experience, in spite of being a failure entomologically. A tramp through Brienz to Interlaken and St. Beatenberg on the 9th yielded nothing but *Pararge mæra*, *Aphantopus hyperanthus*, and *Chrysophanus dorilis*, for, though it was fine, the sun only appeared at intervals; and on the following day, walking from St. Beatenberg to the shore of the lake at Beatenbucht, I only took *Erebia æthiops*, *Aphantopus hyperanthus*, *Epinephele jurtina*, *Pararge mæra*, *P. megæra*, and a worn specimen of *Thecla spini*. I also saw a fine male of *Callimorpha quadripunctaria* in the waiting-room by the landing-stage. Then I went by water to Thun, where, about 1 p.m., while waiting on the quay for the return boat, a male *Apatura iris* settled by a puddle on the road almost at my feet, but I could not get out my net in time. I crossed the lake to Spiez, and walked to Frutigen. It was fine, and the sun shone brightly till about 4 p.m., by which time, when passing through Aeschi, I had taken *Leptostia sinapis*, *Polyommatus icarus*, and *P. corydon*. During the rest of my tour the weather was very uncertain, and I took no more insects, but I carried out my programme in spite of the wet, and walked, on the 11th, to Lauterbrunnen, thence on the 12th *viâ* Wengern and the Wengern Alp, over the Little Scheidegg and Männlichen to Grindelwald; on the following day over the Great Scheidegg, through a perfect deluge of rain and sleet, to Meiringen, whence I started, on the 14th, *viâ* the Brunig Pass, Lungern, and Giswil to Sarnen and Lucerne.

Between Aug. 2nd and 14th I walked about two hundred and sixty miles, every bit of the country being new to me, and I added considerably to my collection. I imagine that the ground between St. Gothard and Airolo, and that on both shores of Lago Maggiore, would well repay a prolonged stay, for, apart from the new species to be taken there, the variation among such insects as *Pararge mæra* and *Chrysophanus virgaureæ* is very interesting.

I cannot conclude this short article without recording my grateful thanks to Dr. Chapman, who very kindly identified several of the specimens about which I was doubtful.

The Red House, Haslemere: Dec. 30th, 1912.

FRIENDS AND FOES OF THE CONIFERÆ.

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

(Concluded from p. 54.)

SUCH a series is readily made up, and the following is offered as a reasonable scheme, as all the spiders in it can be obtained anywhere, with the exception of *Bolyphantes expunctus*, which, however, can be obtained in abundance in certain districts, as has been explained.

SPECIES	HABITS	HABITAT	WHEN ADULT
<i>Salticus cingulatus</i> ..	Hunting spider	Bark	May-Sept.
<i>Cryphocca silricola</i> ..	—	Bark, needles, dead leaves	All the year
<i>Amaurobius fenestralis</i> ..	Spins a floccose web	Under bark	do.
<i>Theridion varians</i> ..	Spins a web	In trees and bushes	Summer
<i>T. sisyphium</i>	do.	do.	do.
<i>T. pallens</i>	do.	do.	March-June
<i>Leptyphantus obscurus</i> ..	Spins slight web	Under bark	May-July
<i>Linyphia montana</i> ..	Spins a web	In trees and shrubs	May and June
<i>L. triangularis</i>	do.	Low down on shrubs	August-Sept.
<i>L. peltata</i>	do.	Higher in trees	May-August
<i>L. insignis</i>	Spins a snare	On branches	August-Oct.
<i>Drapetisca socialis</i> ..	Hunts over bark	On trunk	August
<i>Bolyphantes expunctus</i> ..	Hunts	On branches	August-May
<i>Meta segmentata</i>	Spins a geometric web	Amongst foliage	All the year
<i>Epeira diademata</i> ..	do.	do.	Autumn
<i>E. cucurbitina</i>	do.	do.	do.
<i>E. umbratica</i>	Spins geometric web; lives under bark	Lower branches	do.
<i>Zilla 10-notata</i>	Lives in colonies; spins a snare	Amongst conifer needles	August-April
All Lycosidæ and Drassidæ	Hunting spiders	Generally on the ground	Summer

The two Phalangids, *Oligolophus morio* and *O. alpinus*, would be of great use too, as they can be beaten out of conifers in many woods, in great abundance.

The above list does not pretend to be exhaustive, but all the spiders in it, except *Bolyphantes* and the Drassids and Lycosids, could be collected in large numbers from furze bushes and various shrubs by any intelligent woodman, and liberated in areas infested by *Coleophora laricella* to a dangerous extent. The Lycosids and Drassids, of course, would have to be captured on the ground—a task giving but little trouble. To give the spiders a fair chance to deal with the pests, it would be necessary to discourage their spinning snares too close to the ground; this could be done by keeping the wood clear of rubbish of all kinds,

and this would destroy, incidentally, the breeding grounds of the Scolytid beetles such as *Tomicus laricis*, *Hylurgus piniperda*, &c. Further, it would be as well to limit the growth of heather (unless required for game purposes) for the same reason. None of the above spiders and Phalangids, except the Drassids and Lycosids, are averse to living in trees, for I have beaten nearly all from conifers, and they would form an effective patrol for the woods when *C. laricella* was out as an imago, and, incidentally, in the case of the small forms, many Aphids would be captured, and in the same way the larger forms would secure many beetles and sawflies.

In all of the woods examined, beetles, either weevils or bark beetles, were but few in numbers, and have never at any time caused appreciable damage. Possibly the commonest beetles in the woods were the Coccinellids mentioned above, and *Rhagium bifasciatum*. As was said, the ladybirds are friendly insects, and in all probability *Rhagium* should be placed in the same category, as its larva feeds on, and demolishes, decaying stumps which otherwise would be lurking places for destructive insects of all kinds.

It was said that *Phigalia pedaria* (the Brindled Beauty Moth) was in sufficient numbers to affect the foliage of the larch in the larval condition. It can never become such a pest as *C. laricella*, for it emerges at a time when insect food is scarce, and owls make short work of it, as the huge number of wings lying about in March and April shows. It is only the immense quantity of eggs laid by the wingless females that keeps its numbers up.

NEW BUTTERFLIES FROM NIAS.

BY PERCY I. LATHY, F.Z.S., F.E.S.*

Hiposcritia nupta.

Hiposcritia lalage nupta, Fruhs. Ent. Nachr. Jahrgang, xxiii. n. 4, p. 63 (1897).

Catophaga melania nupta, Fruhs. Iris p. 287 (1902).

♀. Upper side. Fore wing with costa, apical third and outer margin blackish, three submarginal white spots: hind wing white, outer margin blackish, enclosing three white spots on inner edge.

Under side. Fore wing white, apex yellowish, a subapical blackish band containing a white spot between upper and middle median nervules; hind wing uniform yellowish.

This appears to be a rare species. There are ten males and the female here described, which is, I believe, unique, in Coll. Adams.

* The types of all the species described in this paper are in the Adams Collection, which is now at the Natural History Museum, South Kensington.

Neptis kahaja, sp. nov.

Neptis ilira, Kheil, Rhop. Ins. Nias, p. 24, v. iii. f. 14 (1884).

♂. Upper side. Fore wing blackish brown; cell, inner margin, streaks along nervules, an irregular postdiscal line, and two submarginal lines fuliginous, a whitish streak beyond cell, and four discal triangular white patches. Hind wing blackish brown, costal area widely shining grey, four fuliginous bands crossing wing, the first and third from base being wider.

Under side. Fore wing pale brown, inner margin widely shining grey, cell and interspaces clouded with fuscous, a shining golden patch at base of median nervules, an irregular postdiscal and two submarginal fuscous lines, the space between whitish, white markings as above but with a lilacine tint; a long whitish streak within cell. Hind wing pale brown slightly clouded with fuscous, three fuscous bands crossing wing beyond cell and a submarginal fuscous line, two whitish bands, one across centre of cell, the other postdiscal.

♀. Upper side. Fore wing similar to male, but markings paler and two additional white patches. Hind wing as in male, but without costal shining area and bands paler and more conspicuous.

Under side. Fore wing wants shining area and all markings of both wings larger and paler.

From *N. lasara*, Fruhs., this species may be distinguished by fringes having no white, and from *N. ilira*, Kheil, by the greater extent of costal shining area of hind wing in male, and greater extent of white markings.

Neptis charonides, sp. nov.

♂. Upper side. Fore wing black with the following white markings: a long narrow streak within and triangular patch at end of cell, two preapical patches with minute dash above them, a patch above and a larger one below middle median nervule, a point on inner margin, a submarginal series of spots. Hind wing black, pale on costa, an antediscal white band, a postdiscal series of white spots and a submarginal pale brown line.

Under side. Fore wing dark brown paler on inner margin, white markings as above but cellular streak shorter, submarginal spots larger, and beyond them a fine white line. Hind wing dark brown, white markings as above but spots larger, a discal pale brown line, submarginal line whitish, base of costa whitish.

♀. Similar to male in both wings above and below, but somewhat larger, paler, and the white markings a little more extended.

A race of *N. charon*, Butl. It may be separated from the allied form from the adjacent islands by the much narrower white markings.

Pantoporia kannegieteri, sp. nov.

Athyma kresna, Kheil (nec Moore, 1858), Rhop. Ins. Nias, p. 25 (1884).

♂. Upper side. Fore wing blackish with following white markings: a basal streak within cell, two spots beyond this streak, a

large triangular patch at end of cell, two preapical spots, of which the lower is the larger, below these a minute point, a large round spot between middle and lower median nervules, a triangular patch above middle of submedian nervule, and an oblong patch below it; two obscure submarginal waved pale brown lines, of which the inner is strongly incurved on upper median nervule. Hind wing blackish, an antediscal white band, broken at subcostal nervule, a postdiscal series of white spots, a submarginal pale brown line.

Under side. Fore wing ochreous brown, white markings as above, spaces between them blotched with dark brown, submarginal lines whitish. Hind wing ochreous brown, white markings as above, submarginal line whitish, a discal row of dark brown spots.

♀. Upper side. Fore wing similar to male, but slightly paler, white markings larger and inner submarginal line white. Hind wing similar to male but paler and white markings larger.

Under side. Both wings similar to male but paler and white markings larger.

This is a race of *P. kresna*, Moore, from which it appears to be constantly different in the paler ground colour above and below, and the much more restricted white markings.

Euthalia mitschkei, sp. nov.

♂. Upper side. Fore wing dark olive brown with the following blackish markings: a line near base, two across middle of, and two at end of, cell, a bar between median and submedian nervules, and a small circular line below base of lower median nervule, two narrow lunular bands, one discal, the other submarginal—this inclined to be sagittate. Hind wing shining dark olive brown, paler on costa, a double black bar at end of cell with a blackish spot below it; lunular bands as in fore wing.

Under side. Fore wing pale yellowish brown, darker towards anal angle; the following black markings: a spot near base, two lines across middle of, and two at end of, cell, a minute spot below base of lower median nervule and a series of submarginal spots, an obscure row of discal brown lunules. Hind wing pale yellowish brown, with following black markings: cellular and submarginal as in fore wing, two oval marks above cell, of which the upper is the larger, discal brown markings more conspicuous than in fore wings.

This is the Nias representative of *Euthalia kanda*, Moore, from which it differs in the paler ground colour and more conspicuous markings of the upper surface and the much paler ground colour of the under side; it appears to be very rare. It seems to be very remarkable that *Euthalia monima*, Fabr., does not appear to occur in Nias; this is such a common species in all the adjacent islands that one would certainly expect to find it.

Euthalia adinda, sp. nov.

♀. Upper side. Fore wing copper-brown with the following white markings: an irregular patch at end of cell, three patches

beyond cell, of which the upper is minute, beyond these a curved series of four spots, two large patches between upper and lower median nervules, and below these two smaller patches, a yellowish streak below these; the white markings above median nervule more or less edged with blackish, two black bars in basal half of cell with a black spot below each outside cell, a submarginal row of blackish spots. Hind wing copper-brown with the following black markings: a double bar at end of cell, with minute spot above it, two rows of discal lunules, the first only reaching half way across wing, a submarginal row of spots, of which the three upper ones and that at the anal angle are outwardly widely bordered with scarlet, three brownish white discal patches from costa to lower discocellular nervule; a coppery green patch at anal angle.

Under side. Fore wing yellowish brown paler at anal angle, white markings as above, two black bars at end of, and two crossing middle of, cell, each scarlet patches, a black spot near base of cell, and another below base of lower median nervule; submarginal black markings as above. Hind wing yellowish brown, inner margin and anal angle greenish, discal and submarginal markings as above but smaller, base of costa scarlet, a black bar on precostal nervule; cellular black and scarlet markings as in fore wing but smaller, two irregular twin black markings above cell, each enclosing a scarlet spot, a black line between discocellulars.

This species belongs to the *lubentina* group, but may be distinguished by the discal patches of hind wing above, being brownish white instead of red. It is an exceedingly rare species, the female here described being the only specimen I know.

(To be continued.)

A MONTH'S COLLECTING IN HUNGARY.

BY GERARD H. GURNEY, F.E.S.

(Continued from p. 57.)

SWARMS of *C. iphis* in perfect condition fluttered amongst the grass, and *C. pamphilus* was nearly as plentiful. Hundreds of gloriously fresh *Issoria lathonia* flew amongst the juniper bushes, both sexes being equally common; a few odd specimens of *M. trivia* occurred at the beginning of the wood, but it is a local butterfly, and not until we had penetrated for nearly a mile into the middle of the forest did we find the headquarters of this pretty little species, and then in several places it was very common, and evidently only very recently emerged. *Trivia* is a somewhat difficult insect to catch on the wing, its flight is very quick and rather erratic, but no sooner had we reached the spot where it was common than the sun became overcast by clouds, and the butterflies at once ceased flying, and settled down in twos and threes on grasses and flower-heads, and I was then able to take easily a nice series of perfect specimens. I was told

that Csepel was a very good locality for *P. orion*, but apparently it was not yet out here, as we did not see a sign of it, though, curiously enough, the following day I took four or five specimens on the Schwabenburg, a good thousand feet higher elevation!

Another visit to the Budafok marshes resulted in a dozen more perfect *C. thersamon*, which was quite common. Some of the males were very fine, with a beautiful purple suffusion on the upper side of the lower wings; but I got little else that was fresh except two rather worn male *Everes argiades* var. *poly-sperchon*, and a long series of *C. iphis*, which was very abundant and showed considerable variation in the spotting on the under side of the hind wings.

On the Schwabenburg on the 24th I found *P. mnemosyne* males common in a meadow by the station; here also were a few fresh *Hesperia carthami*. In the sheltered glades *P. orbifer* was now plentiful, and a few rather small *P. orion* var. *ornata* were secured. Here and there were the two "swallowtails," while *I. lathonia*, *M. phæbe*, *Pararge megæra*, one very light-coloured *P. egeria*, a few fresh *P. rapæ*, which were quite ordinary, and several *N. cyllarus* and *P. icarus* males make up the tale.

On May 27th I left Budapest for Herkulesbad, nearly three hundred miles further south. Owing to the heavy rains, large floods had risen, and in consequence of a bridge over a swollen river giving way, my train was detained at Temeshar a good many hours, and did not arrive at Herkulesbad until late on the evening of the 28th. This washing away of bridges is apparently a somewhat common occurrence in Hungary; I believe one or two other entomologists have been detained at Temeshar on previous occasions from the same cause.

Herkulesbad is a most delightful place, with a very comfortable hotel. I was told the weather had been extremely wet for the past fortnight, and certainly the amount of water in the Czerna, and the amount of mud on the road up the gorge, looked as if there had been a lot of rain. However, the first three days I was there were very fine and hot, though after that the weather again broke up, and I had to put up with several *dies non*; still, on the whole, I had a very successful week, and, in spite of weather, the more I saw of the place the more I liked it.

The butterfly of which I was most anxious to secure a series was *Neptis aceris*, which is a local species, never very easy to obtain. It is found, however, commonly at Herkulesbad, and I had not gone very far up the Czerna gorge on the morning of the 29th before I had netted my first, but it was rather a torn example, and I was very glad when I took others and soon found that I need only keep the best specimens, as it turned out to be quite common. I saw *N. aceris* nowhere else except in the

gorge, where I took a beautiful series of perfect specimens, though many were caught only to be released again, owing to their being chipped or torn, as this species very quickly becomes broken and ragged, partly, no doubt, owing to their habit of continually flying in and amongst the leaves and foliage of the trees and shrubs. I took most of my series in the afternoon on the way back to Herkulesbad. In the morning they seemed to be much more lively, not settling on the road or low down, but generally on the top twigs or leaves of a tree, and if disturbed flying rather quickly up the hillside until they were lost in the wood; but about three o'clock they would come down and fly gently up and down a sunny glade or along the side of the stone wall which borders the road for some distance, often stopping and lingering at some spot where the sun's rays came through the leaves overhead, as though loth to leave it; or else sitting on the road itself with outspread wings, when they were easy enough to catch. They varied a good deal in size; some of the males are very small, but amongst the large number netted and examined, no aberrations of any sort were observed—all were absolutely typical.

On the whole butterflies were not nearly so plentiful as I had expected; whether this was due to the weather, or to a late season, or whether my anticipations had led me to hope for too much, I do not know; but I certainly did not meet with anything like all the species I had anticipated. Certainly one cannot complain of the lack of *E. cardamines* and *L. sinapis*, as almost everywhere these two species were abundant; the latter large with well-marked under sides. *N. tages* also was in very great numbers along the road up the gorge; here, too, *P. orion* was beginning to come out, and before I left had become fairly common, though it was local; most of my specimens are var. *ornata*, but a few tend to var. *nigra*.

About a couple of miles up the gorge the valley widens out, the mountainous sides become much less steep, and delightful open marshy glades and meadows break into the thick woods; here butterflies were rather more numerous. *Everes argiades* was quite common and very large; equally common, but rather more local, was *E. coretas* ab. *decolorata*. Both these species were flying together in damp spots amongst the lush grass which grew round the little streams and tiny bogs. Here, too, *N. cyllarus* was almost plentiful, splendid large examples of both sexes. They generally have very little spotting on the under side of the upper wings. One or two fresh *Callophrys rubi* were also netted in the same place. Some three miles up the valley there is a large meadow on the right of the road, here fresh *P. mnemosyne* were plentiful, and two days later I found another locality for this species nearer Herkulesbad, where both sexes were flying up and down in some numbers. It is rather a fine

form, larger than my Swiss specimens, and darker than those I have from near Digne. On the aforesaid meadow were a few worn *Brenthis euphrosyne*, some fresh *A. cratægi*, with *G. rhamnii*, *P. icarus*, *C. hyale*, *I. lathonia*, *P. mæra*, and *P. egeria*—all common.

Pieris napi was a very abundant species nearly everywhere, but especially on the way up the Domogled. All the examples I took were of the first brood; the second brood, which is var. *napæa*, had not appeared before I left. *Pieris manni* was also common. It is perfectly distinct from the other "whites" at Herkulesbad, both in its flight and in its habits. It was generally to be found flying with a very *Sinapis*-like flight along the edge of the wood, threading its way in and out of the bushes; it did not often come down to the level of the road, and is entirely a woodland species. Larvæ were found on a tall white crucifer which grew right underneath the bushes in the wood.

On the Coronini meadows, which are on the right bank of the river below the town, on June 2nd I found several species which I had not seen before. A fresh brood of *Melitæa didyma* was common, rather small, but very red and with bold black markings. Quite typical *Epinephele janira* were just emerging, and I picked half a dozen fresh *Nomiades semiargus*. The flower-covered banks of a small stream were alive with butterflies. Some rather worn *R. argus* (*ægon*) were netted and released; brilliantly fresh *N. cyllarus* (males) sat on the leaves of knapweed, with equally large *P. icarus*, while nicely marked though rather small *M. phæbe* were common, and a single *Euvanessa antiopa*, the only specimen I saw at Herkulesbad, sailed round the willow trees planted by the edge of the stream. Climbing higher to where the wood joins the meadows, I netted two perfect *N. aceris*, but did not see much else, beyond a few fresh *Zygæna filipendulæ*.

(To be continued.)

BUTTERFLY-HUNTING IN THE BALKANS.

BY A. E. GIBBS, F.L.S.

I SPENT a few weeks in the summer of 1912 in the Western Balkans, visiting Dalmatia, Montenegro, Herzegovina, and Bosnia. Although the season there, as elsewhere, was a disappointing one, and I did not see several species whose acquaintance I hoped to make, and which are known to occur in these countries, yet I obtained a fair number of interesting butterflies, and an account of the journey may be worth writing. Having crossed Europe to Trieste I went by boat down the Dalmatian coast to Cattaro, from which port I travelled over

the Black Mountain into Montenegro, subsequently returning to the sea and proceeding to Gravosa, whence I was able to get on by railway to Herzegovina and Bosnia. I shall relate my experiences in the different countries visited, devoting a short chapter to each.

DALMATIA.

It is a far cry from my Hertfordshire home at St. Albans to Spalato, the charmingly situated Dalmatian seaport, some two hundred miles down the eastern coast of the Adriatic, but there is a connecting link between the two places which makes Spalato a particularly interesting spot to me. It was under the Diocletian persecution that the martyrdom of St. Alban took place. The great emperor was a native of what is now Dalmatia, and when, growing old, the cares of government became too heavy for him, he did what a good many Roman emperors were unable to accomplish—he laid them down without also laying down his life, and, retiring to his native land, built himself a splendid palace. When the Avars overran the country and destroyed the Roman town of Salona, the inhabitants took refuge inside the strong walls of Diocletian's great house, actually building their new city in its spacious enclosures. So, on June 2nd, as I strolled up the slopes of Monte Marjan, I thought of all that the decree of the mighty Dalmatian emperor of Rome had meant for British Christianity, and remembered that the very existence of my native city might be directly attributed to it. But I was awakened from dreams of the past by a small white butterfly which fluttered across the path. A turn of the net and my first specimen of *Pieris ergane* was secured, the pioneer of a considerable series captured during the Balkan journey. The insect which before all others I was especially on the lookout for was *Melanargia larissa* var. *herta*, Hb., and seeing a grassy place which appeared to be a likely spot, I climbed the wall of the enclosure and succeeded in beating out and securing a specimen of this local Satyrid. *Herta* is the variety of *larissa* which occurs in the Western Balkans, and is distinguished from the nymotypical form in having the disc of the wings white. Returning to the path I took two specimens of *Thecla spini*, which is a rather abundant insect in this part of the world. On the flower-heads the commonest of our Palearctic Syntomids, *Syntomis phegea*, was disporting itself, while *Cœnonympha pamphilus*, which could not be distinguished from the British form, flew by the wayside. When I reached the top of the hill I found an old and familiar friend, *Vanessa cardui*, careering boldly about as is its wont, but while I sat on a wall watching its gambols with one eye, and with the other the crowd of young Dalmatians swinging and playing in the grounds of the restaurant, the gathering clouds warned me

to be moving, and before I could get back to the town rain began to fall. The next morning, however, was fine and bright, and there appeared to be every prospect of a good butterfly day, so I resolved to take the ten o'clock train to a place called Clissa, about an hour's ride inland. I booked second class, and my travelling companions were a young couple with a baby. The mother insisted, despite the heat, on having the windows closed for fear baby should catch cold, while the father spent his time in entomological pursuits, chasing and killing the numerous flies which showed a strong desire to settle on the sleeping infant! I made up my mind to escape at the first opportunity, so at a wayside halt I changed into an airy third class carriage with an open platform in front, from which I saw var. *herta* flying abundantly among the grass and herbage on the hillside. I think my journey would have yielded better entomological results if I had left the train at one of these little stations. At Clissa there is a picturesque castle-crowned hill, where a few soldiers are stationed, and as I entered the gateway to explore the old fortifications, I noticed *Papilio podalirius* flying round the young trees; but they were ancient specimens and in very worn condition, so I let most of those I captured go. A soldier had been watching me, and when I put down the net to take a snapshot from the ramparts, he took possession of it and frantically, but not very successfully, chased every *Papilio* that appeared, bringing to me in triumph the poor, battered, tailless creatures which he succeeded in catching. When I got the net back I started off down the hill to try to reach the source of the river Jeder, which issues, as so many of the Balkan rivers do, in a great stream from the base of a limestone cliff. It was a hot walk of two or three miles, with nothing to be had until I came to a hillside where I got eight or nine *M. var. herta*, a nice series of *Polyommatus escheri* in prime condition, and one *P. orion* decidedly the worse for wear. I have said that nothing was to be had *en route*, but I had forgotten a stern chase after a very vigorous specimen of *Polygonia egea*, which I ultimately caught on a bramble bush; but I caught the bramble too, and, before I could disentangle the net, *egea* succeeded in getting away. But I made up for the disappointment as I netted several specimens later in the day, and during my visit to the Balkans I got a good many of them. After a picnic lunch in a green and shady corner of the valley by the source of the river, with a flowery spot near by, where I took *Pontia daplidice* and several of the common *Lycanids*, I walked back to Spalato, where I posted my captures—fifty-six in number—home to be set.

The next day I went on by sea to Ragusa, an ancient and most interesting town. In the afternoon of my arrival I took passage on a small steamer which was advertised to run to the island of Lacroma, where *Charaxes jasius* is said to fly, and

thence to the source of the river Ombla. It was too rough to land on the island, so we steamed round it, and running for a few miles up the coast, the little boat tumbling about a good deal in a very choppy sea, we entered the estuary of the river, where we found smoother water. We steamed up it as far as the boat could be taken, landing in front of a little inn, five minutes' walk from a mighty cliff, where the Ombla issues from the bowels of the earth a full-grown river. During the half-hour or so we spent here I took a few *P. ergane* and other insects. It seemed a good spot for collecting, so I resolved to revisit it the next day, when I decided that I would try to reach it by climbing over the mountain behind Ragusa, instead of by following the coast line. It was a very rough scramble to the top of the hill, for I failed to find the path, the nature of the ground making butterfly-hunting quite impossible, but when once the summit was gained I was rewarded by a beautiful view of the coast. In a little hollow *Agriades thetis* was flying in considerable numbers and good condition. Having crossed the plateau I struck the railway from Gravosa, which had climbed high up on the side of a valley. A path zigzagged from the little station down to the village. By the side of it I got *Melitæa cinxia* and *M. trivia* in single specimens, *M. didyma*, *Thecla spini*, and *T. ilicis*.

One of the most interesting captures of the day was a Hesperid, which at the time I thought was *Pamphila nostradamus*, but which I now believe to be *P. lefebrvii*. Two males, both rather worn, were taken. In vol. iv. of 'Lépidopterologie Comparée,' M. Oberthür sets out at length the distinguishing features of these two species, and on Plate lxiv. in vol. v. there are excellent figures of upper and under sides of both sexes, drawn from specimens taken by Signor Querci at Formia, in the Italian province of Caserta. I have a good series of *P. lefebrvii* from the same place, and comparing these two specimens both with M. Oberthür's figures and with my Italian insects I think that the Dalmatian specimens must be assigned to Rambur's *lefebrvii*, notwithstanding the fact that M. Oberthür gives Dalmatia as a locality for *P. nostradamus*. At the little inn by the landing-stage I made an unsatisfactory lunch of raw ham and hard-boiled eggs, with coarse bread hot from the oven, washed down by a bottle of Giesshubler water and the wine of the country. Then I sought the hillside where on the previous day I had found *P. ergane*. The mountain was steep and the sun overpowering, so I had to remain under the shadow of a small tree and capture the few specimens which came my way. On the other side of the river the ground was a little less precipitous and there was more shade, so I made my way thither and took several *P. egea*, a poor *L. camilla*, and things of lesser note, but was also fortunate enough to secure another specimen

of *M. var. herta*. But the Ombla valley was like an oven, and I was glad to find a man with a conveyance, and I engaged him to drive me to Gravosa, whence the tramway took me back to the comfortable Hôtel Impérial at Ragusa. This brought to an end my brief entomological experiences in Dalmatia, for the plans I made to return later on for more *M. var. herta* were not carried out.

(To be continued.)

AN UNRECORDED APPLE SAWFLY IN BRITAIN
(*LYGÆONEMATUS MÆSTUS*, ZADDACH).

BY FRED V. THEOBALD, M.A., F.E.S., Hon. F.R.H.S., &c.

THE larvæ of *Lygæonematus mæstus*, Zaddach, were sent me in 1911 and 1912 from two places in Hampshire (Steep and Froxfield), and from Berkshire (Mortimer). In all three cases they were found feeding on apple foliage. I also found a small colony on a "Worcester Pearman" at Wye in 1907, but was not then successful in rearing the insect.

The larvæ were sent me from Steep by Mr. T. E. Crompton, who found them in an orchard on June 5th, 1911, and on June 10th he sent me another batch found in an orchard at Froxfield, which were considerably smaller than those first sent. At Steep only a single branch of one tree was attacked and completely defoliated. At Froxfield they were much more plentiful, and were stripping the trees in typical sawfly manner.

The first ones pupated on June 13th, and the last on July 22nd. Some of them pupated in the soil of the breeding-jars, others on the surface of the soil, and several amongst the damaged foliage. Those in and on the soil covered the dull yellowish silk of their cocoons with fine particles of earth; those on the foliage had a thick cocoon of a pale, dull yellowish silk. The adults hatched out from April 20th to May 5th in 1912.

The colony from Mortimer, twenty in number, were found on a "Mother" apple, and were sent me by Mr. J. D. Lake on June 14th, 1912. These have pupated entirely amongst the foliage, making similar cocoons to those that pupated amongst the leaves in the previous year. The larvæ are very marked in appearance. The adult larva is apple-green, with a small, somewhat irregular, black spot on each side of the first four segments, and a large round black spot on each side of the next seven segments, numerous small black specks on the first four segments, and some on the sides of the others. Head green, with black eyes. Legs green. Length, 12 to 12.5 mm. A few specimens showed a more yellow tinge. Those under observa-

tion fed freely on the leaves, mainly eating them from the edge inwards, but now and then they devoured holes in the leaves. The adult is shiny black, with paler incisions on the venter; the legs pale, and also the base of the wings.

The insects were very kindly identified for me by the Rev. F. D. Morice, who writes me that *L. mæstus* of Zaddach is the same as *L. brevicornis*, Th. (1862) (non Cameron).

NOTES AND OBSERVATIONS.

SOME ABERRATIONS OF BRITISH LEPIDOPTERA: *EUCHLOË CARDAMINES*.—Thanks to the photograph on page 28, *antea*, I am able to identify the albinistic aberration of *cardamines*, taken at Cock Clarks, Essex, as ab. *lasthenia*, Millière (Ann. Soc. Linn. Lyon, 1860, 3me livr. pl. 10, figs. 1 and 2). Millière figures a male. Mr. L. C. Hocking also figures a male. I have in my collection a female *lasthenia* taken in the environs of Sedan, Department of Ardennes. The example figured by Millière was captured at Digne, Basses-Alpes, by Donzel. I think it may be interesting to publish this information in the 'Entomologist.'—CHARLES OBERTHÜR, Rennes, Ille-et-Vilaine, France, February 5th, 1913.

The form figured by Mr. Hocking, and identified by M. Oberthür as ab. *lasthenia*, Millière, is included in the account of *E. cardamines* in Tutt's 'British Butterflies,' 1896, p. 245. Millière's description is as follows: "Larger than the type. The front wings and the hind wings appear to be more elongate, and less rounded than those of the type. The insect, in fact, seems to me to present an entirely different facies to that of the several male and female *cardamines* under my eyes; so much so that this butterfly might well be a distinct species. . . . The apical orange blotch, which is a little less vivid than in ordinary *cardamines*, occupies the same position, but the border of the apex is entirely without black; also the discoidal spot. In lieu of the characteristic spot and the black border broken with white, absolutely nothing is visible except the milky ground colour. The basal area of all four wings is quite white, and the under side markings, which in male *cardamines* always show through more or less above, are indistinguishable. The hind wings are also remarkable. The green under side spots of the type are replaced by spots of a very faint greenish yellow, arranged almost in the same way as in ordinary *cardamines*. Antennæ white. The plumules of the frontal tuft (toupet) pure white. Abdomen rather slender and long, white, as well as the legs." Millière, in fact, seems to have thought that, if not a distinct species, *lasthenia* might prove to be a hybrid with *sinapis*.

FURTHER NOTES ON HESPERIID CLASSIFICATION.—In the paper by me, concluded at page 28, I did not make it sufficiently clear that, of the Swiss authorities cited, I am indebted to Dr. J. L. Reverdin alone for the many and minute distinguishing characters of the Hesperiiids under review. Also that Plate iii. was originally designed and

prepared by him for fasc. 3, vol. ii. of the 'Bulletin de la Société lépidoptérologique de Genève,' of which publication Dr. Blachier is editor, and by whose and Dr. Reverdin's kind permission I was permitted to reproduce it in the 'Entomologist.' Dr. Blachier himself did not collaborate with Dr. Reverdin in the authorship of these valuable articles; nor did M. Rehfsous, and his bionomic observations are supplementary to Dr. Reverdin's own studies of the wing characters, &c., of the several species.—H. ROWLAND-BROWN.

FURTHER NOTES ON *TAPINOSTOLA CONCOLOR*.—Further to my notes (Entom. vol. xlv. p. 256) on the ovipositing of the above species. The ova referred to were laid June 23rd, 1912, and the bulk of them were hatched by 8 a.m. on July 10th following, the dark heads of the larvæ showing through the envelopes of the ova some twelve hours before emergence. A few larvæ were very actively crawling about all over the boxes in which they were confined, but the majority of them were secreted in the folds of the withered leaves on which the ova had been deposited; the empty egg shells did not appear to have been utilised as food. The young larvæ, immediately after emergence, measured about $\frac{3}{8}$ in. in length, their colour being yellowish white; head and plate brown, black above the anal flap; when disturbed they became exceedingly active, and dropped when touched with a fine camel hair. The larvæ, to the number of forty, were placed in three separate glass tubes, each tube 4 in. long by $\frac{3}{4}$ in. diameter (about equal numbers of larvæ to each tube), and in each tube were placed two 3-inch lengths of *Dactylis glomerata*, two lengths of reed tips, and two lengths of *Calamagrostis epigeios*. After introducing the larvæ to the tubes they were secured by closing the mouth of each tube with a layer of clean blotting-paper under a piece of muslin, both being held in place by a rubber band round the tube. The three tubes were then put in a glass jar, and placed in a shady corner of the garden; visited thirty-five minutes later, all the larvæ had disappeared from view. No perforations were revealed by a cursory examination, but a closer scrutiny showed that most of the larvæ were ensconced between the stems and leaf sheaths of *C. epigeios*, several having selected *D. glomerata* and one or two reed. Two perforations could be seen in the stems of *C. epigeios*, and one in *D. glomerata*, but none in the reeds, and these were possibly used merely as temporary places of concealment. The covers of the tubes containing the larvæ were then again tied down and left undisturbed until the evening. At 9.30 p.m. they were again visited with a lamp, and several larvæ were seen to be crawling about the tubes, possibly those who had not in the first instance selected *C. epigeios*, and who now found the stems already tenanted. Transparent patches were showing on the stems of *C. epigeios* and *D. glomerata*, where the green matter had been eaten away, showing that feeding had commenced, but so far as could be ascertained the reed tips had not been touched. Frass could be seen protruding from several of the perforations in the *epigeios* and *glomerata*.

On the following days (July 11th and 12th) the larvæ remained concealed by day, but when it became dusk several were always to be

seen crawling about the tubes. Two or three stems were gently opened, and larvæ found lying extended within. On the evening of July 13th the stems of *epigeios* and *glomerata* appeared to be almost reduced to shells, whilst the succulent portion of the reeds had also been attacked, and the larvæ in the tubes were crawling about in all directions, the tract of food within the larvæ showing up very distinctly as dark lines through the transparent skins.

On the morning of July 14th all the stems and *débris* in the three tubes were carefully gone through, and the larvæ transferred to a clean empty tube. Thirty of the larvæ were then turned out one by one on to a plant of *C. epigeios*, which had been planted for them in a shady corner of the garden, in a large wooden box measuring 3 ft. × 18 in. × 15 in. deep, sunk into the ground to within 3 in. of the top edges. The remaining ten larvæ were kept in the tube for further observation, and supplied with fresh food. The thirty released larvæ, when placed on the growing plant of *epigeios* (about 9 a.m.), immediately began to crawl down the stems, and many of them disappeared from sight behind the sheaths, whilst a few, when they had travelled to within 2 or 3 inches from the base of the stems, commenced to bore into them. By 9.30 a.m. one of the larvæ engaged in boring operations had disappeared out of sight within the stem. The larvæ on the growing food-plant were visited with a light about 9 p.m. the same evening, when a few could be seen wandering about.

On July 17th a few of the terminal shoots of the growing sedge in the box appeared to be drooping, and, on examining the stems, perforations (in one case two in the same stem) were seen about 2 inches from the base of several stems. On July 18th the terminal shoots just mentioned were found to be distinctly withered in appearance. At this date, owing to prospective absence from home, it was deemed advisable to release the larvæ in the glass tube, and they were accordingly turned down upon the growing plant. Only hurried observations were practicable until September 1st, 1912. At this date many of the terminal shoots of the growing plant were withered and turned to a yellowish-brown colour, but it was not thought advisable to attempt to find any of the larvæ for fear of injuring them, and accordingly they were not disturbed.

In December, 1912, during my absence from home, that pest the "jobbing" gardener was called in, and apparently one of his very first actions had been to dig up the plant of *epigeios* ("squitch"!) from the box, and to cut it up and bury it in the adjoining soil. The scattered remnants were collected as far as possible and replanted, but the larvæ have in all probability perished. — G. BERTRAM KERSHAW; West Wickham, Kent.

HIBERNATION OF *PYRAMEIS ATALANTA*.—As a good deal has been written lately on this subject, it may be worth while to record some experiments which I made this winter. As I noted in vol. xlv. p. 299, of the 'Entomologist,' *P. atalanta* larvæ were quite abundant here in late September of last year. They were in all stages of growth, but the small ones seemed to feed up quicker than those I had in the summer. By the middle of October all had pupated, and contrary to

my July experiences the pupæ were all healthy, and out of a dozen only one really failed to emerge, although another, as I will mention later, did not become fully perfect. These dozen pupæ were kept in glass-covered flower pots in my sitting-room, and the first butterfly emerged during the last week of October. I then began to see what effect direct sunlight had on the emergence, and discovered that the pupæ which were exposed in the window on sunny days quickly emerged, but the result of holding them back in the shade and only giving them occasional doses of sunlight was to retard the latest emergences till the first week of December. For instance, one day these turned colour, and the wing markings of the butterfly were plainly visible through the pupa case. The next day one of these broke its shell under the influence of the sun's rays, but when I removed them into the shade again all growth seemed to stop; in fact, the partially emerged one never got any further at all, and its two companions delayed their arrival for two days. The perfect insects also were remarkably responsive to sunlight. Two or three, which were always kept in the shade, never moved at all from the time of their emergence till death cut short their careers. Others seemed to prepare for hibernation, but ten minutes' bright sunshine would galvanise them into the excitement of active life. I believe it is commonly the case with this family that the sexes take no interest in each other till after hibernation; certainly none of mine did. But, on the other hand, the somewhat confined space of a flower-pot was not very congenial to five or six lively and powerful butterflies! Early in December death carried off one after another of the butterflies. I fancy that it was the early morning frosts, felt even in a room, which caused them to die; I am all the more astonished to read Mr. Frohawk's account (*antea*, p. 40) of *atalanta* being found alive out of doors in February. For before Christmas all mine were dead.—J. S. CARTER, Warren Hill Cottage, Eastbourne.

THE AUDACITY OF A BIRD.—“It was either a very bold or a very hungry member of the feathered tribe (perhaps both), for I was sitting in my room, writing at a table not far away, when I heard a suspicious fluttering of wings in the neighbourhood of some freshly turned and turning pupæ hanging up to dry. I got up quickly, just in time to see a good sized bird fly through the open door out on to the verandah, where he boldly perched on the balustrade outside, with something in his beak. I turned to the pupæ to discover which I had lost by this unseemly and unlooked-for intrusion, and I soon saw that a huge larva of *Papilio polymnestor*, which I had hung up for pupation the night before, was missing; and though the last of a good many others of this species, it was an especially large one, and would no doubt have produced in due course a very fine female. It had been bred from an ovum. The bird who had paid me this unwelcome visit and thus partaken uninvited of my hospitality was about the size of a Starling.”—MARGARET E. FOUNTAINE, F.E.S., Khandala (Poona), India, Jan. 17th, 1913.

NOTES ON THE EARLIER STAGES OF *EREBIA EMBLA*.—Amongst the *Erebia embla* captured by me at Saeterstøen, in South Norway,

on June 5th last, were several females, one of which deposited an ovum whilst on the setting board. The larva from this emerged on July 11th. Immediately after emergence I measured it, and found it had a length of 2 mm.; the head was straw-coloured with a purple blotch, and a few specks of the same colour around the jaws. On each side of the head there was a conspicuous black spot. The head was large. The larva had a rather broad central dorsal and two narrow subdorsal purple stripes; the ground-colour of the general area was straw colour. The whole of the larva was thickly covered with inconspicuous spines. I measured it again on July 20th, when it had increased only to 3 mm. in length, after which date I could not find that it fed, and it did not further increase in size by July 28th, on which day it died. I tried the larva with various Arctic grasses, out of which it selected a very fine *Aira*, which much resembled *A. cæspitosa*, and which was possibly that species. In feeding, it stretched itself out at full length on a blade of grass, with the head upwards, and commenced to feed at the extreme tip, eating towards the base, and leaving a thin strip of grass uneaten in its progress down the blade. *E. embla* is supposed, from the fact that it is only common in alternate years, to take two years to complete its metamorphosis, and the behaviour of my larva seems to lend colour to this view, for as the imago appears at the end of May, there does not seem time for much larval growth in the spring, whereas from the facts that the ova stage appears to last five weeks, and that the young larva took seventeen days to increase one millimetre in length, it seems probable that in a state of nature it hibernates for the first winter quite small, probably in the first stage, attaining its full size the following summer, and passing the second winter as a full-grown larva or as a pupa.—W. G. SHELDON, F.E.S., February 3rd, 1913.

HEMEROPHILA ABRUPTARIA EMERGING IN JANUARY.—On January 25th a specimen of *Hemerophila abruptaria* appeared in one of my breeding cages, and on February 8th another came forth. The larvæ from which they were reared were hatched out on May 19th of last year, and pupated between the middle of July and the first week in August. Throughout their existence they were kept in an outhouse where, except that they were sheltered from rain, they are well exposed to the weather, and where the pupæ have remained throughout the winter.—ROBERT ADKIN; Lewisham, February, 1913.

COLEOPTERA OF THE BRITISH ISLANDS.—The growing interest taken in the study of our native Coleoptera is exemplified by the fact that almost every month new species are being recorded. Coleopterists will therefore welcome the announcement that the Rev. Canon W. W. Fowler has, in collaboration with Mr. H. St. John Donisthorpe, prepared a sixth and supplementary volume to his standard work 'The Coleoptera of the British Islands.' The last volume of the series was published in 1891, and the present volume brings the work entirely down to date. The Large Paper Edition of the present work (10" × 6 $\frac{3}{4}$ ") contains, in addition to three plates from photographs (which are also included in the smaller edition, 8 $\frac{3}{4}$ " × 5 $\frac{1}{2}$ "), no fewer

than twenty coloured plates, depicting two hundred and fifty-five species. Mr. Donisthorpe has contributed to the volume a special paper on the British Myrmecophilous Coleoptera. We understand that both the large and small paper editions, which are being published by Messrs. Lovell, Reeve & Co., Ltd., of 6, Henrietta Street, Covent Garden, London, are to be ready by March 15th.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*Annual Meeting, Wednesday, January 15th, 1913.*—The Rev. F. D. Morice, President, in the chair.—Mr. J. E. Collin, one of the Auditors, read the Treasurer's Balance Sheet for 1912, showing a balance of £16 18s. 9d. On the proposal of the Rev. F. E. Lowe, seconded by Mr. H. Main, it was unanimously adopted.—The Rev. George Wheeler, one of the Secretaries, then read the Report of the Council. Mr. A. Bacot proposed that the Council's Report be adopted. This was seconded by Dr. T. A. Chapman, and carried unanimously. The President then put the Council's list of nominees for the Officers and Council for the ensuing session to the meeting and asked for a show of hands. The following were then declared elected unanimously:—President, G. T. Bethune-Baker, F.Z.S.; Treasurer, Albert H. Jones; Secretaries, Commander J. J. Walker, M.A., R.N., F.L.S., and Rev. G. Wheeler, M.A., F.Z.S.; Librarian, G. C. Champion, A.L.S., F.Z.S.; other members of the Council, R. Adkin, James E. Collin, J. Hartley Durrant, Stanley Edwards, F.Z.S., F.L.S.; H. Eltringham, M.A., F.Z.S.; A. E. Gibbs, F.L.S., F.Z.S.; Rev. F. D. Morice, M.A.; G. W. Nicholson, M.A., M.D.; Hon. N. C. Rothschild, M.A., F.L.S., F.Z.S.; W. E. Sharp, J. R. le B. Tomlin, M.A.; Colbran J. Wainwright. The President, the Rev. F. D. Morice, then delivered an address, at the close of which Mr. C. J. Gahan proposed a vote of thanks to him for his services as President and for his address, at the same time asking for its publication as a part of the Proceedings of the Society; this was seconded by Mr. C. Fenn, and carried unanimously. The President having replied with a few words of thanks, Mr. G. Meade-Waldo proposed, and Professor Selwyn Image seconded, a vote of thanks to the Officers of the Society for their work during the past year, which was also carried unanimously. The Treasurer and both the Secretaries returned thanks, the former referring to the generosity with which Dr. Chapman had for years contributed towards the expense of the plates published in the Transactions.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY. — *Annual Pocket-box Exhibition, November 28th.* — Mr. A. E. Tonge, F.E.S., President, in the chair.—Mr. C. N. Freeman, of Sanderstead, was elected a member.—Mr. A. E. Tonge exhibited species taken and bred by him during the season, including *Heliothis marginatus*, *Agrotis cinerea*, *Oncocera ahenella*, *Notodonta phæbe* (*dictæa*), &c., from Reigate; *Polia chi*, from Winslow, Bucks, *Leucania albipuncta*, *Noctua stigmatica*, *Bryophila muralis* var. *impar*, from Deal, &c.—Mr. B. H. Smith, thirty specimens of *Phryxus*

livornica, taken at light in South Cornwall in May.—Mr. R. Adkin, long and varied series of *Anthrocera lonicera*, *A. trifolii* and *A. filipendula*, and called attention to the similar colour aberrations occurring in all three species, from normal deep red, through pale red, orange to yellow by small gradations.—Mr. A. Sieh, the two very rare Coleophorids obtained by him this year, *Coleophora trigeminella* and *C. agramella*, the latter from East Hoathly, Sussex.—Mr. E. P. Sharp, an extensive series of the Sussex forms of *Dianthæcia carpophaga*, and dark and red forms of *Nonagria edelsteni*.—Captain Cardew, an almost obsolete under side of *Celastrina argiolus* near ab. *argyphontes*, from Oxshott.—Mr. T. H. L. Grosvenor, a very long series of *Cænonympha typhon*, from Witherslack, Cumberland and Scotland, and pointed out the gradual suppression of the spotting as the species occurs more to the north. He also showed *Agriades eoridon* ab. *semisygrapha*, ab. *inæqualis*, ab. *aurantia*, and ab. *tithonus*, *P. rapæ* from Aberdeen with females varying from pale yellow to buff, under side aberrations of *Aphantopus hyperanthus*, *Cænonympha pamphilus* and *Aricia medon*, and a *Triphæna pronuba* with pale lemon-yellow hind wings.—Rev. J. E. Tarbat, a series of *Crambus fasciellus*, from Norfolk.—Mrs. Hemming, 2 broods of *Colias edusa* bred from ova laid by females captured on May 21st and July 21st respectively; there was but little variation in brood 1, while the males of brood 2 showed a diminished amount of spotting on the hind wings, and the females had considerable suppression of the fore wing marginal spotting. Mrs. Hemming also showed aberrations of *Pieris napi*, a melanic *Anthrocera trifolii*, a dusky-fringed *Agriades thetis*, a green-tipped male *Euchloë cardamines*, and a female *C. edusa* right side ab. *helice*, &c.—Mr. L. W. Newman, a long bred series of hybrid *oellatus populi*, examples of other hybrids previously shown by him; extremely large bred *C. edusa*, a melanic example of *Cosmia trapezina* from Bexley, and a yellow *Polygonia c-album*.—Mr. H. J. Turner, series of *Bryophila muralis* from Freshwater and Dawlish, the former light green and gray in ground, the latter dark and intense in colour and marking; two specimens were smaller than *B. perla*.—Mr. A. E. Gibbs, a drawer of the brilliant South American genus *Catagramma* and its allies.—Mr. W. J. Lucas, a number of species of Neuroptera, most remarkable for their strikingly exaggerated form of wing, including *Nemoptera bipennis* from Gibraltar, *N. coa* from Corinth, *Lertha barbaru* from Algeria, &c.—Dr. T. A. Chapman, a series of *Agriades thersites* with *A. escheri*, *Polyommatus icarus*, &c., for comparison; and he called attention to the overlapping of the flowering time of *Ulex europæus* and *U. nanus*.—Mr. Wells, an unusually large specimen of *Apatura iris* and a *P. c-album*, with much reduced costal blotches and dark suffused hind wings.—Mr. R. T. Baumann, a melanic specimen of *Acidalia virgularia* bred from a captured melanic female, and a long series of *Hydriomena furcata (sordidata)* from Forres, showing banded, vinous, and very dark forms.—Mr. J. A. Simes, a long and varied series of *Melitæa didyma* from Europe and North Africa, including the small pale form ab. *persea* from Greece, the huge South Italian form, and a beautiful radiated aberration.—The Rev. Alfred Stiff, a series of

Epinephele tithonus with extra ocelli well developed; *Aphantopus hyperanthus* with large and richly coloured ocelli; a *Celastrina argiolus* the size of *Cupido minimus*; *Pyrameis atalanta* with the fore-wing bands broken, one with light vermilion bands, and one with partially yellow bands on the hind wings.—Mr. A. G. Scorer, a *Eugonia polychloros* with three heavy spots on the inner margin of the fore wing; a *Xanthorhoë sociata* with the band reduced to a couple of spots; a *Boarmia repandata* with the white band bordered with a blackish brown belt; and a *Triphæna comes (orbona)*, with the black submarginal band of the hind wings broken into irregular rays.—Mr. G. T. Porritt, series of two fine forms of *A. grossulariata*, one near *hazeleighensis*, with the orange band very broad and the outer margins broadly white, and the other a heavily marked form with the yellow almost obsolete.—Mr. L. W. Newman, the paintings of the aberrations bred by him during the last two seasons.—Mr. W. J. Kaye, species of the genus *Heliconius*, with aberrations of each species, showing melanism in both fore and hind wings, including *H. numata*, *H. ismenius*, *H. thelxiope*, *H. alithea*, *H. melpomene*, *H. erato*, *H. doris*, &c.—The Rev. G. Wheeler, five examples of the hybrid *Agriades polonus* from Assisi, *Agriades thetis* ab. *punctifera* from Africa, ab. *celestis* from South-west France, and ab. *urania* from Dorking; under sides of *Dryas paphia*, including ab. *dives*, a new form from Algeria, &c.—Mr. J. Platt Barrett, *Polyommatus icarus* taken in 1911 and 1912, to show that those of the former date were much more brightly marked than those of the latter year.—Mr. W. J. Ashdown, a xanthic aberration of *Epinephele jurtina*, a very variable series of *Calymnia trapezina*, and a very fine range of variation in *Chiasmia clathrata*.—M. Stallman, *Aricia medon* from Margate, showing some white round the discal spots; a female *Colias edusa* with only traces of spots on the marginal bands; a *Cosmotriche potatoria* with a semicircular sinus in the hind wing, bred from a Wicken cocoon; and a *Hypocrita jacobææ* with some of the red markings yellowish.—Dr. G. S. Robertson, a dark banded *C. trapezina*, three confluent forms of *Anthocera trifolii*, blue females of *Agriades thetis*—the two last from near Dorking—bred specimens of *A. meliloti* from the New Forest, *Cymatophora octogesima* from a fence in Dulwich, &c.—The Rev. G. H. Raynor two new forms of *A. grossulariata*: (1) a dark and radiated form of ab. *lacticolor*, and (2) an orange-coloured form of ab. *fluvipalliatæ*.—Mr. Stanley Edwards, examples of the groups of the genus *Papilio* which occur in the Ethiopian region, including *P. antimachus*, *P. zalmoxis*, *P. ridleyanus*, *P. cynorta*, *P. hesperus*, *P. leonidas*, *P. demoleus*, *P. menestheus*, *P. polycenes*, *P. fulleri*, *P. latreillanus*, *P. niveus*, *P. colonna*, and *P. phorcas*.—Mr. B. N. Crabtree, a very long series of *A. grossulariata*, including the well-known forms *nigrosparisata*, *varleyata*, *lacticolor*, and *lutea*, and most of the aberrations named and described by Rev. G. H. Raynor; a long series of *A. sylvata (ulmata)*, including many smoky forms; two *Nemeophila plantaginis* with the black markings absent, the ground being pale ochreous yellow; and five aberrations of *Eustroma reticulata* (see Entom. xlv. plate i.).—Mr. H. W. Andrews, a collection of predaceous Diptera illustrating the

work of Professor Poulton, including British species of the Asilidæ, the Empidæ, the Dolichopodidæ, the Cordylurid *Scatophaga stercoraria*, and the Anthomyid *Cænosiâ tigrina*.—Mr. M. E. Moseley, mounts illustrating the various stages in the metamorphoses of *Sialis lutaria*, *Ephemera danica*, *Brachycentrus subnubilus*, and *Dictyopteryx microcephala*.—HY. J. TURNER, *Hon. Rep. Secretary*.

RECENT LITERATURE.

Catalogue des Lépidoptères Observés dans L'Ouest de la France.
Pte. 1, Macrolépidoptères. By HENRI GELIN and DANIEL LUCAS. 8vo, pp. 232. Published by the Authors: 2, Rue Beaune la Rolande, Niort, Deux-Sèvres, France. 6 frs.

THE Lepidoptera of Western France have a peculiar interest for the British student collector, inasmuch as that part at least of the region to the north of the Loire approximates in many respects, climate, formation, and flora, to our own southern counties. At intervals local catalogues of Lepidoptera have been published by some of the learned and scientific societies of the western Departments, but until the publication of MM. Gelin and Lucas's work there has been no reliable review of the whole Atlantic region from Finistère to the Basses-Pyrénées. The authors, however, are not content to put forward a mere list of captures, or to collate records already in print. In a suggestive preface M. Gelin sums up the characters of the several seaboard and inland Departments included; and, though modestly describing his own observations as no more than material to assist further scientific research, he throws much light on problems of distribution. M. Lucas, also, expatiates on the wonderful results obtained among the Heterocera by the use of modern illuminants, and incidentally upon the wide field thus made available for the naturalist who is satisfied to work within, what many of us to-day consider, a too restricted area. The Catalogue before us affords perhaps the best excuse for the home collector in the west of France; for the region is seen to be as rich in the variety of its Lepidoptera as of soil and scenery, ranging from the sandy heaths and dunes of the Biscay littoral to the wooded chalk hills of Charente, and the granite silences of Bretagne. To the growing number of British entomologists who travel the name of M. Lucas is familiar as the discoverer of the fine large form of *Hesperia serratulæ* var. *occidentalis*, which, as we are now informed, predominates in Vendée, Vienne, and the Deux-Sèvres. Hardly less exhaustive is the account of *Cænonympha ædipus* and its several forms, which once upon a time we thought confined in France to the marshes of Biarritz, St. Jean de Luz, and Guéthary, and chased in vain for want of knowledge of the date of emergence thereabouts. Nor is the consideration in this volume of the Heterocera less thorough, and we commend it the more cordially, therefore, to entomologists who would know something definite of the life-history,

and the chances of successful establishment in England of the occasional, unexpected, and inexplicable moth-immigrant. Curiously enough, of the ten *Plusiidae* which figure in the Catalogue, *Plusia moneta* (a recent colonist with us) is not to be found; though *P. ni*, which we have watched ovipositing on the rhododendrons of the Hautes-Pyrénées, reaches the valley of the Loire (the food-plants given here are nettle and *reseda*); so that the former, may be, found its way to us from the south-east. But in the short space at our disposal it is, of course, impossible to do more than draw attention to a single typical instance. Let me, however, recommend a close study of this admirable Catalogue to all lepidopterists working at home, and the addition of a copy of it to the travelling library of any who are contemplating a spring or summer tour in Western France. I may add that the volume on the *Micros* is in an advanced stage of preparation, and will be published shortly.

H. ROWLAND-BROWN.

The Dictionary of Entomology. By N. K. JARDINE, F.E.S. London: West, Newman & Co. 6s.

THE title of this well-printed book is what catches the eye; it is presumptuous, and presumption pays, as a rule, nowadays—we hope this book will. For it is a good book; and contains, we have no hesitation in saying (not being presumptuous), a great deal we did not know. The author is a Classic rather than an Entomologist, and gives us the true meaning of the words rather than that in which they are now used in our somewhat slipshod descriptions. For, in reality, this is a Dictionary of [the classical meaning of the descriptive terms used in] Entomology, though we cannot always bow to that given; *e.g.*, the anal angle of the wing is that “between the dorsum and the tergum” (the last word is, perhaps, a *lapsus calami* for “termen”), &c. That its 258 pages contain most of the terms in general use is proved by testing it by the February number of the ‘Entomologist,’ in which there are but four descriptive terms not there given, one of which (callipers) is a bad oversight. The book is worth its price.—C. M.

Eugenio Rignano upon the Inheritance of Acquired Characters.
Authorized English Translation by BASIL C. H. HARVEY.
Chicago: The Open Court Publishing Co. 1911.

THIS book deals with some of the deepest and most interesting of biological problems, considered from the point of view of one who is not only “a student of Biology,” but “has the training of an engineer and physicist,” as the translator in his preface tells us.

The author “offers an explanation on a physical basis of assimilation, cell division, and the biogenetic law of recapitulation in ontogeny, and he suggests a mechanism whereby the inheritance of acquired characters may be effected.” He brings under review a number of

different theories of heredity, and finds them all unsatisfactory. Some he rejects as altogether untenable, inasmuch as they do not even profess to explain the inheritance of acquired characters. Chief among these is Weismann's theory of the germ plasm, which our author maintains does not even succeed in giving a rational explanation of the law of recapitulation in ontogeny. Other theories, which seem to be more in harmony with his own, he looks upon as being much too vague and nebulous.

Although the idea underlying it is simple enough, the mechanism which the author suggests as an explanation of the inheritance of acquired characters and of the repetition of the phylogenetic history in the course of ontogeny is of so extremely complex a character, and is based so much on the assumed behaviour of that form of energy which he calls *nervo-motive force*, that it is by no means easy to understand it or to decide how far theoretically it is workable and sound. The idea is that a nervous current, like an electric current, in passing through an accumulator can cause the deposit there of a material substance—a potential element, which in its turn can give rise to a current in the reverse direction corresponding to that which caused its deposit. It is suggested that in the living organism the nervous accumulators are situated in the nuclei of the cells. When a functional stimulus is given, say by the use of some organ or in response to the environment, the dynamic equilibrium is disturbed, a nervous current flows, and in every nucleus through which it passes there is deposited a potential element—in the germ cells as well as in the somatic nuclei, although, so far as heredity is concerned, the latter do not matter, since they are lost with the life of the individual. Up to this point the analogy with electricity helps us to understand. The electric accumulator is capable of giving off a current similar to that which caused the deposit, and differing from it only in intensity. But the nervous accumulator is no such simple affair. It must needs be an accumulation of accumulators, each of which is capable of giving rise to a current of a specific intensity corresponding to the current which caused the deposit in it of the specific potential element. To find out further how the machinery would work, our readers must refer to the book itself, in which also they will find an abundance of extracts from the writings of speculative philosophers, and an interesting chapter on memory, which is explained on the same lines as ontogeny and the inheritance of acquired characters. It is to be noted that the author, although a firm believer in the inheritance of acquired characters, is candid enough to admit that no irrefutable evidence has yet been brought forward to prove that acquired characters are inherited.

C. J. G.

OBITUARY.

GEORGE BAKER.

At the beginning of last month, in the island of Guernsey, there died at the advanced age of eighty-three years, George Baker, who although probably but little known to the present generation of entomologists, was half a century ago one of the keenest and best of our British Lepidopterists.

Baker, who was by occupation a gardener, was born at Chelsea. In the late fifties his work took him to Sheffield, where his taste for entomology seems to have been developed by association with several well-known working men collectors who resided there. He was one of the very few lepidopterists who have taken *Gastropacha ilicifolia* in Britain, of which species, it is recorded in the magazines of that date, he bred two imagines in 1860 from larvæ taken the preceding autumn on the moors around Sheffield, which specimens after various vicissitudes came into my possession some years ago.

Some years later Baker obtained the position of Head Gardener of Coolings Nurseries at Derby, which he held until 1877. It was whilst residing in this town that he became associated with Harper Crewe in working out the life-histories of the Eupitheca; he was one of Crewe's chief assistants, actually discovering himself the larvæ of several species, and assisting with others; and thus he became known as one of the principal "pug" men of that period.

He was a very keen and acute field entomologist, and obtained in numbers many species then considered very rare, disposing of his surplus specimens to purchase other species that he wanted for his collection. When I commenced to take an interest in entomology—in 1876 I think it was—I paid him a visit, and well remember his pointing out with pride that his cabinet of about forty drawers was exchanged with a well-known London dealer for the surplus *Xanthia gilvago*, until then very rare, which he had bred in one season. His specimens were keenly sought after for their perfect setting and condition.

In 1877 Baker was induced by the late Dr. Mason of Burton-on-Trent to become his Curator, which position he held jointly with the late John Sang, until the close work at his employer's collection resulted in the loss of an eye.

For a number of years now he had resided in Guernsey, to the fauna of which island, the Rev. F. E. Lowe informs me, he added several species of Lepidoptera, chiefly amongst his favourite genus the *Eupithecia*; and continued to take an active interest in entomology until the end, actually calling upon Mr. Lowe with a box of specimens he wished to discuss a few weeks before his death.

His collection when he left Burton-on-Trent was incorporated with that of Dr. Mason.

Baker was twice married, his second wife survives him.

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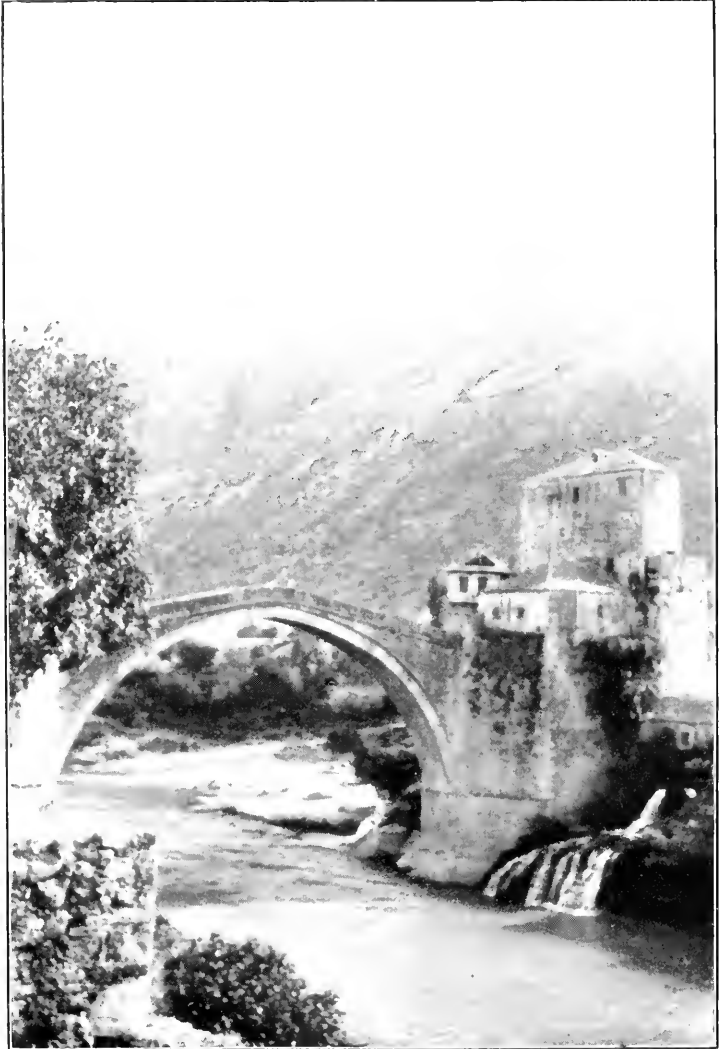
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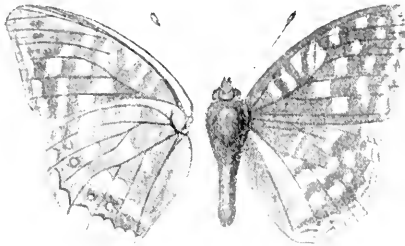
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[No. 599

VARIETY OF *ARGYNNIS ADIPPE*.

By F. W. FROHAWK, M.B.O.U., F.E.S.



Argynnis adippe var.

THE above figure represents a remarkable variety of *Argynnis adippe* (male), captured in Kent, July 7th, 1888, now in the Tring Museum, and kindly lent me by the Hon. Walter Rothschild. The upper side has the fulvous ground colour rather paler than in normal examples, and the whole of the usual black markings are replaced by a very pale leaden or pearly-grey colour; the usual olive basal area of the wings of *adippe* is, in this specimen, inclining to pinkish-buff, and somewhat paler than the rest of the ground colour. The under side is similar in colouring to the upper, excepting that the spots on the upper wings are rather more leaden; the hind wings are without the usual greenish-ochreous tint at base and inner margin, but the silver spots are normal in both colour and pattern. The antenna, head, thorax and abdomen are much paler than in typical specimens. The black pigment is entirely absent from every part of this insect. Varieties of this form of partial albinism are extremely scarce.

I am also indebted to Mr. A. E. Gibbs for the loan of another specimen of *A. adippe* of the same form of variation; the only difference is in the spots on the under surface of the fore wings, which are pale rusty-brown. In other respects it is identical

with the one figured; it is likewise a male, and was captured in the New Forest in July, 1901.

Commander J. J. Walker has kindly informed me that a very similar variety of *A. aglaia* exists in the "Dale Collection," now in the Oxford University Museum, which he described in the Entom. Mon. Mag. vol. xviii. p. 101. The specimen is labelled "Dover, Leplaistrier," and referred to by the Rev. W. T. Bree in Loudon's Mag. Nat. History, 1832, p. 334. It is stated to have been taken in a remarkably wet season.

A similar variety of *A. euphrosyne* is figured in Mosley's 'Illustrations of Varieties of British Lepidoptera,' pt. 5, pl. 3, fig. 1; the specimen, it is stated, was captured at Barnwell Wold by T. H. Briggs, and passed into the collection of Mr. Howard Vaughan.

It would be of great interest if other entomologists would record the existence of any similar albino varieties they may know of, with a view to ascertain what species are liable to the same form of variation.

BUTTERFLY-HUNTING IN THE BALKANS.

BY A. E. GIBBS, F.L.S.

(Continued from p. 108.)

(PLATE VIII.)

MONTENEGRO.

CETTIGNE, the tiny capital of the land of the Black Mountain, is situated at the end of one of the comparatively fertile little plains which the traveller finds here and there in the desolate limestone mountains which are such a characteristic feature in the scenery of this part of the Balkan peninsula. This bare and treeless region, almost devoid of vegetation, is known as the Karst, and the sight of it does not inspire the butterfly-hunter with anticipations of a very profitable expedition; but for all that I found it most interesting ground. There is practically only one hotel in Cettigne, "The Grand," a not very ambitious or palatial place, but it is clean and comfortable, and the charges are quite moderate. I spent a few very happy days there, and my experiences, both of the country and the people, were of the pleasantest. It was a long day's ride from Ragusa to Cettigne, first by steamer to the Dalmatian town of Cattaro, on the beautiful land-locked Bocche of the same name, and thence by automobile up the wonderful road which climbs the far-famed Black Mountain and connects Cettigne with the outer world. When I awoke on the morning after my arrival the country was bathed in sunshine, and I lost no time in setting out to explore

the neighbourhood. Behind the hotel is a park where the band plays on Sundays, and beyond it rises a mountain slope clothed with wild sage and other plants, quite a flowery bank for Montenegro. I made my way to this, hoping to find *Thais polyxena*, which I knew occurred somewhere hereabouts, and in a short time I secured four specimens, not in very first rate condition, for June 7th is a late date for this species. My time on the hillside, however, was limited, for I had to return to the town to keep an eleven o'clock appointment with the British Minister, the Count de Salis. To that gentleman I am indebted for many little kindnesses and much information which helped to make my stay in Montenegro pleasant. *Pieris ergane* was in evidence on the hillside, and I got a rather interesting series, including the aberrations of the female, upon which Rostagno has bestowed the names *magnimaculata*, in which the spots are much enlarged, and *longomaculata*, in which they are elongated and united to form a cloudy band. But the commonest Pierid appeared to be *P. brassica*, which was to be seen everywhere. After lunch I climbed the hills in another direction, but was not so fortunate as in the early morning, for I struck upon a district where the slopes were covered for the most part with loose stones, with hardly any flowers to enliven their desolate appearance, and only some low scrub around which nothing was flying. The next morning was dull, but I decided to try my luck on the road to Rjeka and to visit the Belvedere, from which place I was told a fine view was to be obtained. Some rain fell soon after I started, and I had to take shelter under the bushes, but I found *Pararge mæra* flying between the showers. Persevering, I reached the Belvedere, and was well rewarded for my walk. A rough pavilion is erected on a commanding rock, and from it a most wonderful panorama of mountain, valley, lake and stream is to be seen. Fifteen hundred feet below lies a deep valley stretching right away towards the distant lake of Skutari, the shores of which are partly Turkish and partly Montenegrin, while on the horizon the gloomy mountains of Albania rise, peak after peak, in endless succession. They are known as "the Mountains of the Damned," and their terrible slopes are said to have never been climbed by a stranger. What entomological treasures they contain no one knows, but perhaps recent happenings may hasten the day when it will be safe for the butterfly-hunter to venture into that lawless country, now inhabited by fierce and half civilized people, with some of whom I came in contact a few days later in the cattle-market at Podgorica. The weather had brightened a little, and occasional rays of sunshine enlivened the scene, lighting up the waters of the distant lake. At my feet was the excellent road made by King Nicholas, winding down the steep slopes of the rock-strewn valley, which had repeatedly proved a death-trap to the hoardes of Turks, who for so many

centuries vainly tried to subdue the Montenegrins. While taking a photograph of this glorious scene, perhaps the finest view I have ever looked upon, *Limenitis camilla*, fresh as paint, settled on the rock beside me, and before I could put down the camera and take up the net it had sailed away over the trees to my right. This little woodland fairy proved a good guide, for on trying to follow it I struck a narrow path which led me into a tiny meadow, probably little more than an acre in extent, which proved to be one of the best butterfly corners I discovered in Montenegro. I remained there catching lepidoptera until it was time to hurry back to Cettijne for lunch. Often a sweep of the net yielded four or five different species. Here I made my first acquaintance with *Hesperia sidae*, one of the most striking insects of its group. *H. orbifer*, too, was there, with *Spilothyrus lavateræ*, and beautifully bright specimens of *H. sylvanus*, which glistened in the sunshine like "coppers." There was also a black and white skipper which I hesitate to name. Of "blues" there were *Nomiades cyllarus*, *Cupido minima*, a fine large and bright form of *Plebeius argus*, L., *Polyommatus icarus*, *Cyaniris semiargus*, and *Lycæna orion*. *Thais polyxena*, a poor, battered object, was fluttering over the grass, and among the bushes *Canonympha arcania* was found. On the previous day I had taken an interesting form of *C. tiphon* which puzzled me, and now I caught seven more specimens. It turned out to be the variety *rhodopensis* of Elwes, and resembles somewhat our northern form, the *scotica* of Staudinger, but is of a much lighter and brighter tint than the Scotch insect. There are no ocelli on the upper side, but in some of my specimens the apical spots of the under side show through. Dr. Seitz states that the hind wing of this form on the under side mostly exhibits a complete row of ocelli; but my Montenegrin specimens, and also a few I took at Jablanica, in the Herzegovina, are very variable in this respect. Some of my females have the full complement of six ocelli, which are almost as conspicuous as in the typical *tiphon* of Von Rottenburg, which I take to correspond to the British middle form, as described by Buckle in his well-known article on this species.* In the majority of my specimens, however, the ocelli are but feebly developed, and I secured at Cettijne one male of the form which Rebel has described from Bosnia and Herzegovina under the name of *occupata*, in which the spots are entirely obsolescent. There is considerable sexual variation in colour, the males being darker than the females, the veins and costal and outer margins conspicuously so, and in one specimen the hind wings are so much darkened that at the first glance I took it to be *C. iphis*. The under side, too, is much brighter than typical *tiphon*; the fore wings, except for their ashy-grey apices and margins, being generally unicolorous. Mr. Elwes in his description of the

* The 'Entomologist's Record,' vii, p. 100.

variety, published in the Entomological Society's 'Transactions,' 1900, p. 205, says that it differs from the normal European form in having, in most cases, the apical band of the fore wing below obsolete, but that about one-third of his specimens show a trace of the band. My specimens agree with those of Mr. Elwes, for I have three or four examples, mostly females, in which a rudimentary band can be seen, and in these specimens the apical eye-spot is also well developed. The ground colour of the hind wings, especially of the females, is of the same *pamphilus*-yellow which prevails throughout. Altogether, *C. var. rhodopenensis* is a most attractive form of this variable species.

After lunch I determined to re-visit the flowery hillside behind the hotel, following up a narrow path which I afterwards found was the old road to Rjeka. Here I again met with the local form of *tiphon*. A pupa of *Aporia crataegi* was discovered, from which in a few days the butterfly emerged. Two very common insects were *Venilia maculata* and *Vanessa cardui*, and I found a colony of Zygænid larvæ on wild sage, which I was unable to rear. The path wound about among the mountains, and great was my surprise, on crossing a ridge, to find myself above the high road close to the Belvedere, which I had visited earlier in the day. So I determined to pay another visit to the little meadow, but a curious incident interfered with my plans. As I descended to the road I heard what I thought to be a number of boys coming from the direction of Cettijne, and singing songs as they walked along; but hardly had I reached the pavilion when I discovered that the noise proceeded from a regiment of khaki-clad soldiers, marching along the road without any sort of order. As I watched them they formed up, and standing at the entrance to the path leading to the meadow an officer addressed them at great length, apparently on the subject of taking cover. So well was the lesson learned that a few seconds after the order to disperse had been given not a soldier was to be seen except the officers who had remained upon the road. But interesting though this little incident was it quite spoiled my afternoon's work, for access to the meadow had been cut off, and I was not able to enter it until the sun had sunk behind the mountains, and nothing worth speaking of was to be found. Other excursions in the neighbourhood of Cettijne yielded *Papilio podalirius*, *Brenthis euphrosyne*, both apparently nearly over, *Epinephele janira* (males only), *Hesperia tages*, *Euchloë cardamines*, *Colias edusa*, *Leptosia sinapis*, and *Melitæa cinxia*.

From Cettijne I wanted to go to Skutari, a Turkish town which has lately become famous in connection with the unfortunate war which broke out a few months after I returned home from the Balkans. But Turks and Montenegrins had already begun to quarrel, and the steamer which usually plies

upon the lake, between Rjeka and Skutari, had stopped running. So I changed my plans. Learning that at Rjeka, one of the most beautifully situated places I visited, there was no hotel fit to stop at, I decided to go on to Podgorica, upon which in a few weeks the eyes of the civilized world were to be fixed, for it is the border town where the Montenegrin army was mobilized, and near to which the first battles of the war were fought. It was a most interesting spot, and much might be written about it, but I must only relate my entomological experiences. My first walk was in the direction of the Turkish frontier, and here, on a hill-top, both the common European forms of *Papilio* were flying. But the wind was very strong, and although I spent a considerable time trying to catch an elusive specimen of *P. machaon*, which appeared to me to be of a very dark orange colour, I was unsuccessful, the examples of both species which fell to my net being in no way remarkable. On the slope of the hill *M. didyma* was flitting from flower to flower, and in a Turkish graveyard at its foot *Anthocaris*, var. *ausonia*, was present in abundance. The only other noteworthy insect was *Satyrus semele*, of which I found a fine, well-marked form on the hills round Podgorica. I think the specimens were the largest I have seen, being 60 mm. in expanse. The next morning I climbed the mountain on the opposite side of the town, where I found all the species of the previous day, as well as *Pieris rapæ*, *P. ergane*, *Epinephele janira*, *Pararge megera*, *Rumiccia phlæas*, *Thecla spini*, and a very pretty and abundant Pyralid which was present in thousands in the grass everywhere.

Another day at Cettijne permitted me to visit again the Belvedere, where I added *Polyommatus astrarche* and *Pararge egeria* to the list.

HERZEGOVINA.

On Friday, June 14th, I arrived at Mostar. I left Gravosa in the early morning in bright sunshine, and from the railway, high up above the shores of the Ombla, I caught sight of my old hunting-ground at the source of that river. Some fine views of the Adriatic on the one hand, and of the cypress-covered hills on the other, were obtained; but soon we turned inland, traversing a more desolate region of bare rock and scanty cultivation. For more than an hour we travelled by the side of the bed of a lake, which is only a lake for about five months of the year. It was for the most part dry and laid out in small patches for cultivation, water still covering the lower levels. When I passed it again a month or so later the crops were fast approaching maturity, and the cows were being pastured in places which now appeared to be only mud. It was curious to notice the boats lying on the hillside in spots which in winter would presumably be the water's edge, but now far above the level

of the little river which trickled along amid fast-drying pools in the bottom of the valley. This curious lake bears the unpronounceable name of Popovopolje, and in summer its waters are said to find a subterranean outlet. The water system of the Balkans presents many curious phenomena of this kind, full-grown rivers issuing from cliffs, and streams disappearing in fissures of the earth in a remarkable way. The bright morning was succeeded by cloud and rain, and it was wet when I left the shelter of the hotel Narenta, at Mostar, to explore the sights of this oriental city, and to admire its incomparable bridge, perhaps the most interesting structure in the Balkans. Much valuable time was wasted in an endeavour to get a permit to take photographs, which was absolutely refused me by the commander of the garrison, but I got my way by telegraphing direct to the headquarters of the military district at Ragusa. So that afternoon slipped away, and I was not able to do any entomological work until the next morning. Its early hours were cloudy, but while I was having my coffee the sun came out, and a *Pieris brassicæ* was seen flying in the little public park in front of the hotel. This decided me to try my luck on the north-west of the town, along the railway line. At first nothing but a few *Anthocaris*, var. *ausonia*, were to be had, but as I got further away from Mostar matters improved. The hillsides are highly tilled wherever cultivation is possible, the vine being grown on the lower slopes. I followed a narrow lane leading upwards between the vineyards, and on a thistle-head a beautiful female *Dryas pandora* was sunning herself. She fell a victim, and, hoping for others, I lingered near the attractive flowers; but although no more *pandora* were secured at this spot, I caught two *Argynnis adippe*, var. *cleodoxa*, which seems to be the prevailing form of this species in the Balkans. *Libythea celtis*, just out of the chrysalis, was sporting along the thorny hedgerows, where it was well protected and difficult to get without tearing the net. A nice specimen which I succeeded in capturing was unfortunately smashed between the cork and the bottle, and although a fair number of others were seen I only carried one *celtis* home. A green hair-streak was observed, and hoping for *Thecla aris*, I caught it; but, like all other specimens I captured in this part of the world, it proved to be only the common species. A male *Argynnis phæbe* next came along, and in a meadow two *Melitæa didyma* were added to the bag. On the hillside *Pieris ergane* was abundant, and *Polygonia egea* flew round the bramble blossoms. Three more *D. pandora* were accounted for on the way home, as well as a very respectable specimen of *Hesperia sidæ*. The Lycænids taken during the morning were *Agriades thetis*, *Polyommatus astrarche*, *P. escheri*, *Thecla spini*, and *Rumicia phleas*.

Mostar is compressed into a few long streets on either bank

of the river Narenta by the precipitous fortress-crowned hills which dominate the valley. Their slopes are very difficult to negotiate, being covered with large loose stones, but I noticed patches of garden ground, and, here and there, higher up, some grassy places, so I thought it might be worth while to see what insect life was to be found there. I therefore scrambled up the slope above the new Servian church, and as the morning was a very hot one I soon regretted my decision. *Thecla spini* and *Pieris ergane*, both in abundance, were the two insects which divided possession of these rough places, with a few stray specimens of *P. egea*, *Satyrus semele*, and *A. var. ausonia* to keep them company. It was here among the fruit trees in a garden, in a little gully, that I saw the only example of *Charaxes jasius* I met with this year; but the nature of the ground forbade pursuit, and I was forced to be content with a passing glance.

The Narenta is one of the most remarkable streams in Europe. I know of no finer scenery anywhere than is to be found in the gorges of some of the Balkan rivers. We have to thank the Austrians for opening up this land of wonders to the traveller, and for giving, not only security of life and property in a country which, less than forty years ago, was only visited of dire necessity and with a strong escort, but also for constructing railway lines and carriage roads through defiles like that of the Narenta, making their scenery easy of access. The journey from Mostar to Jablanica, by the side of the Narenta's foaming waters, was most enjoyable. At the latter place where a mountain stream, the Rama, joins the larger river, the Government has built a little hotel, and is trying to make it popular as a summer resort. It is unpretentious but quite satisfactory, meals being served under the shady trees in a pretty garden. On June 18th I walked up the valley with my net, and found the railway banks provided a good hunting ground. On a clump of dwarf elder growing by the roadside I took a nice series of *Argynnis daphne* and *Chrysophanus alciphron* (type) in beautiful condition, and also a fresh female specimen of *A. hecate*, my proceedings being watched with evident amusement by a picturesque group of platelayers in oriental costume, who were repairing the line. *T. ilicis* and its var. *cerri* were also to be found on the flower-heads, and *A. var. cleodoxa* was among the desirable things captured. Other insects seen during the morning were *A. daphne*, *P. c-album*, *P. rapæ*, *E. janira*, *L. sinapis*, *R. phleas*, *P. podalirius*, *D. paphia*, and *Eugonia polychloros*.

In the afternoon I went on to Sarajevo, where I had arranged to meet Mr. P. J. Barraud, but I resolved to return later on and explore some of the higher ground, Jablanica being an excellent centre for the purpose. It was not, however, until July 9th that I was able to carry my resolution into effect. On that day, in

company with a guide, I left the hotel and climbed to a high point called the Plaça, spending the day on the mountains. As we passed the castle-like barracks on the hill *podalirius* was flying, and as the guide anxiously urged me to catch it I did so, but the loss of a tail saved its life. The way led for the most part under the shade of trees, and consequently very little insect life was to be seen, but on a flowery slope two beautiful *Polyommatus meleager* proved welcome captures, and on my return a male in good condition was awaiting me on the same spot. A species which I anticipated getting during my Balkan journey was *Neptis lucilla*, but I saw no sign of it until to-day, when half a dozen specimens, all in rather poor condition, were taken. The species was practically over, and I was very unlucky in missing it while it was in its first beauty. At the highest point of the long day's climb *Parnassius mnemosyne*, also quite worn out, was flying. Other insects taken were *Satyrus hermione*, *Pieris manni*, *Melanargia galatea*, var. *procida*, *Chrysophanus hippothoë*, *Spilothyrus lavateræ*, and a *Melitæa*, which I hoped would prove to be *M. dictynnoides*, but which the Rev. G. Wheeler, who has very kindly looked through my Balkan *Melitæas*, believes to be *M. athalia*.

The morning of July 10th was devoted to the exploration of a valley on the south-east side of the Narenta, below Jablanica. In the meadows near the bridge which carries the railway over the river *C. edusa* was flying. The hillsides hereabouts were as bare and lacking in shelter as the previous day's climb had been shady, there being very few trees or bushes. My notes show that the most abundant butterfly was *L. sinapis*, but the insects which were the most successful in making their presence known were undoubtedly the cicadas which abound in these valleys, and whose stridulations are sometimes almost deafening. I climbed to a ridge where a few young trees were growing, and here I found *S. hermione* in considerable numbers, sitting on the tree trunks, and, when disturbed, flying to a similar resting place a few yards away. *P. machaon* was racing up and down the mountain slope, but it was too hot to chase it, even if I had wanted to. *Zygæna carniolica* was common, resting upon the wild sage, and in looking at them I disturbed a butterfly which proved to be a male *Epinephele lycaon*. The species was evidently just emerging, and I only succeeded in finding two other specimens, all of the same sex. In the afternoon I again visited the railway banks to the north of Jablanica, where I had found *C. alciphron* and *A. daphne* so plentiful in June, but everything was now very different. Although the clumps of dwarf elder were still in flower, both butterflies were wanting or only represented by one or two dilapidated specimens. Vegetation in the valley had been burned up by the scorching rays of the midsummer sun, and as there were no lepidoptera to be found I

amused myself watching the cicadas on the tree trunks, and securing a few specimens as mementos of the occasion. On the following day I returned to Gravosa *en route* for England.

(To be continued.)

A NOTE ON TWO SPECIES OF BASSID ICHNEUMONIDÆ PARASITIC ON A SPECIES OF SYRPHID LARVA.

By A. E. CAMERON, M.A., B.Sc.

In the course of my investigations into the Insect Fauna of the Soil, at the Experimental Laboratory of the Zoological Department of the University of Manchester, on which I am at present engaged, I collected in the beginning of April of last year a number of Syrphid pupæ with a view to rearing the imagines. As a general rule, the pupæ were found lying on the surface of the ground covered over by decaying cut grass, but several were obtained buried in the surface soil to a depth of two to three inches, the full-grown larvæ having evidently entered there to pupate. All the pupæ, along with some earth, were transferred to a glass jar, care being taken to keep the conditions fairly moist in order to prevent desiccation. On May 8th a small species of ichneumon was observed flying about within the muslin-covered jar, and an examination showed that one of the pupa-cases was empty, being pierced by a small circular aperture at the broad end. The adult ichneumon, which had evidently emerged from the empty Syrphid pupa-case, was identified by Mr. Claude Morley as *Homocidus dimidiatus*, Schr. (male). Owing to some inexplicable cause my endeavours to rear the adult Syrphid signally failed on this occasion, but recently I have been more fortunate in attaining this object.

On October 7th last I was successful in obtaining a large number of the larvæ of this same Syrphid. In the middle of January they began to pupate, much earlier, indeed, than would happen under natural conditions in the open, this being accounted for by the quickening influence of the higher temperature of the laboratory where the larvæ were kept (62° F.). The first adult of this lot appeared on February 3rd, followed by others later, and on February 5th I had the satisfaction of finding another specimen of *H. dimidiatus* (female), which had emerged from one of the pupa-cases.

A specimen of the adult Syrphid was examined by Mr. F. E. Edwards, of the Natural History Museum, South Kensington, and he diagnosed it as *Platycheirus albimanus*, Fab. (female).

H. dimidiatus belongs to the subfamily Tryphoninæ and the tribe Bassides. Morley, in his 'British Ichneumons,' vol. iv.

p. 103, notes it as occurring abundantly both on the Continent and in Britain; and, further, he there suggests, from the habits of allied species, that it may prey upon Syrphid larvæ. The following extract from his description of the species may be of interest:—"We know nothing of its economy, though that it preys upon Syrphid larvæ is rendered probable by my capture of a female on 28th June, 1903, investigating the green and unopened buds of *Heracleum*, covered with *Aphis hieracii*, Kalt."

The periods of occurrence of the Syrphid and its parasite as adults practically coincide, both being on the wing from May to September. The Syrphid is double-brooded, the insect hibernating in the larval state, pupating in March, and the adults emerging in the beginning of May. The eggs laid by this generation give rise to the adults which are seen on the wing in September, the summer brood passing through its development much more rapidly than the winter one. The larvæ which hatch from the eggs of this second generation of flies are those which hibernate, and from their pupæ the adults of late spring and early summer emerge. On making investigations as to the food of the larvæ of *P. albimanus*, I found that they were preying upon *Pterocallis tiliæ*, Linn., a species of *Aphis* infesting the lime-trees (*Tilia grandiflora*, Ehrhart) in the grounds attached to the Experimental Laboratory.

In addition to *H. dimidiatus*, I also succeeded in rearing another species of this genus, the host being the same as in the previous case (*P. albimanus*). This latter was identified by Mr. Morley as being *Homocidus tarsatorius*, Panz. The date of its emergence from the parasitized pupa was Sept. 12th, 1912.

ON WALKER'S JAPANESE ICHNEUMONIDÆ.

By CLAUDE MORLEY, F.Z.S.

IN "Descriptions of some Japanese Hymenoptera, by Francis Walker, Esq." ('Cistula Entomologica,' i. 1874, pp. 301-310), twenty-two species of Parasitica and two Cynipidæ are shortly and quite inadequately diagnosed as new by its author, excepting one, of which he states the alternate sex had been brought forward by Fred. Smith during the same year in his 'Descriptions of New Species of Tenthredinidæ, Ichneumonidæ, Chrysididæ, Formicidæ, &c., of Japan.' No more definite localities are indicated than Japan. I shall here try to throw some light upon the systematic position of these insects, which have hitherto been but an incumbrance to our catalogues, though the discoloured state and the deplorable setting of the specimens, which were doubtless first preserved in spirit, greatly hamper such an attempt, since they are all gummed (often over their very

bodies) upon dirty cards, sideways, with both wings tightly fastened down in such a manner as to render the metanotal structure and often that of the abdomen invisible.

ICHNEUMONIDÆ.

1. *ICHNEUMON ALBIDIPES* (p. 302, ♂).—A male of the Cryptid genus *Goryphus*, Holmgr., 1868 = *Melcha*, Cam., 1899, and most closely related to *G. reticulatus*, Cam. ('*Spolia Zeylanica*,' 1905, p. 108. ♂). Black, with the face, except a narrow central line, apex of scape beneath, apices of first and second segments, and part of legs white; antennæ fractæ, areolet pentagonal, emitting recurrent nervure from its centre; nervellus indefinitely intercepted at its extreme bottom; length, 6 mm. One specimen.

2. *I. DIVERSIPES* (p. 302, ♂).—The male of a true *Cryptus* (*sensu* Thoms.). It is the front of the head and not the frons which is whitish, though the latter is narrowly concolorous on either side, as are the mandibles centrally; both metanotal transcarinæ are strong, and there is no "slight longitudinal furrow"; the second and third segments are dull, and doubtless discoloured, red; anterior legs piceous, with part of front ones paler; wings probably hyaline in nature; areolet small, subquadrate, and higher than broad; antennæ fractæ; length, 8 mm. One specimen.

3. *I. LANCEOLATUS* (p. 302, ♂).—A male of some Phæogenid; the metathoracic spiracles are small and quite circular; probably an *Ischnus*, on account of its deeply impressed and elongate notauli and strongly compressed anus. Antennæ fractæ; "the hind borders of the segments luteous" means that the three basal ones are apically red, and the seventh and most of the eighth are indefinitely white; not only are the hind tibiæ conspicuously white at their base, but their second to fourth tarsal joints are also white; the wings are doubtless discoloured; the areolet is large, weak, and subparallel-sided; length, 6½ mm. One specimen.

4. *I. INSOLITUS* (p. 302; ♀ only, ♂ lost).—This is *Cratichneumon annulator*, F., ab. female, or a very closely allied species, with the white hind tibial band nearly entire and close, though not quite extending, to the base; scopulæ wanting; length, 6 mm. One specimen.

5. *ISCHNOCERUS BICINCTUS* (p. 303, ♀).—Type lost.

6. *CRYPTUS VARIATOR* (p. 303, ♀).—Very like a red Indian Cryptid of my acquaintance of the genus *Aritranis*, with head, pro- and mesothorax, second segment before its apex, third to fifth entirely, and the hind legs except their femoral base, black; antennæ black and slender, centrally white-banded, basally attenuate and apically fractæ; metathoracic spiracles small and circular, basal transcarina and apophyses wanting; terebra

nearly half abdominal length, with valvulæ apically explanate; length, 8 mm. One specimen.

7. *C. MACULIPES* (p. 304, ♀; cf. Smith, Trans. Ent. Soc. 1874, p. 393, ♀).—“The male is described by Mr. Smith,” says Walker; but Smith described the female only, and the latter's type in the British Museum belongs to that sex, and is, moreover, generically distinct from either of Walker's females, which are certainly not co-specific! α is apparently a female *Trichocryptus*, though the metanotal areola is obsolete; it is black, with its face (nearly concealed by the card) entirely whitish, as are the anus and flagellar band; the front legs may be partly pale; terebra nearly half abdominal length; notauli obsolete; areolet weak and subquadrate; length, 6 mm. β is much stouter, though similarly white-marked, but with the face entirely black; length, 8 mm.; it is probably a *Cratocryptus*, but is too greasy to allow of an adequate examination. Two specimens, both with small and circular metathoracic spiracles.

8. *MESOSTENUS LATICINCTUS* (p. 304, ♂).—*Exolytus lævigatus*, Grav., ♂. The “Var. B. Hind femora black, except at the base” is another male of this variable species. Four specimens.

9. *GLYPTA ALBICOXA* (p. 304, ♀).—So far from being “nearly allied to *G. ceratitidis*” (*sic*), this is a typical specimen of *Clistopyga incitator*, Fab., female, with pale hind coxæ, determinately white-banded hind tibiæ, and terebra (probably broken) unusually short; length, nearly 6 mm. One specimen.

10. *LISSONOTA SEMISTRIATA* (p. 305, ♀).—One of the Agathid Braconidæ, extremely closely allied to, if not synonymous with, *Earinus gloriatorius*, Panz., female, with the Rev. T. A. Marshall's account of which it agrees in every way except in its very great size of 6 mm., with the terebra slightly longer than whole body. One specimen.

11. *MACRUS APICIFER* (p. 305, ♀).—A typical *Syzeuctus*, with elongate metathoracic spiracles; black, with the legs, except hind coxæ and base of their trochanters, pale; four basal abdominal segments red, with their apices, apical declivity of metathorax, and (apparently) scutellum flavidous; metapleuræ with no carinæ; cubital cell apically infumate; areolet minute and not as long as its petiole; terebra 7, and body, 10 mm. in length. It is none of the known Indian species of Lissonotinae. One specimen.

12. *ECTHURUS ATRATOR* (p. 306, ♀).—A remarkable black Cryptid with only the flagellum partly and anus discally white; areolet pentagonal; abdomen petiolate, terebra as long as the abdomen; it has the facies of *Pristomerus*, though with no femoral tooth. Head very finely shagreened, discally subquadrate, with buccate cheeks; prominent and internally parallel eyes; antennæ fractæ, with flagellum partly pure white; notauli

deeply impressed and discally coalescent; scutellum deplanate and somewhat small; metathoracic areæ apparently obsolete, though the apical transcarina is strong, spiracles circular and very small, lateral carinæ distinct; petiole shagreened, centrally subsulcate and gradually explanate throughout; terebra a little reflexed; legs slender and not short, with pulvilli small and claws somewhat elongate; length, 7 mm. I would suggest a position for it near the Cryptid genus *Cecidonomus*, Bridg. One specimen.

13. *MESOLEPTUS STYGIUS* (p. 306, ♂).—The subquadrate vertex places this greasy male in *Perilissus*. The areolet is entire, the legs unusually slender, and the abdomen has, I think, once been centrally red; length, $7\frac{1}{2}$ mm. One specimen.

14. *CAMPOPLEX ALBIMANUS* (p. 306, ♂).—A typical *Nematopodius*—just possibly *N. linearis*, Grav.—with small, rectangular, and slightly transverse areolet, emitting recurrent nervure a little beyond its centre; mesopleuræ distinctly sulcate below, and both flagellum and hind tarsi white-banded, and clypeus wholly concolorous; the thorax and abdomen bear a coating which may once have been elongate pilosity; both metanotal transcarinæ are entire; spiracles strongly elongate; length, 11 mm. One specimen.

15. *SAGARITIS VENTRALIS* (p. 307, ♀).—A Campoplegid, too smothered in gum to determine. Antennæ fractæ; areolet entire and petiolate; terebra shorter than breadth of anus dorso-ventrally, and much less than basal segment; areola deeply impressed and confluent with petiolar area, as in *Limnerium*, though the terebra is too short for that genus or *Omorga*; the third and following segments appear to be ochraceous, with only a discal vitta black; the coxæ are normal; length about 6 mm. Two specimens; and a third, belonging to ? *Eriborus*, with terebra longer than half abdomen and no areolet.

16. *CHAROPS LUTEIPES* (p. 307, ♀).—Type lost. Very improbably placed in its correct genus, for Walker's *Porizon dominans* (Ann. Nat. Hist. 3, v. 1860, p. 307) is a typical *Charops*—cf. 'Fauna of India,' i. 1913, p. 435.

BRACONIDÆ.

17. *BRACON SEMILUTEUS* (p. 307, ♀).—Quite certainly synonymous with *B. piger*, Wesm. One specimen.

18. *SPATHIUS FASCIATUS* (p. 307, ♀).—Superficially indistinguishable from *S. exarator*, Linn. One specimen.

19. *HECABOLUS CINCTUS* (p. 308, ♂).—Certainly belongs to Marshall's Braconides-cyclostomes, not a Bracon, and perhaps *Hecabolus*: I know nothing like it. One specimen.

20. *CHELONUS DIVERSUS* (p. 308, ♂).—A beautiful species of

Phanerotoma, Wesm., with the abdominal carapace trisected and the intermediate tibiæ a little sinuate. One specimen.

21. *PROTEROPS BASALIS* (p. 308, ♀; sic ♂).—The type appears to belong to the genus *Cardiochiles*, Nees, on account of its distinct cubital areolet and deeply impressed notauli of the black mesonotum. One female specimen.

PROCTOTRYPIDÆ.

22. *EPYRIS CRASSICORNIS* (p. 309, ♀).—Type lost.

CYNIPIDÆ.

23. *RHODITES JAPONICA* (p. 309, ♀). — A true female of *Rhodites*. One specimen.

24. *SYNERGUS JAPONICUS* (p. 309, ♀). — A true female of *Synergus*. One specimen.

NEW BUTTERFLIES FROM NIAS.

BY PERCY I. LATHY, F.Z.S, F.E.S.

(Concluded from p. 101.)

Eulacura bipupillata, sp. nov.

♀. Upper side. Fore wing yellowish brown, a wide, irregular, diffused, whitish band beyond cell, an obscure preapical light spot; base of costa, a bar within, and a fascia beyond cell slightly paler than ground colour, two black spots, of which the lower is the larger, between upper and lower median nervules; beyond these spots some indistinct pale lunules. Hind wing brown, a discal yellowish brown band crossing wings at end of cell, the upper part of this band whitish, beyond a series of blackish markings, the upper ones sagittate, the lower circular, all edged with pale yellowish brown, a dark submarginal line.

Under side. Fore wing pale lilac-brown, a pale brown bar within, and another at end of, cell, an irregular dark line sharply angled on median nervure crossing disc, the area beyond diffused with whitish, black spots as above, but blue-centred, and ringed with yellowish brown, an obscure submarginal dark line. Hind wing pale lilac-brown, a dark spot within cell, discal line of fore wing continued to inner margin above anal angle, this line outwardly edged with bluish white diffused on upper half, a submarginal series of more or less sagittate bluish white lunules, two blue-centred yellowish-ringed black spots between upper and lower median nervules; of these the lower is much the larger.

Four female specimens in Coll. Adams. This species may easily be separated from *E. osteria*, Westw., as it has two ocelli between the median nervules on both wings below.

Apatura ruficincta, sp. nov.

♂. Upper side. Fore wing blackish brown with the following obscure reddish brown markings: three bars within cell, an irregular discal band and a marginal line, five preapical white spots, an oval, reddish-ringed black spot between middle and lower median nervules. Hind wing blackish brown, with following obscure reddish brown markings: a bar within cell, and discal, submarginal, and marginal bands, the latter enclosing a fine black line: a black spot, widely ringed with red, near anal angle.

Under side. Fore wing yellowish brown, three black spots within, and a double black bar at end of cell, an obscure discal pale band, becoming whitish on inner margin, white spots as above but edged black, red-ringed black spot between median nervules more conspicuous than above, an irregular submarginal brown band and fine black line beyond. Hind wing yellowish brown, two black spots within, and double black line at end of, cell, traces of a discal pale band, a submarginal sagittate brown line, and fine black line beyond, red-ringed black spot as above.

This is the Nias representative of *A. parisatis*, Westw., from which, however, it may be easily distinguished by conspicuous red spot at anal angle of hind wing above; in this respect it resembles *A. rheca*, Feld., from the Philippines, but from that species it differs in the very different colour of the under side. Apparently a rare species. I have seen only two specimens; both are in the Adams Collection.

Eulepis kannegieteri, sp. nov.

♂. Upper side. Fore wing black; a wide pale yellow band from upper median nervule to inner margin, a pale yellow spot between this band and apex. Hind wing black, a wide pale yellow band from middle of costa, narrowing to a point near anal angle, submarginal row of white spots, a yellowish bar at anal angle.

Under side. Fore wing with yellow markings as above, base and costa broadly lilac-brown, a black spot within, and a black bar at end of, cell, a black line inwardly narrowly edged with white extending from apex of cell to lower median nervule; the pale yellow area, which is inwardly edged black, is surrounded by a chocolate-brown border very narrow and becoming blackish on its outer edge, beyond this a series of blackish lunules filled in with lilac, and set in a pale lilac band, a twin black patch below lunules, outer margin widely greenish brown. Hind wing with yellow markings as above, edged outwardly and inwardly with bright chocolate-brown, a subbasal black line, inwardly edged with white, extending from costa to just below median nervule, another black line from costa to base of lower median nervule edging the yellow area, base and inner margin lilac-brown, beyond the pale area a series of reddish silver-edged lunules surrounded by blackish, but no trace of red in lunules between upper and lower median nervules, a black line outwardly edged with white from lower median nervule to inner margin; outer margin widely greenish brown with a submarginal series of white spots edged outwardly with black, and a marginal series of yellowish bars.

This is the Nias form of *Eulepis athamas*, Dru., and appears to be rare. Mr. Adams has eight examples, and I cannot find any previous record of it from Nias. It may be distinguished from the other races of *athamas*, Dru., by the greater extent of the black on the under side, the subterminal patch on fore wing being much larger, and there is not the slightest trace of red in the lunules between upper and lower median nervules on hind wing.

Charaxes vandepolli, sp. nov.

♂. Upper side. Fore wing chestnut-brown, a wide white band from just below costa to submedian nervule, beyond this band black; a blackish spot at end of cell and two black bars between upper and lower median nervules. Hind wing chestnut-brown, paler on costa, a waved dark line from centre of costal to subcostal nervule, a submarginal row of white-pointed black spots, of which the two upper are fused into a large patch, a small greenish patch at anal angle and the two black spots here have some bluish scaling.

Under side. Fore wing brown with a slight lilac tinge, paler on the outer margin, inner margin whitish; the following black markings: a spot at base, three irregular lines within, and a twin bar at end of, cell, a line from base of middle median and lower median nervule and a line below this nearer base, two highly irregular discal lines, the inner outwardly edged with whitish, and both with diffused ochreous; interspace between cellular lines paler than ground colour, outer margin greenish bordered inwardly with a narrow silvery band, two obscure subapical greenish patches. Hind wing brown, with a slight lilac tinge, a black bar at base, two irregular subbasal black lines, the space they enclose being paler than ground colour, and the outer line inwardly edged with whitish, discal lines and edging similar to fore wing; a wide lunular dark band from apex to anal angle, where it narrows to a point; a submarginal series of small black spots, surrounded by bluish, green, and white scaling, and a whitish spot behind each; outer margin ochreous, and a fine marginal rich brown line.

This is a very distinct species, somewhat resembling the female of *C. psaphon*, Westw. The only other island form of this group of *Charaxes* that I know in which the male has a discal pale band is *C. borneensis*, Butl., from Sumatra and Borneo; that species has, however, a very dark under side with no ochreous markings, has also a much narrower discal band, and much shorter tails. I only know of the specimen here described.

Charaxes mitschkei, sp. nov.

♂. Upper side. Fore wing chestnut-brown, a twin black spot at upper end of cell, apical third black. Hind wing chestnut-brown, with submarginal row of black lunules inwardly edged with yellowish; the two at anal angle being white and having bluish scaling; an apical black patch containing two whitish spots.

Under side. Fore wing shining brown, with a faint lilac tinge

beyond disc yellowish green; the following more or less irregular black lines: three within, and a double one closing cell, the third from base within cell being continued to near submedian nervule, two beyond cell from near costa to submedian; some obscure subapical brownish spots and an obscure submarginal line of the same colour. Hind wing with ground colour as in fore wing; four irregular black lines crossing wing, of which the outer is the most distinct; a faint double black line closing cell; some postdiscal obscure brown lunules and a submarginal line of a similar colour; a submarginal series of white spots, all of which, excepting the two upper ones, are outwardly edged first with pale blue, then black.

This species may be distinguished from *C. fervens*, Butl., by its much smaller size, the former averaging 96 mm., while the new species averages 76 mm. The ground colour of the under side of *C. fervens* is different, being much redder, and the linear black markings are edged with white, this not being so in *C. mitschkei*; from *C. engamieus*, Fruhs., to which it appears to me to be the nearest, it may be separated by the outer black line of both wings below being quite well defined, and the blue-edged spots of hind wing below smaller.

ORTHOPTERA IN 1912. (SUPPLEMENTARY LIST.)

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

MR. F. W. FROHAWK has given me a few earwigs (*Forficula auricularia*) which he captured in the Scilly Islands under pieces of rock in October, 1912. Though they were not picked specimens, most were large, one or two being var. *forcipata*. A rather large male had one branch of its callipers extremely short and bent downwards, the other being about normal.

Mr. B. S. Harwood sent me the following short list for 1912. *Forficula auricularia* var. *forcipata* and near it. *F. lcsnei*, obtained at Colchester by beating. *Ectobius panzeri*, at Clacton-on-Sea in August. *Ectobius perspicillaris* (= *livida*), one taken by his brother at Bournemouth. *Gryllus domesticus*, in a bakehouse at Colchester. *Nemobius sylvestris*, taken by his brother in the New Forest in October. *Leptophyes punctatissimus*, several at Colchester by beating various trees in August and September. *Meconema thalassinum*, not uncommon at Colchester by beating various trees in August and September. *Conocephalus dorsalis*, North Essex coast, September 7th, several, both male and female. *Phasgonura viridissima*, two or three in damp meadows at Colchester in August. *Pholidoptera griseo-aptera* (= *cinereus*), at Colchester on nettles, &c., till well on into October: nymphs in June and July. *Metrioptera albopunctata* (= *grisea*), two at Colchester on restharrow in August. *Metrioptera roeslii*, at Colchester; nymphs noticed on June 24th; four female imagines

captured September 7th. *Gomphocerus maculatus*, at Clacton-on-Sea in August. *Stauroderus bicolor*, abundant at Colchester. *Chorthippus elegans*, rather common on sea-walls at Colchester on September 7th. *Chorthippus parallelus*, not uncommon at Colchester in dry fields. Mr. Harwood was good enough to send the *E. perspicillaris* and some of the *F. auricularia* for inspection. I usually expect *C. parallelus* to be more frequent on damp than on dry ground.

Kingston-on-Thames: March, 1913.

NOTES AND OBSERVATIONS.

HYBERNATION OF PYRAMEIS ATALANTA.—Referring to the note on this subject by Mr. F. W. Frohawk in the February number of the 'Entomologist' (vol. xlvii. pp. 40-42), perhaps it may be worth putting on record in the same journal that amongst my notes on the Lepidoptera of Northumberland and the Borders, which I have lately been going over with a view to publication, there is one of a red admiral which I found hybernating in a potting-shed in our garden in Berwick-on-Tweed, in December, 1887. It was alive when discovered, and in such fair condition that it made quite a passable cabinet specimen. The sex does not appear to have been noted. In addition to this instance I have a note of one found hybernating by the late William Shaw, of Eyemouth, in Berwickshire, a few years previously, and, although I forget now what became of the specimen, and have no more details of it, he was a most careful entomologist and a man whose statements could always be implicitly relied upon. We were not aware at that date that the hybernation of this species was so exceptional in this country as it appears to be considered now, else, no doubt, fuller particulars would have been preserved, and possibly other instances noted.—GEORGE BOLAM; Alston, Cumberland.

EREBIA EPIPHRON (var. CASSIOPE) AT "MALVERN."—In the Oberthür collection at Rennes there are fifteen specimens of *epiphron* (var. *cassiope*) purchased at the sale of the Raynor collection at Stevens's Auction Rooms, October 27th, 1891. Some of them are labelled "Malvern." Can any reader of the 'Entomologist' throw light on the origin of these butterflies, or refer me to any account of the occurrence of the species in Worcestershire?—H. ROWLAND-BROWN; Harrow Weald, March 10th, 1913.

CENONYMPHA TIPHON AND PAMPHILUS ON THE SAME GROUND.—In his interesting article describing the rediscovery of *Canonympha tiphon* in North Wales Mr. Arkle concludes with an observation which seems intended to invite a confirmation, or the contrary, from the experience of other collectors. I refer to the remark, "I have no recollection of seeing *pamphilus* on exactly the same ground as *tiphon*, whatever the character of the locality might be." My own experience of *tiphon* is so small as to be confined to only two localities, and both these Continental. But, oddly enough, in both

these places, *viz.* the Weesen Marshes, in Switzerland, and at St. Maurice sur Moselle, in France, I took *pamphilus* flying on the very same ground as *tiphon*. Indeed, at Weesen I sometimes made an unnecessary capture of *pamphilus* female in mistake for *tiphon*, as the former species is often exceptionally large in this locality. Very probably, had I had opportunity of hunting *tiphon* in as many and varied haunts as Mr. Arkle, it would have struck me also with surprise to see the two butterflies on the same ground. What seems to be remarkable is that in these two places, so wide apart, and the only localities where I have come across *tiphon*, I found its congener too. May a possible explanation be that, though *pamphilus* can be comfortable in the lowest or driest of *tiphon's* habitats, when the latter occurs at higher elevations, or in very wet places, the smaller cononymph is absent?—(Rev.) FRANK E. LOWE; Guernsey, March 7th.

EARLY EMERGENCES OF *PLUSIA GAMMA* AND *DEMAS CORYLI*.—It may be of interest to record the emergence of *Plusia gamma* on January 17th. The pupa was spun up in an outdoor cage fully exposed on an outdoor wall facing east. The larva was taken in October last under some plants of *Chenopodium*; and although there are several other pupae of *P. gamma* in the same cage, this is the only one which has emerged. I have also had a male specimen of *Demas coryli* emerge, but the cage this pupa was kept in was indoors, so perhaps this emergence is not so remarkable as that of *P. gamma*.—B. L. WILLIAMS; 77, Durham Road, East Finchley, N., February 17th, 1913.

EUCOSMIA UNDULATA AT CARLISLE.—I captured a single specimen of this moth at Orton, near here, on June 22nd last. It was flying about 6 p.m. among some young firs. I know of no previous record from this district. Dawson does not mention it in his list, while Mawson gives it as "rare" in his West Cumberland list.—JAS. MURRAY; 2, Balfour Road, Carlisle.

HYBERNIA MARGINARIA FUSCATA AT CAMBRIDGE.—On Friday last, March 7th, 1913, I captured a perfect male specimen of *Hybernia marginaria* var. *fuscata* on a street lamp near the river at Cambridge. Is not this occurrence rather unusual for this part of England?—A. CAPEL MORRIS; Leafield, Gibson's Hill, Norwood, S.E.

LEUCOPHASIA SINAPIS IN SUSSEX.—I was stopping at a little village called Northchapel, Sussex, halfway between Haslemere and Petworth, on May 11th last, and with my friend, Mr. J. Dunnett, went out before breakfast, taking the nets with us, as it was a wonderfully fine morning; and in a glade between the oak woods, between 8.30 and 9.30, we caught six males and three females of *L. sinapis*, all in perfect condition, evidently having come out of chrysalis the same morning.—J. H. VICKERS; Holywood, Bulstrode Road, Heston, Hounslow.

ENTOMOLOGICAL CLUB.—A meeting was held on March 18th, 1913, at 58, Kensington Mansions, S.W., Mr. Horace Donisthorpe in the chair. The other members present were Messrs. Adkin, Hall,

Porritt, Rowland-Brown, Sieh, and Collin (Honorary). Among the visitors were the Rev. F. D. Morice and Messrs. Durrant, Gahan, and Step.—RICHARD SOUTH (*Hon. Sec.*).

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*Dec. 12th, 1912.*—Mr. A. E. Tonge, F.E.S., President, in the chair.—Mr. Ashdown exhibited a collection of over one hundred species of attractive Coleoptera obtained by him in Switzerland in June and July, 1911 and 1912, including *Cerambyx cerdo*, *C. scopoli*, *Saperda scalaris*, *Trichius fasciatus*, &c.—Mr. Tonge, very dark *Noctua xanthographa* from Deal, at sugar, and a bred series of *Cirrhia citrigo* from Dorking.—Mr. South, for Rev. W. Claxton, a series of *Tortrix pronubana* from Bournemouth, among which was a specimen identical with the *ambustana* of Hübner—it was the only one of the form reared; also a form of *Olethreutes ochroleucana* from near Romford, with the apical third of fore wing greyish, enclosing dusky cloud-like markings almost parallel with the termen.—Mr. Kaye, three Syntomid moths, *Oreynia carcarata* from Caracas, mimicking a wasp; *O. tarsalis* from British Guiana, mimicking a fossorial wasp; and *Trichura cerberus*, male, with long anal projection, mimicking an ichneumon female with long ovipositor. The resemblances were most pronounced.—Mr. Grosvenor, series of *Melitæa aurinia* from more than a dozen British localities, to show the geographical variation.—Mr. Hy. J. Turner, a series of under sides of *Argynnis adippe*, to show the variation obtainable on the Continent, including ab. *cleodoxa*, var. *chlorodippe*, var. *cleodippe* (the two last Spanish), ab. *bajuarica*, ab. *ornatissima*, var. *norvegica*, &c.—Mr. Newman, very varied forms of *Agrotis cursoria* from Shetland.—Mr. Main, larvæ of *Clythra quadripunctata* in their cases of excrement, taken by Mr. Donisthorpe from a nest of the ant *Formica rufa*.

January 9th, 1913.—Mr. A. E. Tonge, F.E.S., President, in the chair.—Mr. F. H. Stållman, of Dulwich, was elected a member.—Mr. R. Adkin exhibited three specimens of *Papilio machaon* reared from Norfolk larvæ, having the whole of the lunules on the outer margin of the hind wings more or less strongly orange.—Mr. Newman, a living female *Selenia bilunaria* bred out of doors on January 9th, the first of the brood emerged on December 20th. He also showed sprays of alder and buckthorn in leaf.—Mr. Rayward, the working of *Egeria andrenæformis* in *Viburnum*, and a similar working in elder, which had all the characteristics of that of *Æ. andrenæformis*.—Mr. Tonge, several species of butterflies from Redlands, California.—Mr. Gahan read a paper on "Mimicry in Coleoptera," and illustrated it with a large number of particularly mimetic species.

January 23rd.—*Annual Meeting.*—Mr. A. E. Tonge, F.E.S., President, in the chair.—The Reports of the Council and Officers for the past year were read and adopted, and the President read the Annual Address in which, after discussing the affairs of the Society and reviewing the entomological happenings for the year, he sum-

marised his own work in the study of the ova and early stages of the Lepidoptera.

The following is a list of the Officers and Council elected to serve for the ensuing year:—President, A. E. Tonge, F.E.S.; Vice-Presidents, W. J. Kaye, F.E.S. and B. H. Smith, B.A., F.E.S.; Treasurer, T. W. Hall, F.E.S.; Librarian, A. W. Dods; Curator, W. West; Hon. Secretaries, Stanley Edwards, F.L.S., and Hy. J. Turner, F.E.S.; Council, R. Adkin, F.E.S., C. W. Colthrup, T. W. Cowham, A. E. Gibbs, F.L.S., A. Russell, F.E.S., W. G. Sheldon, F.E.S., and A. Sich, F.E.S.—Votes of thanks were passed to the President and other Officers.—*Special Meeting*.—It was unanimously agreed to appoint an Editor of 'Proceedings' as an additional Officer and to increase the number of the Council from seven to nine. The new rules to take effect as from January 1st, 1913.—*Ordinary Meeting*.—Mr. Buckstone exhibited several short series of bred *Phragmatobia fuliginosa*, representing second and third broods from Aberdeen, first brood from Horsley, and second brood from Wendover.—Mr. Bacot, an enlarged photograph of an Indian flea, reputed to be one of the carriers of plague.—Mr. Dunster, specimens of *Dicycloo*, *Mellinia ocellaris* and *Miselia oxyacanthæ* from Winchmore Hill.

February 13th.—Mr. A. E. Tonge, F.E.S., President, in the chair.—Mr. C. R. Wixcey, of Palmer's Green, N., was elected a member.—It was announced that Mr. Step had been made Editor of 'Proceedings,' and that Messrs. J. Platt Barrett and N. D. Riley were added to the Council, in accordance with the alterations in the bye-laws passed at the Special Meeting held on January 23rd.—Mr. Buckstone exhibited several aberrations of *Charæas graminis*, including a remarkably uniform grey specimen, the markings being scarcely discernible.—Mr. West, six species of the coleopterous genus *Ophonus* (*Harpalus* in part), with the ædeagus mounted by the side of the males, and remarked that the study of this organ had revolutionized the previous identification of the species.—Mr. Andrews, a series of the Dipteron *Hamatobia irritans*, taken off the backs of bullocks near Milford Haven. Around the horns, clustered in dense rings, flies had frequently been noticed.—Mr. K. G. Blair, a large, living larva of a *Geotrupes* sp. (dung beetle) and compared it with that of *Melolontha*.—Mr. A. E. Gibbs, a large number of Syntomidæ, with their supposed models, taken by Dr. Davis, of Belize, in British Honduras.—Mr. Tonge, a fine bred series of *Epunda lichenea*, from Eastbourne.—Mr. Coote, bred *Papilio machaon*, in which the ground colour approached that of ab. *aurantiaca*.—Mr. Frohawk, various aberrations of *Melitæa athalia*, *M. aurinia* and *M. cinxia*, including a fine melanic form of the first species and some fine under side forms of the last-named, together with drawings of an albino *Argynnis adippe*, an albino *Euchloë cardamines*, &c.—The rest of the evening was devoted to microscopical exhibits by Messrs. C. B. Williams, R. Adkin, F. Noad Clark, Ashdown, and W. West (Ashstead).—HY. J. TURNER (*Hon. Rep. Sec.*).

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Meeting held at the Royal Institution, Colquit Street, Liverpool, Monday, January 20th, 1913, Mr. R. Wilding, Vice-President, in the chair.—

A paper by Mr. H. St. J. K. Donisthorpe, entitled "Some Associations between Ants of different Species," was read by the Hon. Sec. The paper fully described all that is known of these associations, and specially dealt with the relationship between species of *Formicoenus*, *Anergates*, and *Whecleriella*. A vote of thanks to the author was carried unanimously, and a discussion, showing a general interest in the subject, ensued. Exhibits were as follows:—A box of Micro-Lepidoptera by Mr. A. W. Boyd, collected in Lancashire and Cheshire during 1912, recording many new localities for species already on our list.—Mr. W. Mansbridge showed a buff male of *Arctia mendica* from Co. Cork.—WM. MANSBRIDGE, *Hon. Sec.*

THE MANCHESTER ENTOMOLOGICAL SOCIETY.—Meeting held in the Manchester Museum on Wednesday, December 4th, 1912, Mr. W. Buckley in the chair.—Mr. B. H. Crabtree exhibited *Aplecta nebulosa* from Argyll and the New Forest, and the three forms from Delamere.—Mr. J. H. Watson gave a lecture on "The Parnassiinae, an Ancient Group of Butterflies," which was illustrated by the exhibition of his collection. The headquarters of the family is in Tibet, which more nearly approaches the conditions of the glacial epoch than any other country. The family is a very ancient one, and an allied form is found as a Miocene fossil. Mr. Watson exhibited twenty-two out of thirty-two species recognized by Mr. Rothschild, and another (*P. delius*) which he considered should be raised to specific rank.

January 8th, 1913.—Mr. W. Buckley gave the Annual Presidential Address "On Collecting and Rearing *Acidalia contiguaria*, some Personal Experiences." In the first place, he gave his experiences in the field in N. Wales, with the insect in all its stages. Then he referred to its breeding in captivity; 95% of the larvae survive the winter if dried knot-grass be used for hibernation. Finally, he gave full details of his experiments in breeding the light and dark forms. After breeding for three generations from the wild insects he made the four different pairings possible between the light and dark forms, with the following results:—(i) Light ♀ × dark ♂. One brood of sixty-nine imagines had 68·7% dark and 31·2% light; another brood, 75% dark and 25% light—practically Mendelian proportions, the light form being the recessive. (ii) Dark ♀ × light ♂. Never fertile, though a number of pairings were made. (iii) Dark ♀ × dark ♂. All dark for two generations. (iv) Light ♀ × light ♂. All light.—Mr. J. H. Watson exhibited two *Parnassius apollo* from Mount Ararat and the Altai Mountains.—Mr. B. H. Crabtree showed canary-coloured specimens of *Pieris napi* bred from Donegal by Mr. Head, of Scarborough.—A. W. BOYD, M.A., *Hon. Sec.*

RECENT LITERATURE.

Psyllidarum Catalogus. By Dr. G. AULMANN. Pp. 92. Berlin: W. Junk. 1913.

THIS is a synonymic catalogue of the Psyllidæ of the world, so far at least as these minute homopterous insects have been made known to science.

Of the four hundred and seventy-eight species listed, more than half belong to the Palaearctic Region. The Nearctic species number some eighty to eighty-five, in addition to several that are common to both Regions. The Oriental and Australian Regions together contribute about one hundred and twenty-five species. Only seventeen species are recorded from the Neotropical and Ethiopian Regions, seven from the former, and ten from the latter.

It is interesting to note that of the species occurring in Britain (about sixty in number) four—*Psylla colorata*, *P. lövii*, *P. picta*, and *P. venata*—have not been detected in any other part of the world; whilst thirty of the species inhabiting Japan appear to be confined to that country.

Reference to literature, especially concerning Palaearctic species, is full, and, in some cases, exhaustive. In the majority of instances the food-plants are mentioned, and there is an index to these as well as to the insects.

Diptera Danica. Genera and Species of Flies hitherto Found in Denmark. By WILLIAM LUNDBECK. Part iv. Dolichopodidæ. Pp. 1-407. Text figures 130. Copenhagen: G. E. C. Gad. London: Wesley & Son. 1912.

THE author states that pending further necessary subdivision of the Dolichopodidæ by Becker, who is now working on the family, he has adopted the four subfamilies of the "Katalog d. paläarktischen Diptern." The one hundred and seventy-two species, in thirty-five genera, considered in the present volume are therefore grouped as follows:—i. Dolichopodinae (9 genera, 81 species). ii. Diaphorinae (4 genera, 22 species). iii. Rhapsiinae (5 genera, 22 species). iv. Hydrophorinae (17 genera, 47 species).

We note some synonymic changes, and one novelty—*Dolichopus varitibia*; the latter described from a male caught in Lyngby Mose in 1911, and the only known specimen.

Publication of this important work was commenced in 1907, and Parts ii and iii appeared in 1908 and 1910 respectively. All were duly noticed in the "Entomologist," but it may be again mentioned that the text is in English, and that the bulk of the species so far dealt with are to be found in the British Isles.

Fourteenth Report of the State Entomologist of Minnesota for the Years 1911 and 1912. Eighth Report of F. L. WASHBURN. Pp. i-xiii and 1-114. Agricultural Experiment Station: St. Anthony Park, Minn. Dec. 1, 1912.

TREATS of Grasshoppers and other injurious insects and the methods adopted to destroy them or to control their depredations. In the case of Grasshoppers sodium arsenite spray has been found the most effective.

In addition to numerous illustrations in the text, three excellent plates in colour, representing specimens of some twenty species of Acridiidae taken in Minnesota, are issued with the Report. There is also a plate from a photograph, showing a small portion of a swarm of South African Locusts.

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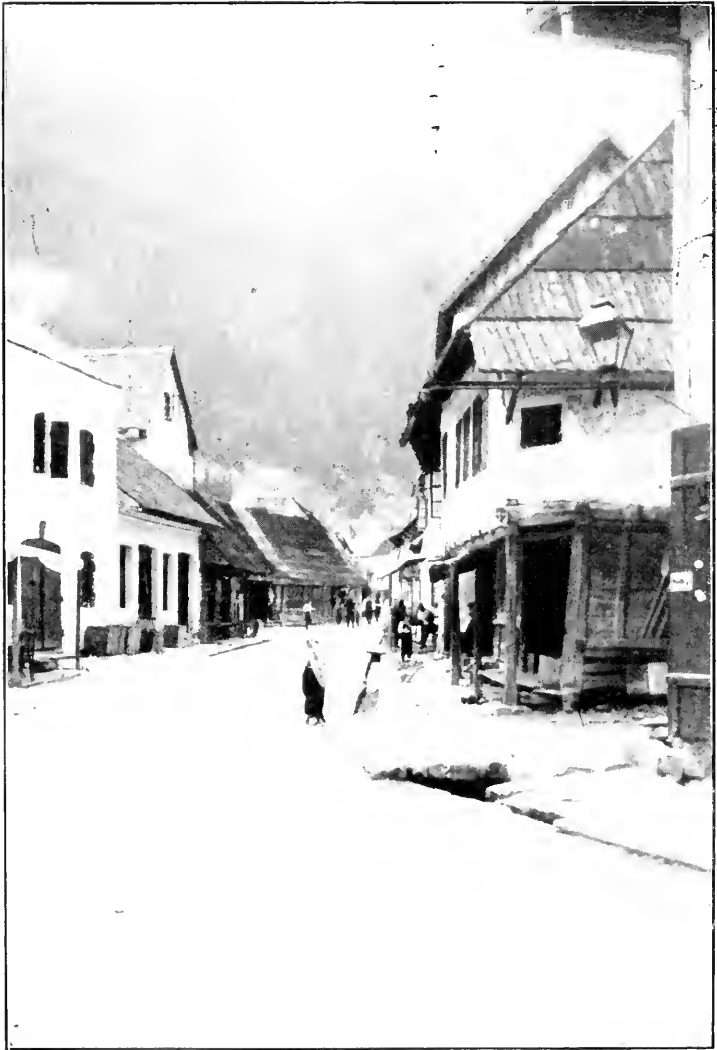
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THE LIFE-HISTORY OF *CÆNONYMPHIA TIPHON*.

By F. W. FROHAWK, M.B.O.U., F.E.S.

ON July 21st, 1903, the late Mr. F. G. Cannon watched a female *C. tiphon* deposit a single egg on a dead stalk of beaked rush (*Rhynchospora alba*), which he kindly sent me; this hatched on August 5th, remaining fifteen days in the egg-state. He also sent me at the same time some live females from Witherslack; these deposited about six dozen eggs during the following week, mostly on the plant of beaked rush sent with them, which I potted up and placed them upon. Most of the eggs hatched during the second week of August.

I am also indebted to Mr. A. S. Tetley for several females which he captured for me on Whitby Moors, Yorkshire, on July 17th and 25th, 1909. These laid several eggs during the following weeks after their arrival, on the 19th and 28th respectively. One female deposited nine eggs in the chip-box during the journey. These laid during the end of the third week of July and hatched during the first week of August.

On June 15th, 1911, Mr. Frank Littlewood kindly sent me eight females, and four more on the 17th, which he captured near Kendal. These were accompanied with a note, saying: "The species must have been on the wing by June 1st, as everything is so forward with the hot weather."

These females I placed on growing plants of beaked rush, sent by Mr. Littlewood for the purpose. Altogether about two hundred eggs were laid during the latter part of June; these started hatching early in July, and by the end of the third week some of the larvæ had moulted once, owing to the continuous fine hot weather of that month; on the 21st and 22nd the shade temperature was as high as 92° and 93°.

On June 29th and 30th, 1912, I captured several females at Witherslack; those reserved for eggs laid freely during the first half of July.

The egg is large for the size of the butterfly, being $\frac{1}{32}$ in. high, of an elliptic-spheroid form, with a swollen micropyle, which is very finely reticulated. The reticulations covering the

surface of the egg increase in size over the rest of the crown, developing into irregular longitudinal keels down the side, which disappear on rounding the base; these number about fifty altogether. The spaces between the keels are finely ribbed transversely. The colour when first laid is whitish ochreous-green, which gradually turns to a pale straw-yellow, and pale ochreous-brown spots appear under the shell, which gradually become more pronounced and form an irregular pattern of small blotches, and a more or less broken band forming an uneven zone. The shell then becomes opalescent, having a bluish reflection in the high light.

The egg is laid singly on the blade or stem of grass.

The larva escapes from the egg by eating away the shell in a line for about two-thirds of the circumference just below the crown; it then forces itself out, the crown acting like a lid.

Directly after emergence the larva measures $\frac{1}{10}$ in. long. The body is slightly attenuated posteriorly, and strongly wrinkled transversely, each of the abdominal segments having six subdivisions, the first of each being the widest. There are five longitudinal dull amber-coloured lines, one medio-dorsal and two on each side, *i.e.* one subdorsal and one immediately above the spiracles; between these last two is a very fine and rather broken-up line of the same colour; the lateral ridge is somewhat whiter than the dorsal surface, which is a pale pearly ochreous; the ventral surface is rather darker ochreous. The anal points end in a short, slightly curved bristle. On the side of each segment are five minute dusky claw-like points, all projecting backwards, two between the dorsal lines, one just above the spiracle and two just below it; on the claspers, legs, and last three segments are simple white spines. The spiracles are dull olive-brown. The head is large and globular, light ochreous in colour, beset with tiny white points; eye-spots black.

The young larvæ refused to feed on the beaked rush, but on supplying them with *Poa annua* they at once started feeding, and continued feeding well upon it. They feed during daytime when young.

First moult, August 24th.

Before first moult, twelve days old, it measures $\frac{1}{5}$ in. long; the ground colour is then greenish ochreous, but almost pure green over the greater part of the anterior half, due to the food showing through its semi-transparent body. The amber stripes of its earlier life are now of a darker hue, being drab, bordered below by a whitish line along the edge of the side stripes.

Before second moult it measures $\frac{1}{4}$ in. long, ground colour green, with darker green medio-dorsal, subdorsal, and spiracular longitudinal stripes; the first is bordered on each side by a fine whitish line, the subdorsal is bordered above by a broader and more conspicuous whitish stripe, and bordered below by a darker

line than the ground colour; the spiracular stripe is bordered below by a conspicuous and comparatively broad white stripe. The head is pale yellow-green, granulated, and beset with minute black points; eye-spots black. The body is sprinkled with black claw-like points similar to the last stage.

Several moulted second time during first week of September, and entered into hybernation during the latter half of the month, resting on the basal stems of grass.

After second moult (after hybernation) about one hundred and ninety days old, it is $\frac{2}{7}$ in. long, which is only a trifle longer than the previous stage, but a good deal stouter. Excepting the stripes, which are bolder, the colouring and pattern are the same as before moulting; the hook-like points are more developed.

On March 6th I examined plants upon which the larvæ hybernated, and found eighteen had survived the winter; a few of these were moving slowly about. The following day, being warm and sunny, I noticed three had crawled up the fine *Festuca* blades, and were eating the extreme tips in the sunshine. They continued feeding through March, usually during the morning when the sun had sufficiently warmed the temperature.

Most of the larvæ moulted third time during March. After third moult, nine months old, it measures $\frac{1}{2}$ in. long. The whole colouring and markings are clearly defined; the head is clear green, granular, and sprinkled with minute white points; the body is likewise granular and studded with whitish warts, each bearing a thorn-like point.

In captivity they feed on various grasses, especially *Festuca*, which they always eat at the tip, gradually eating it down. In movements they are most sluggish, gliding along in a very slow, slug-like motion. Upon the slightest disturbance they fall from the plant.

On April 1st the first one fixed itself for the fourth and last moult.

After fourth and last moult, fully grown, it measures 1 in. long. It is rather slender and slightly attenuated anteriorly, and more so posteriorly. The head is globular, granulated, and covered with extremely minute hair-like points, which develop into whitish hairs in front. The segmental divisions of the body are ill-defined, and each with six subdivisions forming transverse wrinkles. The surface, like the head, is granular, and sprinkled all over with minute whitish warts, each bearing a very minute claw-like point.

The ground colour is grass-green, striped longitudinally with a very dark velvety green medio-dorsal band, palest at each end; this is bordered with a fine whitish line; a subdorsal white stripe tinged with lemon-yellow which terminates in the anal point; a subspiracular stripe rather whiter; all the stripes are equidistant. Between the subdorsal and subspiracular stripes

is a dark green subcutaneous irregular line; the anal points are rose-pink and white. The head is green, mouth-parts and eye-spots brownish; legs and claspers also green.

The first one spun up for pupation on May 10th, and pupated 6 a.m., May 13th, 1912.

Another larva suspended for pupation on May 28th, and pupated early a.m., May 30th, 1911. This specimen was found by Mr. F. Littlewood at night, May 18th, by searching near Kendal, who very kindly sent it direct to me.

The pupa greatly resembles *C. pamphilus*, but has the abdomen less curved and is rather larger. It measures $\frac{7}{16}$ in. long, and is elegantly proportioned. Lateral view: head angular, thorax slightly keeled and swollen dorsally, abdomen tapering and rather swollen towards the base and curving to the anal segment, which terminates in a knobbed cremaster amply provided with a dense cluster of amber-coloured hooks, similar in construction to *C. pamphilus*. Ventral surface: the wings swollen near apex, the outline then slightly concaved to head. Dorsal view: head broad and truncated, angular at base of wings; abdomen swollen at middle, then tapering to anal extremity. The colour at first is a vivid translucent green over the head, thorax, and wings; abdomen yellow green, which gradually becomes greener. After a day old to the end of the fourth day it is of a most intense, brilliant, clear emerald green, finely freckled with greenish-white very faint at first, which becomes more distinct after the fourth day. A dull olive-green streak runs along the inner margin of the wing, which forms a slight ridge bordered along the inner edge with a whitish streak; these streaks are continued in front of the head but broken through by the antennæ and eye; two other streaks run parallel with the nervures, one medium, the other near the apex. The tip of tongue is dark green, gradually fading away about the middle, a dusky green medio-thoracic longitudinal streak and a dull purplish lateral streak on anal segment. The third, fourth, and fifth abdominal segments have each a subdorsal yellowish-white wart.

After the fourth day the green assumes a duller and rather deeper hue, and the white freckles show up in stronger contrast. Some specimens are very boldly marked with black. The colour then remains unchanged for a fortnight, after which time the wings assume a more ochreous tinge and become dull orange on the twenty-first day. The colouring of the imago then rapidly develops, changing to purplish-brown on the twenty-second day, while the head and abdomen remain dull green; and the imago emerged on the following day, the pupal state occupying twenty-three days.

Another, which pupated May 25th, 1912, emerged early a.m., June 17th, 1912; this also being twenty-three days in the pupa.

COLLECTING NEAR VIENNA AND IN AUSTRIAN TYROL.

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

BEFORE leaving England last year, towards the end of June, for an entomological holiday east of the Alps, I had made careful note of Miss Fountaine's paper on the "Butterflies of Hungary and Austria" (Entom. xxxi. p. 281), and decided to open the campaign at the Rohrwald, near Vienna, the *locus classicus* of the "Emperors." As it turned out, I was only to make one visit, indeed to collect at all for more than a single day in this lovely neighbourhood. But June 24th was a day of days, all said and done, though it ended in my being arrested, marched indignant before a gorgeously uniformed stationmaster, and fined five florins for travelling without a ticket, I being under the impression that I had purchased a return to Spillern, and the guard refusing my half of the offending paste-board, or payment for same. I mention this to warn my brother collectors what to expect of Austrian State Railways. I was informed officially at Vienna that our Consul had suffered in precisely the same way, and that there was no redress, on appeal, from the judgment of the omnipotent individual who treated me (as I looked, no doubt) like a tramp. Double tickets on the Austro-Hungarian systems are printed for cutting in half, apparently when children under age travel. I should be glad, but hesitate, to think the stationmaster at Spillern accepted the torn half as a compliment to my juvenility.

On arrival the way to the Rohrwald leads up through the town, then to the right on the Vienna road for about half a mile, and by a cart-road turning off to the left. It is a long and on such a midsummer day a decidedly hot walk, but for a couple of miles there is a footpath through fields and by the side of a stream, which eventually leads into the village of Unter-Rohrbach. Immediately outside Spillern the first *Apatura ilia* greeted me, a typical example in all its fresh beauty. I did not catch it, nor attempt to. In the fields, which unfortunately for me had just been mown, there were a few *Chrysophanus hippothoë* females of the spring brood still flying about, otherwise nothing worth mention; nor was it until I had left the village behind, and was already on the outskirts of the famous forest, that the butterflies began to show up. Almost the first, and I never saw but this one of the species again, was a worn female *C. dispar* var. *rutilus*, rather a surprise, as it is not included in Miss Fountaine's list. As I afterwards found, I should have kept straight along this road for a good mile past Ober-Rohrbach to reach the best collecting ground, but my instinct is always to follow up the brooks, and I made a divagation which occupied

quite an hour. Nor could it be said to have been altogether wasted, though butterflies were remarkable more for their quantity than their quality. Every bush was alive with *Limenitis sibylla*; up and down the narrow path leading to a wide clearing dashed males of *Apatura iris*, extremely difficult to net hereabouts; and *Dryas paphia*, *A. adippe*, *Melitæa athalia*, and *Pararge egeria* var. *egerides* literally swarmed. In the clearings, too, there was an abundance of Anthrocerids, chiefly *A. hippocrepidis*, *A. scabiosæ*, and *A. vieiæ* (*meliloti*). Lycænids were not common. I only noted in the whole day one *Rusticus argyrognomon*, two or three *Everes argiades*, and occasional specimens of *Polyommatus icarus* and *Celastrina argiolus*. *Adopæa sylvanus* and *A. lineola* were, however, in full force, while on the road it was curious to observe the hibernated *Vanessa io* flying with freshly emerged *Pyrameis atalanta* and *Polygonia c-album*. Leaving this byway and regaining the main road, I presently struck the house of the Forester, and here the ways again diverge, a cart-track to the left leading to the heart of the forest, round the edge of a great marsh, that to the right (where there is a fine fountain, and the only drinking water available) leading up in the same direction, but on the further side of the marsh. I had hardly entered the wood when I realised the sovereignty of the Apaturids in all their splendour. Innumerable *A. ilia*, mostly typical, but some of the ab. *clytie*, all males, were running over the little moist patches on the sandy paths, or jostling one another from the mule-droppings. *A. iris* was quite as frequent and pugnacious, while everywhere the graceful *L. sibylla*, and, rather more rarely, *L. camilla*, gleamed in the sunny glades. And presently I was aware of yet another of this lovely group—that *Limenitis populi* which I had sought and seen, but never taken, in the forests of the Aisne. This butterfly is very soon battered. I took six or seven males during the day, and liberated them all as in one way or another defective; the only perfect example escaped from the net. In much the same localities, on the grassy wayside banks, I took quite a decent series of that other Samoussy speciality, *Melitæa maturna*; but this also was on the wane. Of the Satyrids, *Pararge achine* still survived; *P. megæra* and *Aphantopus hyperanthus* were fresh, and also *Cænonympha arcania*, the one or two *C. iphis* netted being, on the contrary, in rags. Common also were *Aporia cratægi*, *Leptosia sinapis*, *Gonepteryx rhamni*, and *Aglais urticæ*, while the privet blossoms, beloved of *maturna*, yielded *Strymon ilicis*, and one or two very fine *S. pruni*. I had intended a second visit to the forest, or should have worked much more sedulously than I did. With regard to *C.* var. *rutilus*, I was informed by two Viennese entomologists I met on the way home that, though not unusual in some other suburban places, the Rohrbach district was not regarded as a favoured locality. Com-

pared with Budapest specimens of the first emergence, this solitary female is decidedly small, and there was remarkable uniformity among the *Apaturids*, so wonderfully variable in the western forests of Longuyon (Meurthe-et-Moselle), and Éclepens, N. Switzerland.

The next three or four weeks were spent by me mainly at Herkulesbad, of which, in view of the several current and other interesting papers published in the 'Entomologist,' as well as Miss Fontaine's previous observations on the butterflies there, I propose to say no more than that the first fortnight of July is decidedly *not* the best time for the rarer species by which this beautiful Hungarian spa is linked in the memories of so many British collectors. My observations entirely concur with those of Dr. J. N. Keynes (Ent. Rec. vol. xxiii. p. 161) as to the appearances of *Erebia melas*. It is much earlier on the wing than our English authorities suggest. I saw it fresh on the Suskului on July 10th, a mountain, by the way, which yielded better results in every way than the more famous and much-hunted Domogled. On July 13th I was back at Budapest, but found the collecting most unproductive (weather hot, windy, and stormy). On the 18th, therefore, I set off for Wolfsberg to try my luck in Carinthia.

The journey to Marburg was made under a flaming sky, and I envied the people sun-basking in their bathing clothes on the sandy shores of Lake Balaton. From Marburg to Wolfsberg the weather held, and the fine sunset gave promise of a favourable morrow. My diary records: "July 18th, a fine hot day," and then the ominous words, "the last for a very long time." In fact, it is no exaggeration to say that I never had a really seasonable day again to the 28th, when my collecting for 1912 was at an end.

The 19th, however, was bright and warm in the morning, but as Baedaeker gives five hours for the Sau Alpe, my immediate objective, I did not start early enough in the morning. It should be five hours there, and at least four back, as I speedily realised after a broiling walk across the great cultivated Lavantthal, which separates Wolfsberg from the Sau. No English entomologists appear to have visited this locality since 1897, when the late Mr. F. C. Lemann, in company with Dr. T. A. Chapman, Mr. W. E. Nicholson, and Mr. R. Wylie Lloyd, made a successful expedition to the Carinthian Alps hereabouts (*cp.* "The Butterflies of Carinthia," Ent. Rec. vol. x. (1898), pp. 12-15), and had I reckoned the remoteness of this locality I should most certainly have made for Stelzing, their first headquarters, on the far side of the range, less than two hours from the upper slopes of the mountain known as the Grosse Sau Alpe (6828 ft.). Still, the Lavantthal approach, though wearisome in point of distance, is an agreeable hunting ground once across the valley, while the

Kor Alpe (7024 ft.) is actually best reached from Wolfsberg itself. The butterflies I particularly wanted were *Erebia arete* and *E. eriphyle*, with the exception of *E. afer*, the only two members of the group whose known haunts I have not visited at some time or other in my entomological rambles. I may at once say that I saw no vestige of either species, and, as far as *arete* is concerned, was somewhat comforted to hear from Herr Höfner, the local authority upon the Lepidoptera (Macro- and Micro-) of Carinthia,* that this was not the year for *arete*, it being, in his opinion, one of those mysterious species credited with intermittent appearances. I mention this not because I am convinced of its entire accuracy, but as an encouragement to any collector who may be inclined to break new ground on the Eastern Alps in 1913, or other "odd-number" years.

Mr. Lemann found *E. arete* "widely distributed over the Sau Alpe," but non-existent on the Kor Alpe; *E. eriphyle* on both Alps, but localized. The road leading up to the Sau from the Lavantthal is well wooded, with a copious rushing stream of crystal clearness, punctuated with occasional saw-mills. The forest passes from alder and beech to pine, and there are plenty of flowery bypaths and little meadows which, unfortunately, in my anxiety to reach the top, I barely entered. On the roadside (where the wild raspberries were in full fruit) *Heodes virgaurea* males were extremely plentiful and in perfect condition, with occasional tawny females, the antemarginal points, as a rule, of clear cerulean blue, more richly coloured even than my Digne beauties of 1911. I was too late for *Limenitis populi*, but *L. camilla* and *L. sibylla* were equally abundant, and on the way up I netted several worn males of *Neptis lucilla*, which were immediately liberated, one perfect female being taken at rest on a *Viburnum* on the return journey. Indeed, I should say that *lucilla* was decidedly commoner hereabouts than at Herkulesbad. Males, also more or less battered, of *Apatura iris* were settled by the roadside runnel, and I again took one fair female so intent upon her "afternoon tea" that I actually pill-boxed her—a record, I fancy, in the way of capture of this sex of *iris*. I had left Wolfsberg at eight. By one o'clock I was still far from the goal of my ambition, for the rain had come on, and some promiscuous collecting on the lower road had held me back. However, I went on directly it ceased, and presently the universal *Erebia ligea* gave place to the first specimens of *E. epiphron* var. *cassiope*, which, I need hardly say, I pounced upon, under the impression that they must be *E. arete* at last. I was now in sight of the summit ridge, and it was two o'clock, when down came the rain again, and I gave up in despair, with the prospect

* Cp. Wien ent. Zeit. 1883, p. 193, and his work on the Macrolpidoptera of Carinthia.

of a long plod back through dripping woods and soaked to the skin. The afternoon, however, brightened, and as I got back to the *lucilla* ground the sun shone out once more. Here, now, I found *Araschnia levana-prorsa*, of which I have bred many in the past, but had never yet encountered the summer brood upon the wing. It was evidently just emerging, but is very easily lost in pursuit against the dark background of the trees. I got back to the extremely comfortable inn at Wolfsberg, kept for generations by the Pfundner family, about eight, and for the next three days (20th–22nd) collecting was impossible, though I made a start for the Kor Alpe on the 21st, at six a.m., to be a second time driven back by wind and weather. In the afternoon, however, I had the great pleasure of visiting Herr Gabriel Höfner, and going through his fine local collections, which are especially rich in Micros. He told me that all the big “Blues” of the *Lycæna* group are common in the Lavanthal, and both *L. arcas* and *L. euphemus* in the immediate neighbourhood of the town. My one day on the Sau Alpe produced, among other commoner species, the following Rhopalocera:—

Adopæa lineola and *A. thaumas*; *Heodes virgaureæ*, *Chrysophanus phlæas*; *Lycæna arion*, *Cupido minimus*, *Nomiades semiargus*; *Leptosia sinapis*, *Colias edusa*, *C. hyale* (in the plain); *Apatura iris*, *Limenitis camilla*, *L. sibylla*, *Neptis lucilla*, *Araschnia levana-prorsa*, *Polygonia e-album*, *Dryas paphia*, *Argynnis adippe*, *Aphantopus hyperanthus* (one fine example of ab. *arcte*); *Erebia epiphron* var. *cassiope*, *E. ligea*, *E. æthiops*, and *Canoynympha satyrion*—a meagre list, and by no means representative of the splendid lepidopterous fauna of the district.

July 23rd being no improvement on its predecessors, I made tracks for the Brenner, and took up my quarters once more at the Post Hotel, which I found (in the dependence) much improved in every respect. Since I was there in 1904, the whole mountain side on the opposite bank of the little stream has changed in character. The forests have been felled in many places; the paths I knew have disappeared, while finger-posts indicate the chief routes for tourists on the climb. I spent four days at Brenner—all save the first wet—but on July 24th I took and saw more butterflies in three hours than upon the whole of the tour of six weeks put together, with the exception of that one memorable day outside Vienna, at the Rohrwald. For the rest it was bitterly cold, and the wind terrific at times. The *Erebias* were common as ever; *Erebia pharte* females, rather worn; typical *E. pronö* females in very fine condition. On the Col below the Wolfendorn *Melitæa asteria* was fairly plentiful, and *M. cynthia* just emerging; and hereabouts I also took, for the first time at Brenner, *Hesperia andromedæ*, and, lower down, *H. cacaliæ* (common). The two Alpine “Blues,” *Polyommatus eros* and *P. pheretes*, were quite common; *P. optilete* rather less

so. But I have no more species to add to my previous lists of the Brenner (*cp.* Entom. vol. xxxvii. pp. 225-226, and Ent. Rec. vol. xiii. pp. 96-97), to which I bade a reluctant farewell on the 28th, having endured certainly as bad a run of luck in the way of weather as I ever encountered on my Continental travels with a net.

BUTTERFLY-HUNTING IN THE BALKANS.

By A. E. GIBBS, F.L.S.

(Concluded from p. 130.)

(PLATE IX.)

BOSNIA.

ON the morning of June 19th I met by appointment at Sarajevo, Mr. P. J. Barraud, of Bushey Heath, who had come through from Vienna in the night, and the greater part of the time devoted to collecting in Bosnia was spent in his company. By the kindness of a friend, whose acquaintance I had made in Montenegro, we were able to explore, in his motor-car, the interesting and little visited country which lies on the borders of Servia, Montenegro, and Turkey. This is not the place to dwell upon the enjoyments of motoring in the Balkans, or to relate the adventures which befel us. Our headquarters, after leaving the capital, was Gorazda, on the Drina, a convenient centre with a fairly decent inn. The ride from Sarajevo to Gorazda, over a mountain pass 4000 ft. above sea-level, was an experience never to be forgotten. At Gorazda I became friendly with an Austrian gentleman, whose business took him to many of the towns and villages in the neighbourhood, and he kindly invited me to go with him on one of his journeys, offering me a seat in his carriage. So, while the car made a successful attempt to get across the Turkish frontier, I drove with Herr Folje to a place called Cajnica, most beautifully situated at the foot of a fir-covered hill. We lunched together at the hotel, and, while my friend was doing his business, I took my net and wandered up the shady mountain-side. There was a Turkish cemetery at its foot, where the grass was long and uncut, and I ventured to climb the fence to see what could be caught. The reward was found in a useful series of *Argynnis amathusia*, fresh from the chrysalis, which were flying, in company with *Melitæa aurelia*, among the graves. Much was not to be expected under the trees on the hillside, but I found a clearing where apparently it was intended some day to erect a pavilion, and here upon the wild flowers I took a specimen of *M. trivialis* which was flying with *M. didyma*, *Plebeius argus*, *Polyommatus icarus*, *Pararge mæra*, and other common insects such as *L. sinapis*, *P. napi*,

A. crataegi, and *P. egeria*. On the drive back to Gorazda we were overtaken by the car, and abandoning the carriage to the care of the driver, we all crowded into it—seven of us all told, belonging to four different nationalities, and each trying to narrate in his own tongue the events of the day. Mr. Barraud had done no butterfly-hunting, but the car, after adventures many and amusing, had succeeded in reaching Plevlje, in the sandjak of Novi-Bazar, where its appearance caused a great sensation.

A day's collecting at Gorazda yielded poor results. In the morning we lost ourselves in the cow-tracks among the scrub on the mountains, and got nothing but a few specimens of *T. ilicis*, while my most notable capture in the afternoon was a bleached *E. janira*, which might have come from the New Forest.

From Gorazda we went on to the town of Foča, a quaint and curious place on Austrian territory, but thoroughly Turkish in its appearance, with many mosques and picturesque but squalid bazaars. Like all these border towns it was full of the soldiers of the Emperor Franz Josef. The morning of June 25th, the day after our arrival, was intensely hot, and as we climbed up to a Dervish monastery on a hill above the town, it was evident that a storm was brewing. However, as time was precious, we persevered, and on a grassy slope we secured a few specimens of *Melanargia galatca* var. *turcica*, a darker form of the species than I had taken elsewhere. The only other capture worth mention was a large and well-marked female *C. pamphilus* of the southern summer form, with unusually broad dark borders, especially to the hind wings. But the storm was quickly gathering, and hardly had we got back to the town before it burst upon us with all its fury. After lunch we left Foča in torrential rain, which fortunately did not last long, for a thirty miles drive to the station of Ustipaca, on the wonderful eastern railway which Austria has built for strategic purposes through apparently inaccessible gorges right up to the Servian border line, where it abruptly stops. From Ustipaca we caught the evening train back to Sarajevo.

Our next excursion was to the better wooded country in the north-west of Bosnia, travelling by railway from the capital to Jajce, one of the most interesting and historic places in the Balkans. Here there is an excellent hotel, with a landlord who speaks English. Near Jajce is an idyllic spot called Jesero, about three hours' walk up the valley of the Pliva, and on the morning of June 29th we drove there, intending to explore the valley beyond the village and walk home in the afternoon. The road to Jesero led by the side of two pretty lakes of the same name, and in the village a government resthouse has been erected, where a simple lunch, in which trout from the river is the chief item, can be obtained. The morning was bright, and as we passed through the village

we saw several specimens of *Apatura iris* and *A. ilia* var. *clyte*, but did not succeed in securing either of them. The most abundant butterfly was a *Melitæa*, which turned out to be *M. athalia* var. *mehadensis*, and this insect settled in little companies on damp places in the road and on the horse-droppings. Wherever we went in the northern districts of Bosnia we met with it in great numbers. Just as we were leaving Jesero, near a picturesque mill, Mr. Barraud caught a fine specimen of *Eugonia xanthomelas*, the only one seen in the course of our wanderings. We walked a mile or so along the road beyond Jesero, and then turned up a valley on the right, where I saw *Parnassius apollo*. We had ordered lunch to be prepared for us at the little restaurant by the lake, and on our way back, in a flowery corner on the edge of a small field, we observed some Theclids flying over the brambles, and eight specimens of *T. spini* and one of *T. acacia* fell to my lot. After we had done justice to the trout we started to walk back to Jajce, intending to work the boggy ground by the lakeside, but the excessive rainfall had caused a rise in the water level, and it was quite impossible to wander many feet from the roadway. At one spot, however, where the ground was a little higher and dryer, we were able to investigate a small meadow in which the grass was uncut, and here I took several tiny *Melitæas*, only 28 mm. in expanse, which puzzled me. They proved to be dwarf specimens of *M. aurelia*, a species of which I took a short series of varying sizes on the margins of these low-lying meadows. *A. phæbe*, too, was flying in nice condition, and several specimens of *A. thetis* were added to the bag. The following day we determined to see what was to be had on higher ground, so we engaged a guide, hoping to find some mountain butterflies. But the quest proved rather disappointing, the hillsides being either closely grazed or so steep and stony as to prove very poor collecting ground. The most noteworthy capture was the striking aberration *navarina* of *M. athalia*, which I found in a meadow by the side of the railway on our homeward journey. Over the skrees *S. hermione* was flying, and at a turn of the footpath *Lycæna arca* found its way into the killing-bottle. After dinner that evening we strolled about the village, boxing a few moths from the white walls of the houses, below the arc lamps, which attracted night-flying insects in swarms, but which were too high up to be of much use for collecting purposes. *Chærocampa porcellus* and *Cossus ligniperda* were the most conspicuous insects taken.

From Jajce we went to Banjaluka through the beautiful and verdant gorge of the Urbas, and on the fifty miles drive I think I saw more butterflies than during the whole of the rest of the holiday put together, the *Melitæas* swarming on the road in countless thousands. It was glorious butterfly weather, but

the way was long and there was no time to unfurl the nets. At Banjaluka, after a most interesting day spent in the market with the cameras, taking snapshots of the natives attired in striking and brightly coloured garments, Mr. Barraud and I parted company, my friend starting on his long homeward journey to England, while I returned for another day among the lepidoptera at beautiful Jajce. I decided next morning to work the wooded hill, on the lower slopes of which the old Christian village is built, and which had an inviting look from the terrace of the hotel. So, crossing the bridge, I ascended the steep pathway between the houses and gardens. In a damp place in a maize field I found *L. arcas* flying with *A. phæbe*, the latter in such shabby raiment as not to be worth catching. Higher up, in an uncut meadow, I got several dark *M. galatea*, but as a number of men were at work close by I thought it best to keep out of the standing grass. Then following a narrow track through a cornfield I hit upon some more meadows and grassy places among the woods, where *C. edusa*, *A. aglaia*, *A. adippe*, *E. janira*, and the common *Melitæas* and "blues" abounded.

On July 5th at Travnik, a curious old town, I spent the best hours of the morning photographing the interesting scenes in the market, held round a painted mosque, which made an artistic background for my pictures. Then I went for a walk along the valley in search of insects, and got several nice male specimens of *Lycæna meleager* and watched an Apaturid, which I think was *A. ilia* flying round a willow tree, while *M. galatea* sported with *C. edusa* on the railway bank. But, as was so often the case, the bright morning was succeeded by a cloudy afternoon, and although I continued to work, this time on the north side of the town and in likely situations, nothing extraordinary was found. Travnik has every appearance of being a good butterfly place, and given a favourable season, the slopes of Mount Vlassic, which rises above the town, would doubtless be worth working. The insects I took at Travnik included *C. hyale*, *L. sinapis*, a dark form of *P. orion*, *B. dia*, and *A. phæbe*.

On July 6th I found myself in Illije, a fashionable bathing station a few miles from Sarajevo. Half an hour's walk from the hotels, through a shady avenue which appeared to be endless and where, of course, there was no work for the net, brought me to the source of the river Bosna, which rises in the pretty grounds of a restaurant at the foot of the mountains. In the meadows by the side of the ponds a single specimen of *Erebia ligea*, with the white markings of the under side strongly developed, was found in company with *E. æthiops*, which was fairly abundant, *A. phæbe*, *M. var. mehadensis*, *M. dictynna*, *M. didyma*, and *P. argus*. A beautiful male *A. iris*, the only Apaturid actually taken in Bosnia, was wheeling round the trees

by the roadside, but a descent to earth proved fatal. *Dryas paphia*, in all the pristine beauty of its recent emergence, was flitting over the brambles, attracting the attention of a little Bosnian boy, who with a home-made net was trying to catch butterflies, while his parents were resting in the gardens. I returned home later in the day with this embryo entomologist who got me to name his captures for him. While I was eating my trout at the restaurant the cook brought me from the kitchen a specimen of *Mania maura*, so badly handled as to be hardly recognisable, but which had, of course, to be accepted with thanks, and afterwards added to the collection of my little friend of the home-made net. At the foot of the hill close by was a bank covered with brambles and wild flowers where butterflies abounded. Here I took *Thecla quercus* and *Aphantopus hyperanthus*, the only representatives of the two species which I met with in the Balkans. The brambles proved very seductive to *L. camilla*, which was here in good condition; and higher up the hill, in a field, I got male *L. meleager*, *C. alciphron*, and *Zygana carniolica*. This pleasant day at Illije ended my collecting in Bosnia, save for a short expedition on the slopes of the Trebevic mountain above Sarajevo, in search of *C. myrmidone* which, according to the books, ought to be found there, and for which I twice searched in vain.

On the whole my insect work in the Balkans was rather disappointing, but in every other respect the holiday was extremely successful, and proved to be one of the most interesting and enjoyable I have ever taken.

A MONTH'S COLLECTING IN HUNGARY.

BY GERARD H. GURNEY, F.E.S.

(Concluded from p. 104.)

ON June 4th I ascended the Domogled, which is a mountain east of the town, and rises to a height of about 3700 ft. It was a brilliantly fine day, with hot sun and no wind. I saw very little of interest on the way up, though after passing the Weisses Kreuze Wood *P. napi*, *P. cardamines*, and *P. egerides** all became exceedingly plentiful. Emerging from the beech forest after a very hot, lengthy climb, I found insects to be fairly numerous on the slopes of the peak, and if I did not get anything unusual the superb view spread out all round me amply made up for the lack of varieties. Looking to the south one saw a panoramic expanse of Roumania stretching away into a series of low hills and

* All of this species found here in June by me were *egerides*.—H. R.-B.

valleys as far as the eye could reach; to the west the fields of Bosnia lay far below; while north, in the dim distance, little silvery patches, that looked like pieces of shining glass, revealed the presence of the Danube, flowing from distant Budapest, nearly three hundred miles away.

Where the beech forest ended, flying amongst the trees—fresh at this elevation and almost common—were quite a lot of *P. manni*. Here also were one or two *P. mnemosyne*, and a few fresh *M. cinxia*. Beautifully dark females of *B. euphrosyne* were busy egg-laying on the small yellow pansies which grew abundantly here, and *P. orion* was not uncommon. In a little grassy hollow near the actual peak itself were one or two worn *Aglais urticae*. Descending again to the edge of the wood I intended to stop there some little time, as butterflies were rather numerous, but the repeated furious attacks of three enormous sheep-dogs caused me to beat a rather hasty retreat, and so I did nothing more there, but picked up a few *P. orion* near the Weisses Kreutz on the way down, altogether an interesting day, though I was disappointed in not meeting with either *Neptis lucilla* or *Erebia medusa* var. *psodea*.* The following day I again went up the Czerna gorge. *P. manni* and *N. aceris* were both common, and I found *Cœnonympha arcania*, a very brightly marked form, just beginning to come out, and I also took single examples of *Melitea matura* and *Chrysophanus alciphron*.

With many regrets I left Herkulesbad that evening, arriving back again at Budapest the following morning, June 7th, and it was not long before I was again on the war-path, and on the way to the now familiar meadows at Budafok. A pleasant change of things had taken place during the ten days I had been

* My impression after four expeditions to the mountains above Herkulesbad in July this year is that the Suskului is a much more productive locality than the Domogled. The route is from the well-known Quelle about an hour beyond the Weisses Kreutz, and there is no water to be found after this spring on the way. The path is eventually much more open than that to the Domogled; there is a fine flora, and there are no herds at any time on the top, and consequently no dogs. But there is a forester's hut with extremely agreeable occupants. The month of July is not to be recommended for Herkulesbad generally, as it is "between broods," so to speak. This year *Pararge roxelana* was in a more or less dishevelled condition on July 5th in the Weisses Kreutz woods. Both *Neptis lucilla* (in the Quelle woods), *N. aceris* (in the Czernathal), and *Erebia medusa* var. *psodea* (on the hills) were over. It should be noted, however, that *E. melas*, as Dr. J. N. Keynes has pointed out elsewhere, is a much earlier insect than we have been led to suppose hitherto. I saw it on the Suskului, at about 3000 ft., on July 10th, but there was a stiff breeze blowing, and before I could get my net to work the butterfly was carried far away; and this happened more than once. Indeed, the wind spoilt collecting most days. Lepidopterists, however, visiting the Domogled in future should not fail to look for *Polyommatus anteros*, taken by Dr. Keynes near the summit, where, owing also to the high wind, I saw next to nothing, though the sun was in a clear sky.—H. R.-B.

away; the luxuriant hay and grass had grown up till nearly everywhere it was three-foot high, the flowers and flowering-plants were wonderful in their variety and abundance, large stretches of ground being purple with *Salvia pratensis*. Moreover, the butterflies, which, when I left were not generally in abundance, were now in the greatest plenty. Fresh *A. crataegi* were in countless swarms everywhere, with *E. ianira* excessively common also; hosts of newly emerged *I. lathonia* hovered wherever the hay was not quite so long; while very numerous were *R. argus*, *P. icarus* (with very large males), and *C. iphis*, which were still in presentable condition. Fresh *A. thetis* were frequent, and the fine dark *P. mæra* common; while *Pyrameis cardui*, *A. urticae*, and *P. daplidice* added to the bag. I had not gone far along the path towards Kamaerardo before I saw the first *Chrysophanus dispar*—only, of course, var. *rutilus*, flying along the side of a small ditch, with the sun shining full on it. It was, indeed, a brilliant object, and no one who has not seen this exquisite species on the wing can have any conception of the beauty of its red-gold wings when it is alive. This specimen, a male, in most perfect condition, was soon followed by others, and I found it to be common though local, and on this day I took nineteen perfect specimens, including five females; they were all very large and fine, in fact, they run very close to many specimens of *dispar*.

On subsequent days I found it to be quite common, though it was not found everywhere; I took most of my specimens off the purple scabious, which was the *only* flower I ever saw *Rutilus* on; *never* on the white composite, which previously had been so attractive to *C. thersamon*. But, to continue the account of my doings on June 7th: near the farmhouse by Kamaerardo Wood I got five fresh *Carcharodus althææ*, and in the wood itself *Strymon pruni* was not uncommon, though already rather torn; here, too, *C. arcania* was plentiful. On the *Aristolochia*, which grows at this point abundantly, were a great many larvæ of *T. polyxena*, in all stages of growth; while fresh *Argiades sylvanus*, worn *N. tages*, one or two *P. daplidice*, and plenty of *M. phæbe* were noted here.

Rather further on, where some tall thistles were growing luxuriantly amongst the hay, I found a great profusion of butterflies, and secured, to my surprise, a magnificent male *Dryas pandora* off a thistle-head, to be followed almost directly after by two more specimens, and on subsequent days I got several others. This species is generally rare near Budapest, though found plentifully in many parts of Hungary; all those I saw were in the vicinity of Kamaerardo Wood, and are very large specimens, though perhaps not so big as some Spanish ones. I paid other visits to these delightful marshes on the 10th and 12th, and always spent long and interesting days there.

On the 12th *C. rutilus* was really quite common, though some of the males were even then beginning to get a little bit worn. On the 12th, too, I took a single specimen of *Argynnis niobe* var. *eris*, which I had not seen before.

The afternoon of the 11th I spent on the Schwabenburg, where in places butterflies were numerous. On one slope on the south side of the hill, *A. niobe* var. *eris* was rather common; here also, but confined to one very small dell, were three or four *Brenthis hecate*, a species whose acquaintance I had not expected to make until I got to Pészer; it is very rare near Budapest, and extremely local in the few places it does occur in. *M. trivia* was very scarce, and I saw only three specimens, and these were a good deal worn; but *I. lathonia* was common, and I netted one fresh *Melitæi aurelia*, the only specimen seen. *A. thetis* and *P. hylas* were common in one or two spots, the latter rather small; *R. argus* was frequent, but I saw no *P. orion*. *H. carthami* flew about gaily, and was still quite fresh, while other species noted on the Schwabenburg were *A. sylvanus*, *E. cardamines*, *E. ianira*, *P. mæra*, *Lowia dorilis*, *P. icarus* (very common), *M. cinxia* (worn), *M. phæbe*, and the two "clouded yellows," *C. hyale* and *C. ebusa*.

Before I left England I had been told it was extremely difficult to get permission to go to Pészer, which, besides being a most wonderful locality for butterflies, is a very interesting place from other points of view. The forest is all Crown property, and leave can only be obtained from headquarters. However, thanks to the kindness of a friend in a high official position at Vienna, the necessary leave was willingly granted, and all arrangements made for me by the Agricultural Department, and I cannot say enough for the kindness and courtesy of the gentlemen who made the plans which enabled the journey and day spent at Pészer to be enjoyed under the most delightful conditions.

Accompanied by Professor Schmidt, of the National Museum, and Mr. Czillinger, of the Forestry Department, I left Budapest by the early morning train on the 13th. The day was almost perfect, a brilliant morning becoming slightly hazy towards the afternoon. Arriving at Alsó Dabas Station about 8.30 we were met by a waggonette, and then had a most interesting drive of over two hours, for the last hour across a flat plain, where the road or track got fainter and fainter until it disappeared altogether, and we simply drove over the short grass. On our left large swamps stretched away for miles, while in front lay the low line of forest towards which we were making our way. Small rodents, about the size of a guinea-pig, watched us keenly from the edge of their holes; these were hamsters (*Cricetus frumentarius*), very pretty little brown animals with brown and white heads.

The Forest of Pészer is a long, narrow strip of wood, composed mostly of acacia and poplar trees, though in one part oak and birch largely predominate; the soil is very sandy. At the south end of the wood are numerous sandhills, between which are open glades; the vegetation is exceedingly luxuriant and varied. No sooner had we entered the wood than we were amongst butterflies in great numbers; in one or two places where we went in the afternoon the profusion of insects was so great that it made one's eyes ache to watch for long the continual movement of the thousands of fluttering wings hovering over the herbage. I think perhaps *A. sylvanus* was the most plentiful butterfly on the wing; it was in swarms everywhere. The only other member of the family that I saw was *H. carthami*. In point of numbers, though, *A. sylvanus* was run very close by *B. hecate*, and this rare and local species was excessively abundant—all in perfect condition, and the newly emerged females very fine, with a beautiful purplish gloss on their wings. *M. trivia* was another very common species; some worn, but most in perfect order. Fine dark *M. athalia* were also abundant, though rather more local. A single specimen of *D. pandora* was secured, the only one seen, but *A. niobe* var. *eris* and *I. lathonia* were both common. On the blossoms of the privet were many Theclids. *Strymon acaciæ*, *S. ilicis*, and *S. pruni*; the first two species were very common, and both quite fresh, *S. ilicis* being of large size and very black; *S. pruni* was frequent also, but generally much torn. In the open glades beautifully fresh *C. alciphron* males were greatly in evidence; this species has a very quick flight, and is rather difficult to follow with the eye. The females seemed to be quite rare.

Melanargia galathea var. *procida* was excessively abundant in certain places—fine dark specimens, in the pink of condition—while *A. crategi*, *E. ianira*, and *P. icarus* were everywhere. On various plants were large numbers of full-fed larvæ of *Arctia caia*, and a beautiful iridescent Longicorn (*Lytta versicatoria*) was very abundant on ash trees. We were given an excellent lunch by the chief forester's wife in their delightful house in the middle of the forest, and though perhaps one rather grudged the time necessary for its proper consumption, it would never have done, by hurrying through the meal, to have offended our host the forester, for we relied on him to take us to the spot, in a distant portion of the forest, where we hoped to find the much wanted *Melanargia iapygia* var. *sucarovius*. Our spirits rose high, cheered partly by his delicious home-made wine and partly by the assurance that "there was no hurry; we should find plenty *sucarovius*," which assurance only made us want to hurry the more; and sure enough, when we did eventually, about two o'clock, reach the locality for this very local species, in two places, we found it very abundant and in perfect condition.

Excepting localities in South Russia, Pészer is the only place where this form of *M. iapygia* occurs in Europe. Of the very few entomologists who have previously visited Pészer, it has only once before been found in anything like abundance, and that was by Miss Fountaine in 1897; its appearance is generally so erratic that many years only two or three specimens will be taken in a season, and when we left Budapest I felt doubtful if we should even see it. The two localities at Pészer where it flies are not far apart, and are each about an acre in extent, and though we found wanderers in one or two other places, they were only stray ones from its headquarters. The soil in these two localities is almost entirely sand, and is covered with two or three species of coarse grass, one or more of which is doubtless the food-plant of *suarovius*. All the specimens we took were very large and fine. In the full sun it flies swiftly and strongly, but settles on a flower-head or blade of grass directly a passing cloud obscures the sun, and during several dull periods I found three, and once four, specimens on one thistle. An interesting point about this species is that it *fixes* its eggs instead of dropping them promiscuously on to the ground, as *all* other *Melanargias* do.

There were not many other butterflies on this particular bit of ground, but, returning to the forester's house late in the afternoon, I took three male *Colias myrmidone*, the first time I had come across this species in Hungary, though I had been continually on the look-out for it; it is much more plentiful in the second brood in July. And so ended a wonderful, red-letter day in one's entomological life—wonderful not only on account of the butterflies, but also because of the great interest and fascination of the place itself, with its teeming fauna and floral life all round one, and it was with overflowing boxes and specimen cases that we got back to Budapest at 10.30 that night.

I paid a final visit to the Budafok marshes on the 15th, and found another great change had taken place since my last visit; all the hay had been cut, and not only that, but every scrap of standing herbage had been laid low also, and instead of innumerable butterflies fluttering everywhere, as I had left when last here only four days before, hardly a solitary insect was to be seen! One rather wonders what happens to them all; where do they go to? No doubt the *cratægi* and the stronger flying species can seek out pastures new, but what becomes of the swarms of "blues," and the innumerable *E. ianira* and *C. iphis* which were so common? Moreover, the destruction of young larvæ must be very great. Amongst the hay and on the edges of the streams the large water-dock flourishes exceedingly; these plants must nearly all have had ova and young larvæ of *Rutilus* on them, all of which necessarily perish when the plants are cut down, and it looks as if this locality would before long

know this beautiful "Copper" no more, while *C. thersamon* and other interesting species will probably share the same fate.*

Leaving the meadows which proved so unprofitable, I went up a sandy lane on the left, the banks of which were thickly covered with sloe bushes; flitting round these were numbers of *S. acaciæ*, all in beautifully fresh condition, while another *D. pandora* found its way into my net. Every sloe bush had three or four clusters of the orange eggs of *A. cratægi* upon it, and in one place were covered with the enormous full-fed larvæ of *Saturnia pini*.

The following day I left Budapest, and arrived in London two days later.

BEEES OF THE GENUS *MEGACHILE* FROM AUSTRALIA.

BY T. D. A. COCKERELL.

Megachile cornifera, Rad.

THIS remarkable insect was described as from Sydney, where it certainly never was found. It has been rediscovered by Mr. Horace Brown at Southern Cross, two hundred and sixty miles inland from Perth, Western Australia; both sexes were forwarded to me by Professor Froggatt. The male, not before known, resembles the female, but is more slender, about 19 mm. long, the quite narrow face covered with light yellow hair, and without prominences; eyes red; anterior tarsi flattened, very light yellow with a large ferruginous spot at the end of each joint, the last joint ferruginous, the first joint very short, crescentic, the whole tarsus very broadly fringed on each side with white hair; anterior coxæ with long curved spines; hind tarsi extremely long; middle tarsi short; sixth abdominal segment with a broad transverse keel, obliquely emarginate in middle; venter of abdomen with much white hair. Also at Southern Cross, Mr. Brown collected a female of *M. fumipennis* (Froggatt, 205).

* I traversed this same ground on July 16th; the morning brilliantly fine, the afternoon attended by a downpour of tropical violence. The sole Chrysophanid observed was *R. phlæas* (one specimen), and hardly a butterfly was to be seen, except *S. circe*, on the sandy cart-track just before coming to the village of Kanaerardo. Evidently the second generation of *C. dispar* var. *rutilus*, and *C. thersamon* had not emerged here; but, as Mr. Gurney points out, the cutting had been conducted ruthlessly, and the mortality of larvæ must have been enormous. I may add that on this ground I was asked by the forester for my "permit." I need scarcely say I had none, but I made him understand I was an English entomologist, and he appeared quite satisfied to let me proceed in peace. My bag for a six hours' day was absolutely *nil*! *C. thersamon*, second generation, at Farkes Volgy, outside the Bude Cemetery, fresh, July 17th.—H. R.-B.

Megachile phenacopyga, Cockerell.

Waroona, Western Australia, March 9th, 1908 (*G. F. Berthoud*; Froggatt, 208). A female from the same locality and collector (Froggatt, 207), but collected December 26th, 1908, agrees with a female "*M. ignita*, Sm.," from Western Australia, determined by F. Smith. It looks much like *M. phenacopyga*, and is perhaps its female; but if so, it cannot be *M. ignita*, since that species was originally described from a male with simple anterior tarsi.

An argument in favour of the reference of these females to *ignita* rather than to *phenacopyga* is found in the fact that they have the tegument of the sixth abdominal segment and the apical part of the fifth red, which is not true of male *phenacopyga*. A feature of the supposed female *ignita* is the presence of conspicuous white lateral hair patches on abdomen; this distinguishes it from *M. mackayensis*, *henrici*, &c. Smith indicates no such patches for male *ignita*. The abdomen of the supposed female *ignita* is of the relatively narrow, parallel-sided type, not broad like that of *M. chrysopyga*.

Megachile horatii, sp. n.

♂. Length about 13 mm.; like *M. erythropyga*, Smith, but larger, with hair of face pure white; third abdominal segment (as well as first and second) with lateral white hair-patches; sixth segment rather more produced; face narrower, with the eyes more parallel; eyes black.

Southern Cross, Western Australia, 1912 (*Horace Brown*; Froggatt, 206).

In the white hair of the face it is like the much smaller *M. tomentella*, Ckll.

I must add, with regard to *M. erythropyga*, that I possess only the male (a specimen from F. Smith's collection labelled New Holland, and two collected by French in Victoria); Smith's short description is characteristic, but it should be added that the apical margin of the fourth abdominal segment, except at the sides, is covered with red hair. The female was described from the W. W. Saunders collection, and is presumably at Oxford. Judging from the descriptions, it seems quite possible that the sexes described do not belong together; the female, in fact, is probably the insect referred to above as supposed *M. ignita*. Although the female of *erythropyga* has precedence of place on the page, it will be better, under the circumstances, to designate the male as the type. This leaves us with a series of readily distinguishable males (*erythropyga*, *ignita*, *phenacopyga*), and one (or two?) females which will have to be connected with the males by workers in the field.

Megachile derelicta, sp. n.

♀. Length about 12 mm., anterior wing nearly 7, the wings relatively short; black, elongated and parallel-sided, the abdomen widest at fourth segment; hair of head and thorax rather scanty, but conspicuously white at sides of face, around the shining tubercles, on under side of thorax and on metathorax; on the broad vertex, the mesothorax and scutellum, the thin hair is pale fuscous-tinted; head rather large, with broad cheeks; clypeus short and broad, the lower edge straight, but above the edge is a pair of large semicircular shining hollows, each one surmounted above by a small tubercle, the median space between the hollows occupied by a large tubercle; upper part of clypeus, face and front densely punctured, vertex with the punctures sufficiently separate to have shining margins; mandibles long, the apical margin with three short teeth, the inner margin with a low angular projection; labrum with a small red sub-apical tubercle, and its lateral apical corners acutely pointed; flagellum obscurely reddish beneath; hind ocelli much nearer to each other than either is to the occipital margin; mesothorax and scutellum shining, but very closely punctured; area of metathorax dullish, depressed in middle; tegulae dark rufous; wings dilute brownish, nervures piceous; legs black, with pale hair, the tarsi reddish apically; abdomen closely punctured, second and third segments with a deep transverse depression; sides of first abdominal segment with conspicuous white hair; hind margins of second and third segments with dense bands of pale yellowish hair, failing in middle, becoming white at sides; extreme basal margins of third and fourth segments with an ochreous line; fourth segment entirely without hair bands or spots; fifth and sixth segments, except at sides, covered with pale yellow tomentum (between dilute orange and ochreous); ventral scopa white, on the last segment fuscous-tinged.

♂. Length about 9 mm.; hair of face entirely white; anterior coxae with tubercles in place of spines; tarsi dark red, the anterior ones simple; tegulae rufopiceous; bands on second and third abdominal segments broadly interrupted in middle, and with very little yellowish; pale yellow apical hair-patch including fifth segment and a broad apical band on fourth (except at sides), and the base of sixth; sixth segment rather obtusely bidentate, the teeth broad-triangular; no apical ventral spine.

Female (type) from Windsor, Victoria (*French*; *Froggatt* coll., 198); male from Victoria (*French*; *Froggatt* coll., 50). Allied to *M. tomentella*, Ckll. (male), but differing by the dusky wings and conspicuous hair-bands. The female may be compared with *M. heriadiformis*, Sm., but it has no bands on the fourth abdominal segment. The species is also somewhat allied to *M. trichognatha*, Ckll.

Megachile hackeri, sp. n.

I had identified this as *M. apicata*, Sm., but comparison with the genuine *apicata*, from Victoria, shows it to be quite distinct.

♀. Length, 8½ mm.; similar to *apicata*, but the three clypeal teeth very low and widely spaced; flagellum dark (bright red beneath

in *apicata*); mesothorax anteriorly without any traces of hair-spots; bases of abdominal segments not broadly pilose; sixth segment entirely red.

♂. Length about 7 mm.; differs from *apicata* by the dark mandibles (orange with dark base and apex in *apicata*); dark flagellum (in *apicata* light red beneath except at apex); apex of abdomen (sixth segment, not the morphological apex) with a pair of small tubercles or obtuse teeth (shallowly emarginate in middle, with about four sharp irregularly placed teeth on each side in *apicata*). In both the anterior tarsi are simple and their coxæ unarmed.

The female (type) of *M. hackeri* is from Kelvin Grove, Brisbane, Queensland, November 6th, 1911 (*H. Hacker*; Queensland Museum, 18). The male (Queensland Museum, 44) has the same data.

Megachile apicata, Smith.

♀. Windsor, Victoria (*French*; Froggatt coll., 200). ♂. Gippsland, Victoria, 1910 (*Froggatt*, 146).

The male is new; its characters are indicated above in comparison with *M. hackeri*.

Megachile victoriae, sp. n.

♂. Length about $7\frac{1}{2}$ mm.; black, with scanty white hair on most parts of body; face and lower parts of cheeks with abundant pure white hair; eyes green; head nearly circular, facial quadrangle much longer than broad; mandibles black, with a tuft of pale yellow hair on inner apical corner; clypeus and front very densely punctured; distance between hind ocelli less than from either one to occipital margin; antennæ long and slender, the flagellum very obscurely brownish beneath; mesothorax and scutellum very densely punctured, but margins of punctures shining; a little tuft of dull white hair at each hind corner of mesothorax; tegulæ piceous; wings hyaline, the rather well-developed stigma and the nervures rufo-fuscous; legs black, the tarsi reddened apically; anterior coxæ unarmed and anterior tarsi quite simple; abdomen shining, strongly punctured, the hind margins of the segments narrowly rufous; rudiments of white hair-bands at sides of first three segments; no apical hair-patch; sixth segment depressed above, the projecting part obtusely bilobate, emarginate.

Victoria, 1900 (*French*; Froggatt coll., 63). A rather insignificant little species, resembling *M. austeni*, Ckll., but much smaller, and without black hair on head and thorax.

Megachile henrici, Ckll.—Melbourne, Victoria (*Froggatt* and *French*).

M. erythropyga, Sm., ♂.—Melbourne, Victoria, January 20th, 1900 (*French*); Windsor, Victoria (*French*; Froggatt coll., 199).

M. chrysopyga, Sm.—Melbourne, Victoria (*Froggatt*); Bayswater, Victoria (*French*); Bendiga, Victoria, November 23rd, 1892 (*Froggatt*).

M. lucidiventris, Sm.—Windsor, Victoria (*French*).

M. macularis, D. T.—Nagambie, Victoria (*French*); Warialda, N.S.W., March 29th (*Froggatt*).

M. semiluctuosa, Sm.—Wimmera, Victoria (*Froggatt*); Rutherglen, Victoria (*French*).

M. latipes, Sm. — Rutherglen, Victoria (*French*); South Australia (*Lea*, 10710; *Froggatt* coll., 209).

M. oculipes, Ckll. (possibly = male of *aurifrons*, Sm.).—Warialda, N.S.W., March 29th, 1901 (*Froggatt*).

M. serricauda, Ckll.—Manilla, N.S.W., male bred from nest (cell of the usual form, 12 mm. long and 6 wide), January 20th, 1902 (*Froggatt*, 162). Larger than the type (length about 10 mm.), with reddish eyes, but otherwise the same. Another male, from Nagambie, Victoria, 1909 (*French*) is 10 mm. long, and has green eyes.

NOTES AND OBSERVATIONS.

SOCIETY FOR THE PROMOTION OF NATURE RESERVES.—We have received the prospectus and appeal of the Society for the Promotion of Nature Reserves, and an extremely interesting document it is for naturalists in general and entomologists in particular. The objects of the Society are to collect and collate information as to areas of land in the United Kingdom which retain their primitive conditions, and contain rare and local species; to prepare a scheme showing which such areas should be secured and handed over to the National Trust, and thus safeguarded as national possessions against encroachment and destruction. Meanwhile, agreeing that one of the first results of success in this direction will be "to encourage the love of Nature study, and to educate public opinion to a better knowledge of the value of nature study," we may confidently look forward also to the exercise of more practical means than we have at present to rescue the rarer insects of the British fauna from extinction. And that the entomological aspect of the Nature Reserve will be carefully considered goes without saying, for among the many distinguished scientists comprising the committee we read the names of Professor E. B. Poulton, F.R.S., the Hon. N. C. Rothschild, Mr. E. G. B. Meade-Waldo, and Mr. W. H. St. Quintin. On the Continent not a few Governments have already done good work for the cause of natural history by enclosing favourable areas, and submitting them to an intelligent system of guardianship; the wholesale exportation of local lepidoptera and plants has been checked; and private owners have supplemented official effort by putting suitable land under Government control. A beginning has been made in England with Blakeney, a part of Wicken Fen, and the "Ruskin Reserve," near Oxford. But much more remains, and, as Dr. Chalmers Mitchell well put it in his address to the Zoological Section of the British Association at Dundee last year, it is only by the deliberate and conscious interference of man that the evil wrought by man in this respect has been, and can be in the future, arrested. The present

headquarters of the Society is in the Natural History Museum, Cromwell Road, London, S.W., and the hon. secretaries, Mr. Ogilvie Grant and the Hon. F. R. Henley, will be glad to communicate particulars to those interested or willing to join as members without subscription.—H. R.-B.

THE ENTOMOLOGICAL SOCIETY OF WASHINGTON.—On April 3rd Dr. David Sharp, Lawnside, Brockenhurst, Hants, England, and Dr. J. H. Fabre, Serignan, Vaucluse, France, were chosen as the first two honorary members of the Entomological Society of Washington. The Entomological Society of Washington has ten honorary members to be chosen from among foreign entomologists.

PROTOZOAN PARASITES OF ICHNEUMONIDÆ.—I have recently named Ichneumonidæ containing these parasites, and the following communication has been most kindly placed in my hands for publication.—CLAUDE MORLEY.

It is of interest to note that certain parasitic Ichneumons may themselves harbour Protozoan parasites. During the researches of Drs. H. B. Fantham and Annie Porter on the Protozoa of *Hymenoptera*, they discovered two parasitic Protozoa in *Stenichneumon trilineatus*, the common destroyer of the gooseberry moth, *Abraxas grossulariata*. The first parasite, found in the alimentary canal and fat body, is a very small sporozoön belonging to the *Microsporidia*, and closely allied to the pathogenic agent of the Isle of Wight Bee Disease, also discovered by these authors. The organism belongs to the genus *Nosema*. It forms small, oval, shining spores, about one-thousandth of the size of a rice grain. Each spore contains an amœbula which creeps out from the spore-coat and enters the cells lining the alimentary tract or the fat body, where it multiplies by repeated division. Each of the daughter forms thus produced ultimately secretes a coat for itself and becomes a spore. The spores serve for the infection of other Ichneumonids. This new Microsporidian is named *Nosema ichneumonis*.

The second protozoön is a Flagellate belonging to the genus *Herpetomonas*, and named *Herpetomonas ichneumonis*. The organism is found in the alimentary canal, where it undergoes three phases of development. It is first a small ovoid body, possessing a large and a small nucleus, and resembling the Leishman-Donovan body, the pathogenic agent of the Indian disease, Kala-azar. This form is known as the pre-flagellate stage. As it grows in the mid-gut of the Ichneumon, the body elongates and forms a long flagellum, so that the organism now has a vermiform or snake-like body with a single flagellum at one end. The flagellum executes vigorous lashing movements, and the organism as a whole moves in jerks. As it reaches the hind-gut, where the contents are more concentrated, the parasite absorbs its flagellum, becomes oval again, and forms a thickened wall or coat around itself. Thus encystment occurs. The cysts or post-flagellate stages pass from the insect's body in the fæces, and are well adapted for extra-corporeal life until they are ingested by a new Ichneumon, when the cycle commences again.

IS *TINEA PALLESCEMELLA* GRANIVOROUS?—When Stainton in 1851 described *Tinea pallescentella* (Sup. Cat. p. 2) from a specimen

sent to him by Gregson, he hazarded no opinion as to the food of its larva, but in his further reference to the species in 1857 he says "larva granivorous" (Ent. Ann. 1857, p. 122). Gregson, in 1856, had described a species that he had reared from "rubbish-sweepings" from the Liverpool Dock warehouses under the name of *Tinea nigri-foldella* (Zool. p. 5295); but this we now know to be synonymous with *T. pallidescitella*. Eales reared the species freely from a dead and desiccated cat (Ent. Mo. Mag. vol. viii. p. 209). Merrin tells us that the larva is found in hare, rabbit, and cat skins, and that the moth frequents poulterers' shops (Lep. Cat. ed. 2, pp. 55, 133, &c.). R. C. R. Jordan records that the only time he found the moth plentiful was in a hairdresser's room (Ent. Mo. Mag. vol. xxv. p. 212). I have myself reared it from larvæ feeding in bags of hares' hair, and frequently taken the moth in my house. Of what Gregson's "rubbish-sweepings" consisted it is now impossible to say, nor do we know whether Stainton had any information regarding the habits of the larva beyond what it may be assumed Gregson supplied; but it will be noted that the recent definite records all give the larva as feeding on animal products, and the situations where the imago has most frequently been met with of late seem to point in the same direction. Perhaps some other entomologists may have had different experiences; may even have reared the species from grain or other vegetable substance. If this should be the case, and they would publish their experiences, they would be throwing light on the economy of a species that might in certain circumstances be exceedingly useful.—ROBERT ADKIN; Lewisham, March, 1913.

CÆNONYMPHA TIPHON IN NORTH WALES.—I was not aware of the supposed rarity of this insect in North Wales until reading Mr. J. Arkle's interesting paper in the 'Entomologist' for March (*ante*, p. 91), but I may say that in July, 1906, I saw it several times, and took more than one specimen to make sure of identification, on the moors above the north-west end of Bala Lake, in Merionethshire, where it did not appear to be very uncommon. I think it was met with on more than one of the moors thereabouts, and that I also saw it in the previous year, but one exact locality is a low, flat, and boggy bit of ground on the lower slopes of Arenig Fawr, known as "The Lordship," a mile or two above Sir Williams Watkin Wynn's seat at Glan Llyn. This cannot be very far, as the crow flies, from Mr. Arkle's station, but the new locality may be worth putting on record. In reference to the concluding remark in his paper, I may add that *C. pamphilus* likewise occurs on these Bala moors, usually in profusion, and in pretty close proximity to its larger congener. I have also taken the two species together on several of the Northumberland and Berwickshire moors.—GEORGE BOLAM.

A SPRING MIGRATION OF PYRAMEIS CARDUI ON THE MEDITERRANEAN.—The first appearance of *Pyrameis cardui* in this country in a season in which it is abundant has been repeatedly noticed, and it seems to be always the same. One day in early summer an absolute absence of the species on the southern coast: the next day a more or less numerous swarm of specimens on the same ground, showing evident signs by their condition of having flown long distances; then

after another day or two the specimens all disappear. I have never, however, until this year seen a migration in southern latitudes, and was thus much interested to meet such an undoubted one in the South of France a few days ago. I was staying at Mentone during the last few days of March. On the 27th, 28th, and 29th the weather was perfect, with bright sun and without wind. During these days not a specimen of *P. cardui* was to be seen; on March 30th there was bright sun, with a very strong wind from the south-east, and the next day *P. cardui* was in numbers everywhere, the specimens in good condition, but considerably faded in colour. On April 1st there was an absence of sun, and on the 2nd, when the sun broke out, the *P. cardui* were all gone. In the event of the species appearing further north, it would be most interesting to have reports of their progress, with dates, if possible, of their first appearance in this country.—W. G. SHELDON; April 11th, 1913.

EUCOSMIA UNULATA IN CUMBERLAND.—In regard to Mr. James Murray's note on *E. undulata* in the April number of the 'Entomologist' (*ante*, p. 140), I took a specimen for the first time on Hayton Moss on July 15th, 1912. The insect was flying at dusk, and is in fair condition. It is undoubtedly rare in the county of Cumberland.—GEORGE B. ROUTLEDGE; Tarn Lodge, Headsnook, Carlisle, April 3rd, 1913.

EUPÆCILIA UDANA.—I am thankful to Mr. Thurnall for his remarks about this species (Entom. xliii. 350). Following his hints, I collected last autumn a bundle of the stems of *Alisma plantago*, though without looking to see if there was anything in them, and, having kept them in a warm greenhouse instead of in the open, I have been rewarded by the emergence (1) of several ichneumons, and (2), to-day, of a charming specimen of *udana*, I hope the first of several.—(Rev.) W. CLAXTON; Navestock, Romford, April 5th, 1913.

"HYBERNATION" OF PYRAMEIS ATALANTA.—As there have been some notes in the 'Entomologist' *re* the above subject, perhaps it may interest some readers to know that during the winter 1912-13 I kept alive until late January a specimen of *P. atalanta*, which emerged from a pupa taken in August, near Sutton Coldfield, by a friend of mine, Miss E. Twilton. About January 28th the insect accidentally met its death, much to my regret. I fed it on honey and water twice a week, which food it seemed to appreciate. The butterfly was kept in a good-sized box with a glass top, in a cold bedroom where it had no artificial heat, but a little sunshine at times.—ERIC BIDDLE; "Selborne," Western Road, Wylde Green, Birmingham.

[The above note is interesting, not that it in any way lends support to the opinion that *P. atalanta* is a hibernating species, quite the contrary, but because it confirms previous records of this butterfly being kept alive during the winter months in this country. Mr. Newman conclusively proved this fact in 1909-10 when he confined seven specimens, kept them in a temperature that never fell below 35°, and provided moistened cane-sugar for their sustenance (Entom. xliv. 99). As some of the butterflies under his observation lived for eight or nine months, we have evidence of the longevity of autumnal

imagines of the species. However, as all the butterflies were active throughout the winter, the term hibernating in its true sense would not apply to them. What we now want are some experiments to test the vitality of *P. atalanta* under circumstances as nearly identical as possible with those the butterfly would have to endure in a state of freedom in the warmer parts of Britain during the winter months.—ED.]

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*Wednesday, February 5th, 1913.*—Mr. G. T. Bethune-Baker, F.L.S., F.Z.S., President, in the chair.—The President announced that he had nominated as Vice-Presidents for the ensuing session the Rev. F. D. Morice, M.A., and Messrs. J. E. Collin and J. H. Durrant.—Mr. A. E. Gibbs exhibited a number of insects, principally Syntomid moths, from British Honduras.—Mr. Donisthorpe, males and workers of *Formica fusca* var. *picea*, Nyl., from the New Forest, and a female from Belgium, and pointed out that it was standing in the British lists as *gagates*, Latr. He gave a history of var. *picea* as British, and exhibited workers and a female of the true *F. fusca*, subsp. *gagates*, Latr., from Vienna, and pointed out that *gagates* has not occurred in Britain.—Mr. A. J. Richards, who was present as a visitor, several very scarce Coleoptera, chiefly from Hindhead.—Mr. W. A. Lamborn, cocoons of *Deilemera antinorii*, Oberth., from the Lagos district, together with the moths that emerged from them.—Mr. J. A. de Gaye, F.L.S., who was present as a visitor, five males and eight females of *Gonometa subfacia*, Walker, which came from Lagos, S. Nigeria. Mr. de Gaye explained how the males were captured while they were trying to get into the breeding-cage in which were two newly-hatched females. Prof. Poulton observed that Dr. Lamborn's previous experiences had made it almost certain that in spite of the great difference in size and appearance these insects were the male and female of the same species, but that Mr. de Gaye's experience had now placed the matter beyond doubt.—Prof. Poulton, a *leighi* female of *Papilio dardanus*, Brown, together with one *trophonius*—two members of a family bred by Mr. G. F. Leigh, from a female parent of the latter form. He also exhibited two further sets of parent and offspring of synepigonic *Pseudaeræas* of the *Eurytus*, L., group, bred by Dr. G. D. H. Carpenter on *Bugalla*, in the Sesse Archipelago.—Mr. B. Harold Smith, thirty-five specimens of *Phryxus livornica*, taken at light in South Cornwall during the last half of May, 1912.—Mr. A. Bacot, a probable gynandromorph of *A. virgularia*, having the right wings melanic, the left wings of normal grey coloration.—Mr. N. D. Riley, on behalf of M. André Avinoff, a collection of Rhopalocera, made on a journey in the Western Himalayas. M. Avinoff, who was present as a visitor, gave an account of his expedition.—The following paper was read by Commander Walker:—"Trichogramma, Westw., probably Synonymous with *Pentarthron*, Riley (Hymenoptera)." By R. C. L. Perkins, M.A., D.Sc., F.Z.S.

Wednesday, March 5th, 1913.—Mr. G. T. Bethune-Baker, F.L.S., F.Z.S., President, in the chair.—The following were elected Fellows

of the Society:—Miss Blanche A. Coney, The Poplars, Pueklechurch, Glos.; Messrs. Lachlan Gibb, 38, Blackheath Park, Blackheath, S.E.; Gerald F. Hill, Govt. Entomologist, Northern Territory, South Australia, Port Darwin, N.T.S.A.; Lowell Mason, 22 and 23, Club Arcade, Durban, Natal. It was announced that the Council had nominated Messrs. J. H. Durrant, L. B. Prout, and C. O. Waterhouse, to act as the representatives of the Society on the National Committee on Nomenclature. The Council also recommended the appointment of a permanent Nomenclature Committee for the Society itself, and suggested that it should consist of the three representatives of the Society on the National Committee, the British representative on the International Committee, the Secretary of the Society, and two elected members; the Council also proposed the names of Mr. G. T. Bethune-Baker and Dr. K. Jordan as the elected members. No alternative was suggested, and the recommendations of the Council were unanimously adopted. The present Committee of the Society therefore consists of the following Fellows:—Messrs. G. T. Bethune-Baker, J. H. Durrant, C. J. Gahan, Dr. K. Jordan, Messrs. L. B. Prout, C. O. Waterhouse, and the Rev. G. Wheeler.—The Hon. N. Charles Rothschild brought before the notice of the meeting a recently formed society—the Society for the Promotion of Nature Reserves, and briefly outlined its objects.—Mr. J. E. Collin, on behalf of Lt.-Col. C. G. Nurse, three specimens of a peculiar insect which Mr. G. C. Champion had identified as a species of *Myiodites*, a heteromerous Coleopteron, captured by Col. Nurse at Quetta (India) in 1902.—Mr. O. E. Janson, specimens of a curious form of staphylinid beetle from South Brazil, apparently the *Ecitomorpha arachnoides*, Wassm.—Mr. L. B. Prout, a series of *Larentia citrata*, L., from Iceland.—Dr. K. Jordan, a species of *Eurytoma*, an almond-feeding Chalcid, together with its live chrysalis, which he had received from Cyprus, where the species does extensive damage in the almond plantations.—Mr. R. Adkin, specimens of *T. pallescens* that he had reared in January last from larvæ found feeding in a bale of hare's hair received from Brandon, Suffolk, in the previous November.—Prof. Poulton, examples of specimens belonging to various distasteful lepidopterous groups, exhibiting "disabling injuries."

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—February 26th, 1913.—Mr. A. E. Tonge, F.E.S., President, in the chair.—Mr. A. E. Gibbs exhibited butterflies collected in the Balkans in 1912, including *Pieris manni*, *P. ergane*, *Anthocharis belia*, *Pontia daplidice*, *Leptosia sinapis*, *Colias edusa*, and *C. hyale*, and aberrant forms of each species.—Mr. Colthrup, a specimen of *Vanessa io*, found hibernating in a room in Dulwich.—Mr. Tonge, a specimen of *Sphinx ligustri*, in which the pink coloration was replaced by white.—Mr. Turner, an aberration of *Melitæa didyma*, in which the black markings were for the most part of a pale slate colour, and various forms of the female of this species.—Mr. Frohawk, a bred series of *Lampides bæticus* of unusually large size. The larvæ fed upon green peas. He also showed drawings of the protective resting positions of various species of Lepidoptera.

March 13th, 1913.—Mr. A. E. Tonge, F.E.S., President, in the chair.—Mr. A. E. Gibbs, of St. Albans, Mr. Geo. Brooks and Mr. Gilbert Storey, of the British Museum (Nat. Hist.), were elected members.—Mr. Tonge exhibited living larvæ of *Epunda lichenea* and of *Aplecta occulta*.—Mr. Colthrup, some excellent photographs of well-known collecting localities, and of the resting positions of various species of the genera *Tephrosia* and *Boarmiia* showing protective resemblance.—Mr. C. B. Williams, larvæ of the Snakefly, *Raphidia notata*, which has occurred not uncommonly in pine stumps at Oxshott. It fed readily on aphides.—Mr. Platt Barrett, specimens of the true *Thera variata* from the New Forest, where the larvæ occurred on spruce.—Mr. Gough, a blackbird's egg having the markings massed at the larger end.—Mr. Brooks, the larva of *Geotrupes stereorarius* found under a rubbish heap.—Mr. A. E. Gibbs, the Satyrids and Hesperids taken by him in his trip to the Balkans in 1912, and contributed notes on the occurrence and variation of the various species.—Mr. R. Adkin, a series of *Tinea pallescentella*, and read a short paper on its history as a British species, and discussed his experience in rearing it.

March 27th.—The President in the chair.—Mr. B. H. Smith gave two specimens of *Phryxus livornica* to the Society's collection.—Mr. R. Adkin exhibited several specimens of *Crymodes exulis* from Shetland and from Inverness to show the characteristics of the two races.—Mr. A. E. Gibbs, a number of Nymphalids, especially of the genera *Argynnis* and *Melitæa*, taken by him in the Balkans in the summer of 1912, including *Dryas pandora*, *Argynnis adippe* ab. *cleodoxa*, *Issoria lathonia*, *B. hecate*, *Chrysophanus alciphron*, *Melitæa trivialis*, *M. athalia* var. *mchadensis* and ab. *navarina*, *Libythea celtis*, *Neptis lucilla*, *Polygonia egea*, &c.—Mr. J. Platt Barrett, a number of species of Sicilian butterflies, including *Melanargia japygia*, *M. pherusa* and var. *plesaura*, *M. galathea* and vars. *lucasi*, *procida* and *syracusana*, and discussed other allied forms; he also showed a series of *Euchloë damone*.—Mr. W. J. Kaye exhibited the pupa of *Lycæna arion* found by Mr. Percy Richards in 1908 in an ant's nest in a frail cocoon.—Mr. F. W. Frohawk a form of *Euchloë cardamines*, in which the discoidal spots of the fore wings were considerably within the orange apical area.—Hy. J. TURNER, *Hon. Rep. Secretary*.

THE MANCHESTER ENTOMOLOGICAL SOCIETY.—February 5th, 1913.—The evening was occupied by a number of small exhibits.—Mr. B. H. Crabtree showed a melanic form of *Acidalia virgularia* from London, and also the type; he showed also three specimens of *Lycæna astrarache* var. *artaxerxes* from Aberdeen, which were largely without the white spots underneath.—Mr. R. Tait, Jun., showed a long series of *Agrotis ashworthii*—the pick of a number of years' collecting. He mentioned that on January 4th, at Penmaenmawr, he found two larvæ of *Agrotis strigula*, and traces showing that they had recently been feeding; frozen snow was on the ground.—Mr. W. Mansbridge exhibited male, female, and case of *Epichnopteryx pulla* from Penmaenmawr and Delamere.—Mr. J. Mangan showed living newly-emerged examples of *Ptinus tectus* from almonds. He remarked that this injurious beetle was establish-

ing itself in Britain. Living larvæ of a species of *Telephorus* from Fallowfield, Manchester. Living larvæ of a *Simulium* taken from a brook at Gatley, Cheshire, in January, 1913. Living larvæ of *Phalacroceræ replicata* (an aquatic Tipulid) found in moss at Prinseall, Chorley, Lancashire.—Mr. J. H. Watson showed *Attacus lorquini* from the Philippines, and *Coscinocera hercules* from N. Australia; also preserved larvæ living under protective cases of *Cicinnus despectris* and *Oiketicus kirbyi*, from Buenos Ayres, early in 1912.—Mr. A. W. Boyd exhibited sundry Micro-lepidoptera from Platt Fields and Boggart Hole Clough, two of the Manchester public parks, which included *Scardia cloacella*, *Tinea fulvimitrella*, *Dasycera sulphurella*, *Stigmonota regiana*, *Laverna atra*, *Hedya neglectana*, *Prays curtisellus*, *Argyresthia pygmacella*, &c. He also showed short series of *Mesoleuca bicolorata*, *Lomaspilis marginata*, *Asthenes luteata*, *Euchæa oblitterata*, *Nola cucullatella* and *Cilix glaucata* from various Cheshire localities, and *Perizoma blandiata* from Cumberland.—Mr. A. E. Salmon showed a female *Sirex gigas* from a Barrow works, and a piece of lead (7 mm. thick) through which it had made its way; previous to boring through the lead it had bored through a board. He quoted various records of this insect's boring powers.—A. W. BOYD, M.A., *Hon. Sec.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Meeting held at the Royal Institution, Colquhoun St., Liverpool, March 17th, 1913, Mr. F. N. Pierce, President, in the chair.—Professor Robert Newstead, F.R.S., M.Sc., of the Liverpool School of Tropical Medicine, delivered a lecture entitled "The Bionomics and Morphology of some Bloodsucking Flies." Mr. Newstead dealt in his usual lucid and thorough manner with the life cycle of representative species of the genus *Glossina*, or tsetse flies, which convey sleeping sickness to man and "ngana" to cattle, the species incriminated being *Glossina morsitans* and *G. palpalis*. The lecturer also described *Stomoxys calcitrans*, a world-wide species and a common stable fly in Great Britain, which is strongly suspected of being concerned in the transmission of trypanosomes. A very interesting life-history was that of *Simulium*, whose larvæ live in rapidly running, shallow streams; and, lastly, the minute midge, *Phlebotomus papatasi*, Fam. Psychodidæ, found commonly on the Mediterranean littoral and elsewhere in subtropical and tropical countries, which carries the "three days" fever from sick to healthy persons, was described. Mr. Newstead, having visited many different parts of the world to investigate the life cycles of these insects, and having himself discovered many important facts concerning them, he was able to give a vividness to his remarks that no mere book knowledge could have done. The lecture was illustrated by blackboard drawings and microscope preparations showing the structure and anatomical details of the insects mentioned above. Further exhibits by Mr. Newstead were two specimens of *Glossina severini*, Newst., a new species recently recognized from the Congo Free State, and a specimen of the very rare *G. fuscipleuris*, Austen; also a wasp, *Bembex forcipata*, that had only recently been found to store its larva cells with the tsetse fly; this exhibit comprised nine

flies from a single cell together with the wasp. The university collection of bloodsucking flies was also on view, containing practically all the known species and many types.—Mr. F. N. Pierce exhibited the genus *Acidalia* as at present arranged, and also as it falls into two distinct groups when classified according to the genitalia.—Mr. C. E. Stott sent for exhibition a specimen of *Thyreocoris scaraboides*, a chalk hemipteron picked up on the shore at Blackpool.—WM. MANSBRIDGE, *Hon. Sec.*

RECENT LITERATURE.

Catalogue of the Lepidoptera Phalænæ in the British Museum.
Vol. xii. By Sir GEORGE F. HAMPSON, Bart. Pp. i.—xiii. and
1–626. London: Printed by Order of the Trustees. 1913.

THIS volume, the 12th of the Phalænæ, and the 9th dealing with the Family Noctuidæ, treats of a portion of the Catocalinæ. The remaining species of this Subfamily and those belonging to the Subfamilies Mominæ and Phytomatrinæ will form the subject-matter of volume 13. Classification of the Subfamily Noctuinæ will be commenced in volume 14.

Sixty-three genera (15 new) and six hundred and forty-three species (71 new) are entered, and fully described, in the present volume.

The six genera noted below have over thirty species each, and collectively they embrace rather more than half of the entire number of species considered—*Catocala*, Schrank (86 species), *Parallelia*, Hübn. (85 species), *Ephestia*, Hübn. (63 species), *Achæa*, Hübn. (50 species), *Anua*, Walk. (46 species), *Catabapta*, Hult (31 species).

Roughly estimated, over two hundred species have hitherto been referred to the genus *Catocala* of authors, but, as indicated above, only eighty-six are here retained in *Catocala*, Schrank; the largest number being allocated to other genera as follows:—*Catabapta*, Hult (*t. antinympha*, Drury), 31 species. *Mormonia*, Hübn. (*t. epione*, Drury), 16 species. *Ephesia*, Hübn. (*t. fulminea*, Scop.) 64 species.

Marula, Walk. (*t. unstrigata*, Guen.) and *Pyramarista*, Kirby (*t. rufescens*, Kirby) are merged in *Eumonodia*, Walk. (*t. pudens*, Walk.); whilst *Spirama*, Guen. (*t. suffumosa*, Guen. = *retorta*, Cram. nec Linn.), and *Hypopyra*, Guen. (*t. triloba*, Guen.) are sunk in *Speiredonia*, Hübn. (*t. retorta*, Linn.).

Only thirteen species are retained in *Ophisma*, Guen. (*t. gravata*, Guen.), a number of species placed in *Ophisma* by Guenée, Walker, and others being referred to *Achæa*, Hübn. (*t. melicerta*, Drury).

The majority of the species here assigned to the genus *Parallelia*, Hübn. (*t. bistriaris*, Hübn.) were originally described in *Ophiusa*.

Minucia, Moore (1884), replaces *Ophiodes*, Guen. (1841), as the latter name is preoccupied in Reptilia. Only two species are included in this genus—*lunaris*, Schiff., the type, and *wiskotti*, Päng.

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PHI

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[No. 601

A NEW GALL-INHABITING EULOPHID GENUS FROM QUEENSLAND, AUSTRALIA.

By A. A. GIRAULT.

HYMENOPTERA CHALCIDOIDEA.

Family EULOPHIDÆ.

Subfamily ELACHERTINÆ.

Tribe ELACHERTINI.

ZAGRAMMOSOMOIDES, new genus.

Female.—With all of the characters of its subfamily and tribe as defined by Ashmead in 1904.

Allied with and resembling *Zagrammosoma*, Ashmead, but more robust, the wings hyaline, the head not thin, not wider than long but triangular, the scutellum with four longitudinal grooved lines, the antennæ ten-jointed with two-ring joints, the abdomen transversely banded. Separated from the other genera in bearing an additional ring-joint in the antennæ, the longitudinal thoracic grooves and in cephalic characters. The thorax is noteworthy because of the very long scutum, which is twice the length of the scutellum, the latter bearing two longitudinal grooved lines along each side. Mesonotum without a median groove. The abdomen is stout, sessile, ovate, subequal in length to the head and thorax combined, the ovipositor not exerted. The fore wings are large, with a short marginal fringe and normal discal ciliation, the postmarginal vein only slightly developed but distinct, the stigmal vein two and a half times longer, the marginal longer than the submarginal. The antenna has a well-defined club which is ovate and three-jointed, the three funicle joints are each much smaller than the pedicel and subquadrate; scape long and stout. The pronotum lengthens considerably on each side. Genal sulcus long and distinct. Antennæ inserted on a line with the ventral ends of the eyes. Metathoracic spiracle oval, moderate in size. Propodeum with a short, slight, median carina, but with no others. Mandibles three-dentate, the two outer teeth acute.

Male.—The same, but the pedicel is a little longer, the club shorter, the abdomen shorter and depressed (in death), the same, or nearly, but in life a little less acute at the apex.

Type.—The following species.

ENTOM.—JUNE, 1913.

1. *Zagrammosomoides fasciatus*, sp. n. (normal position).

Female.—Length about from 2–2.50 mm. General colour flavous, the eyes red, the wings hyaline, the appendages and venation concolorous. Conspicuously marked with black as follows: in the dorsal aspect the abdomen is banded across the posterior margins of the segments commencing at base, there being six transverse stripes which lengthen (widen) distad, or else the middle ones are broader.* The propodeum is black; also the pronotum cephalad in the dorsal aspect on each side of the median line, appearing like two large cuneate spots; a large ovate spot in the centre of the mesoscutellum, an ovate spot on each side of (not upon) the scutum, in the cephalic angle of each axilla, and a smaller spot at the caudo-lateral angle of the pronotum. Cephalad in the disk, the scutum is distinctly stained except along the median line; each parapside is similarly stained, and also the vertex may be so, here the stained area projecting into the face (cephalic aspect) like wedges on each side. The ocelli are in a nearly straight line across the vertex. The antennæ are suffused with dusky, as are also the femora of the legs, more or less. The proximal club-joint is nearly half as long as the entire club. Whole body finely, polygonally reticulated, the vertex and face with more or less obscure umbilicate punctures. (From many specimens, $\frac{2}{3}$ -inch objective, 1-inch optic, Bausch and Lomb.)

Male.—Somewhat smaller; the same, but the dark areas on the cephalic part of the scutum usually black and nearly coalesced; the abdomen bears only five transverse stripes which lengthen (become thicker) caudad, the second concaved at the meson, the fifth twice longer than the fourth, none of the distal four stripes with parallel margins. (From numerous specimens, similarly magnified.)

Described at first from ten males and sixty-two females reared from a single globular green gall from the foliage of bloodwood gum (forest), Nelson, North Queensland. The gall measured 1.2 cm. diameter, and was blushed with pink. It was obtained on August 22nd, 1912. When cut into halves the naked pupæ of this eulophid were exposed, arranged in a flat layer circularly disposed about a common line-like centre. Emergence commenced on August 23rd, and became general three days later, when the whole periphery of the gall became punctured with the minute exit-holes, as though it had been used some time for a pin-cushion. When approaching full development the white pupæ first show the black markings, the yellow appearing last.

Subsequently reared in enormous numbers from similar galls measuring 1.6 cm., the first two weeks in September.

Habitat.—Australia: Nelson (Cairns), Queensland.

Types.—No. Hy/1169, Queensland Museum, Brisbane; two males, two females, mounted on card points, two pins.

This eulophid *appears* to be a true gall-making species.

* The penultimate stripe prolonged caudad at meson, the ultimate thin, the first concaved along the cephalic margin. There is some variation in these stripes.

A NEW MOSQUITO FROM NORTHERN CHINA.

BY FRED. V. THEOBALD, M.A., F.E.S., &c.

A SMALL collection of Culicidæ sent me by Dr. Brouquet, of Tien-Tsin, contained a long series of *Myzorhynchus sinensis*, Wiedemann, showing considerable variation in size, but most constant in markings; a single female of *Culex biroï*, Theobald; and a female of *C. pseudoinfula*, Theob., and an undescribed species, which I have called *Grabhamia broquetii*. They were all taken in the Arsenal de l'Est, Tet-chili, North China.

Culex pseudoinfula, Theob., I described from Pasuruan, Java and Samarang; the type is in the Amsterdam Museum.

Grabhamia broquetii, nov. sp.

Head pale golden, brownish at the sides. Proboscis pale golden, black at the apex and base; palpi dark, mottled with pale golden scales; clypeus black. Thorax pale golden, with a median rich chestnut-brown line and a similar coloured area in front of the wings at the sides. Abdomen mostly white scaled, but with four pairs of black quadrangular marks, decreasing in size from the base apically. Legs golden yellow, with black tarsi, with narrow apical and basal creamy bands, last hind tarsal creamy white, last tarsal of fore and mid legs clay coloured. Wings with mottled scales, the first, third, and fifth veins black scaled and the branches of the fourth mostly dark scaled.

♀. Head dark brown, clothed with rather long pale golden to almost creamy narrow-curved scales in the middle, flat rich golden ones at the sides and a small area in front, between the flat and narrow-curved scales, of very small rich golden scales; upright forked scales on mid head pale creamy yellow, a patch of black ones on each side, giving the general brown lateral appearance when viewed with a lens; a tuft of long pale scales projecting forwards between the eyes: chætæ golden in the middle, darkened laterally; eyes coppery red to black.

Antennæ brown; basal segment and second paler, the former with many flat creamy scales; hairs brown. Clypeus dark. Proboscis golden scaled, dark at the apex and base, somewhat mottled. Palpi golden yellow, mottled with black scales, apex pale creamy yellow, chætæ dark.

Thorax dark brown, shiny, clothed with pale golden narrow-curved scales, becoming paler behind, and with a moderate sized median line of rich reddish to chestnut-brown scales, and a similar coloured area in front before the wings; chætæ brown and pale golden. Scutellum pale brown, with narrow-curved pallid scales and brown and golden posterior border bristles, which are numerous on the mid-lobe; metanotum pale brown. Pleuræ densely clothed with flat white scales.

Abdomen densely clothed with flat white scales, the second, third, fourth, and fifth segments with a pair of black scaled areas, roughly quadrangular in outline; a few scattered black scales on the last two

segments; basal segment white scaled; hairs pallid; venter entirely white scaled.

Legs pale golden (in one specimen almost creamy), a few scattered dark scales on the femora; the tarsi dark scaled with narrow apical and basal pale bands, metatarsi all pale scaled; last fore and mid tarsal segments appearing pale, but there are traces of dark apical scales; last hind tarsal white; claws dark, all unserrated; chætæ brown and golden brown; one specimen shows a few scattered dark scales on the tibiæ and apex of the metatarsi.

Wings with creamy and dark scales; the first long vein with flat dark scales, with a few scattered pale ones, the second pale scaled, with long lateral vein-scales, some slightly dusky; third with flat black median scales and scanty, dusky, long, lateral vein-scales; fourth pale scaled, with long lateral vein-scales, except on the apical half of the outer branch, where there are broad and dark scales and on nearly all the inner branch; fifth vein all dark scaled, scales broad and flat; sixth with long thin pale scales; first fork-cell longer and narrower than the second, its base a little the nearer to the base of the wing, its stem not quite as long as the cell; posterior cross-vein about its own length distant from the mid cross-vein.

Length, 5 mm.

Habitat.—Tet-chili, North China; Tamsui, Formosa.

Observations.—Described from three females sent me by Dr. Broquet.

It is a very marked species, with a general resemblance, however, to *sollicitans*, Walker. It can be told by the thoracic adornment, apical and basal leg-banding, and the marked wing and abdominal ornamentation. The colour of the eyes is different in all three specimens—in one black, another coppery red, and the third silvery.

The damaged specimen I recorded with a query as *sollicitans*, from Formosa (Mono. Culicid. i. p. 369, 1901), was evidently this species, as I have since received a specimen from that island that exactly agrees with Dr. Broquet's specimen.

Types in the writer's collection.

BRITISH ODONATA IN 1912.

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

IN 1912 the dragonfly season commenced early. I met with the first example in the New Forest on April 19th. Though not properly identified, it was no doubt a *Pyrhosoma nymphula*. Two days later three more were seen, also in the New Forest. On the 28th of the same month *P. nymphula* was fairly common, though still in the teneral condition, at the Black Pond in Surrey, where also a teneral *Libellula quadrimaculata* was captured.

In the Broads, too, dragonflies were found to be rather early by Mr. G. T. Porritt. Writing June 11th, he says:—"I spent Whit Week at the Norfolk Broads, but found *Agrion armatum* very scarce. Indeed I took only four (three males and one female) all the week, and saw perhaps six or eight more. I rather think I was too late for it this early season, as it was probably well out during the hot weather we had at the end of April. Even *A. pulchellum*, usually the commonest dragonfly of the Broads, seemed in much reduced numbers and going over. *Libellula fulva* was common, but the specimens I netted—of both sexes—were immature, as probably most, if not all, were. I certainly did not see a single adult blue male; but one cannot well work for *L. fulva* and *A. armatum* at the same time. The commonest dragonfly in the Broads was *Erythromma najas*, which abounded and was on the wing all day up to 7 o'clock in the evening, when there was any sun."

Mr. Corbett, on Whit-Monday, visited Askern in Yorkshire, one of the older localities for *L. fulva*, and found the species common, but all the specimens general.

Mr. O. Whittaker found *Ischnura elegans* abundant during May on the canal between Droitwich and Salwarpe, in Worcestershire—the only dragonfly in evidence there. He also found in May *Calopteryx splendens* on the Severn at Holt Fleet, in Worcester. At Studland, Dorset, Col. Yerbury took *I. elegans*, female, var. *rufescens* on May 8th and *Enallagma cyathigerum*, males, on the 11th and 12th.

Mr. S. A. Blenkarn met with the following species in the Isle of Wight, the dates given being those on which the various species were first seen:—" *Libellula depressa*, one male, at a pond on Sandown cliffs, May 26th; and at Brading Marshes on the 28th. *Brachytron pratense*, common at Sandown Marshes, May 18th. *Calopteryx virgo*, one, Brading Marshes, May 28th (new to the Isle of Wight list). *C. splendens*, one male, Sandown Marshes, May 24th; two males, Brading Marshes, May 28th. *I. elegans*, common, Sandown Marshes, May 18th. *P. nymphula*, a few, Sandown Marshes, May 25th. *Pyrrosoma tenellum*, a few, Sandown Marshes, May 28th. *A. pulchellum*, a few, Sandown Marshes, May 25th. *E. cyathigerum*, common, Sandown Marshes, May 18th." I took *P. tenellum* myself on June 9th at the Black Pond.

Writing from Bournemouth, Mr. E. J. B. Sopp said:—"I found *C. splendens* common at Throop in June, but *I. elegans* was not nearly so common in the district as in 1911. At Littledown, in June, *Anax imperator* and *E. cyathigerum* were common after the middle of the month (I did not go there before). Mr. Kenneth Ryde told me of a big dragonfly that was common along the river Bourne (towards Westbourne) near the end of July. I asked him to catch one, and it turned out to

be *Cordulegaster annulatus*. There were fewer dragonflies at Hengistbury (up to mid-July) this year than last. *E. cyathigerum* was also common at Christchurch on July 9th."

By the side of the Great Ouse at Bedford, I captured *I. elegans* and *C. splendens* on July 7th.

On the Essex coast Col. Yerbury took:—*Sympetrum sanguineum*, six, scarcely mature in colouring; one male and female, July 4th, at Frinton-on-Sea; two males and female, July 13th, at Frinton-on-Sea, when the species was in some numbers, many being *in coitu*; one male, July 9th, at Walton-on-Naze, at a bed of *Carex* under the sea-wall. *Lestes sponsa*, male, July 5th, at Walton-on-Naze; one male, July 13th, at Frinton-on-Sea. *I. elegans*, nine, at Frinton-on-Sea, July 4th, three males and six females; one male was still holding its prey, a small



W. J. Lucas photo.

(× 3.)

Ischnura elegans, with fly in its grasp.

fly, in its legs used as a trap* (see figure); two of the females were of the var. *rufescens*, and one had a tendency in that direction. *Agrion puella*, two males on July 4th, at Frinton-on-Sea.

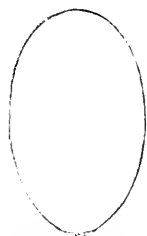
From July 27th to September 9th I was in the New Forest where I met with the following fifteen species:—*Agrion mercuriale*, *Colopteryx virgo*, *Platycnemis pennipes*, *Sympetrum striolatum*, *S. scoticum*, *Orthetrum cærulescens*, *Æschna cyanea*, *Ischnura elegans*, *Pyrrosoma tenellum*, and its var. *melanotum*, *Æschna mixta*, *P. nymphula*, *Agrion puella*, *S. fonscolombii*, *Enallagma cyathigerum*, and *Cordulegaster annulatus*. This last I saw only on September 7th—a single specimen which I could not capture. As this is usually one of the commonest of the

* I presume the fly may be looked upon as the dragonfly's prey, although Col. Yerbury did not notice its presence when putting his capture into the cyanide bottle.

summer dragonflies in the New Forest, its failure in 1912 is somewhat remarkable. I did not meet with *Ischnura pumilio*, but that may possibly have been over, and the same must be said of it for the corresponding period of the previous year. As late as August 29th I met with a recently emerged *S. scoticum*, and found the empty nymph-skin close at hand.

On August 9th I went to the pond in the New Forest, where I captured *Sympetrum fonscolombii* in 1911. I could not find it, but there were scarcely any dragonflies at the pond, the wind being rather high and somewhat cool. On the way thither I captured, however, a female *S. fonscolombii*, which had a rosy blush to the abdomen. There was a chip out of its rather glossy wings; otherwise it was in good condition. It appears certain that there was an immigration of this species into Britain in 1911; but what was the origin of this female? It was taken home alive. There I held it by its wings and allowed the extremity of the abdomen to dip into a watch-glass of water. Very soon it commenced egg-laying, and I obtained a large number. A few were put in formalin and water for examination; the rest I reserved to see if they would hatch, hoping, if they did so and throve, to get imagines in 1914.

When first laid on August 9th the eggs were whitish in colour. On August 11th most had become yellowish, and perhaps they were fertile, while the unchanged ones were not. Though when first laid the eggs appeared to be quite free and mobile, there was on August 21st, and had been for some time, a film containing them and attaching them lightly to the bottom of the vessel in which they had been placed. At the same time it kept them separate from one another, and no doubt would serve on occasion as a means of protection from injury. Perhaps this film may swell up after oviposition, as in the case of frog-spawn. The eggs are nearly elliptical in section (see figure) the longer axis being $\cdot 5$ millimeters or a trifle over, the minor axis being about two thirds of the longer one. One apex of the egg is a trifle more pointed than the other, and at this more pointed end is what looks like a small pedicel, but which may perhaps be connected with the micropyle. The slightly granulated surface does not show markings of any kind. Several almost transparent little nymphs had come out by the morning of September 4th, and probably had hatched that morning. I could see nothing of a pellicle surrounding any of them: all their legs seemed to be free. Others came out for a few days, till eventually there were quite a large number. The little nymphs swim quite freely with the help of their legs, moving forward in awkward zig-zag jerks. When they rest, their mid-legs are



Egg of *Sympetrum fonscolombii*
($\times 60$).

practically in a straight line, at right angles to the body. They were put into water from amongst the vegetation of a ditch, containing a quantity of minute life. In the morning of September 7th I saw two coming out of the egg, but could not detect the skin containing them. As, however, they seemed to be hampered in their movements, no doubt it was present. I am afraid none have survived. I saw one alive on October 27th, but previous to that had not seen one for a week or two, and I have seen none since.

Mr. F. H. Haines, of Winfrith, Dorset, writes to me as follows with regard to captures that he made of *S. fonscolombii* in 1912:—"On July 15th last the crimson colour of some dragonflies on a large heathland pond, north of Wareham, attracted me. Though excessively wary, their numbers made captures a mere matter of minutes and patient stealth. I was not collecting Odonata only, so after taking eight specimens (seven males and one female, the latter *in cop.*) we passed on. The wing nervures in the female specimen were not nearly so red as in the males taken, but it was teneral. *S. striolatum* was present, but in far less numbers than the rarer species, many of which looked very immature. My impression was strong that they had been bred there, perhaps exceptionally through the heat of 1911. Females were apparently in some numbers, even after deducting a proportion as really females of *S. striolatum*, or immature males of either species. Except that they are less autumnal insects, and keep nearer open water, their habits seem precisely those of *S. striolatum*. They would settle on the edges of the lake, on the tops of rushes growing in or round it, or amid the heather near the waterside. On July 27th I also saw many specimens over, and just round, a large pond on a heath near Warmwell. As before their condition was very bright and fresh, and I believe both sexes were present. I took a single male only for purposes of identification."

On September 9th Mr. Porritt found *S. striolatum* abundant at various places on the Lincolnshire coast—Sutton-on-Sea, Trusthorpe, Mablethorpe, &c.

Writing from Coventry on September 16th, Mr. O. Whittaker said:—"Yesterday afternoon I saw a female *Aeschna* (of which species I could not say) engaged in oviposition. She deposited her eggs in a floating leaf of *Potamogeton*, so that her abdomen was above the surface of the water; but as she clung to a submerged leaf her head, thorax, and wings were entirely beneath the surface. She remained in this position for considerably more than half-an-hour (I timed her), frequently moving her wings with great rapidity. She must have laid about twenty or thirty eggs in the one leaf. Unfortunately, as it was some seven or eight feet from the bank, I could not secure them. Besides the ovipositing dragonfly there was one

flying about, and some local boys said, 'There's a Hornet.' In Lancashire they are called 'Headers,' which in the dialect of that part is pronounced 'Yedders.'" On September 20th Mr. Whittaker went to the pond and captured a specimen (*Æschna cyanea*) which he sent to me alive.

Mr. F. W. Campion told me (September 24th) that Mr. Watts had taken *P. nymphula* var. *melanotum* this year at Byfleet. This is, I believe, the first record of this form of *P. nymphula* from Surrey.

On September 25th Mr. G. Bolam found a male *Æschna juncea* at rest on heather near the top of Cross Fell, in Cumberland. This he sent to me. In connection with this insect Mr. Bolam wrote (September 29th):—"But it occurs all along these hills and also in the Cheviots in Northumberland and Roxburghshire, commonly though not plentifully. Here it is now to be met with in twos and threes about most of the burn-sides and tarns. It is, perhaps, rather an upland species. On the 23rd I took one at rest, and saw others on the wing in both Cumberland and Durham across the watershed, between this place and Middleton-in-Teesdale."

Col. J. W. Yerbury took *S. striolatum* in Cornwall—at Lelant on August 24th; and at Downderry on September 15th. He also captured at Lelant a teneral female specimen of *P. nymphula* on so late a date as August 22nd. Lt.-Col. C. G. Nurse tells me that he took *I. elegans*, male, at Timworth, May 11th, and, female, at West Stow, June 24th; *P. nymphula*, male, at Ampton on April 28th; *A. puella*, female, at Ampton, May 17th; and *E. cyathigerum*, female, at Ampton, April 28th—all in West Suffolk.

For myself the season of 1912 ended on October 6th, when I saw at the Black Pond, Surrey, *S. striolatum*, *S. scoticum* and an *Æschna*, which appeared to be *Æ. mixta*.

Kingston-on-Thames: April, 1913.

NEW FOREST NOTES, 1912.

BY G. T. LYLE, F.E.S.

WHEN compared with the preceding year, 1912 does not show to advantage either climatically or entomologically. July and August were wretchedly wet months with us, and probably this accounted for the comparative scarcity of our commoner butterflies.

In the previous autumn the larvæ of *Apatura iris* had been much more plentiful than usual, consequently it was not surprising that this fine insect turned up in some numbers in July, but, alas! in September and October the larvæ were not

correspondingly abundant, so that it seems likely that we shall see but little of our "emperor" for some few seasons.

On March 24th I noticed a specimen of *Pyrameis atalanta* flying in Irons Hill Enclosure, and on July 14th a perfectly fresh imago of this species was seen. During the past ten years at any rate the larvæ of *P. cardui* have never before been in such evidence. In June I collected many of the small caterpillars in the hope that I might breed parasites from them, but in this I was disappointed. A few full-fed larvæ were still about on July 14th, and a friend captured a freshly emerged imago on that date.

Perhaps the feature of the year was the great abundance of *Hemaris tityus* and *H. fuciformis*, particularly the latter. At rhododendron blossom this swarmed, so much so that a single collector captured ninety in two hours. Later on the ova were to be found commonly; on a small honeysuckle bush I counted more than thirty eggs, which would, I should think, be about half the total number on the bush. These I allowed to remain so that I might take the caterpillars later on, again with an eye to parasites. When next I visited the spot, however, some three weeks later, not a larva was to be found. No prowling entomologist, I am convinced, had robbed me, had he done so, he would have left traces, such as broken leaves, twigs, &c., for, as is well known, it is usual and convenient when collecting eggs or young larvæ of *H. fuciformis* to pick off the leaves to which they are attached. It was quite evident that the ova had hatched, for the curious round holes made in the leaves by the young larvæ were everywhere apparent. The disappearance may perhaps be accounted for by the fact that a few yards away was a large nest of *Formica rufa*. *H. fuciformis* was first reported to me as being out on May 9th, and I witnessed the capture of a specimen in good condition so late as July 7th.

Phryxus (Deilephila) livornica again visited us, Mr. E. Morris being fortunate enough to capture two, male and female, both, however, in poor condition. The female lived only a few days in captivity, laying a single egg before dying; this egg proved fertile, and the larva fed up well on vine, unfortunately succumbing in attempting to pupate.

Our forest burnet, *Zygæna meliloti*, was, as usual, plentiful in its favoured locality. This is a matter for congratulation, as the number of collectors who discover or are told of its haunt is yearly increasing. I have frequently noticed that this species does not fly much before midday.

Collectors who "assembled" for males of *Saturnia paronia* had no lack of sport, the insects being very abundant. While in company with Mr. W. J. Lucas a female of *Boarmia cinctaria* was taken from a fence so early in the year as April 5th. Being confined in a chip-box, it had laid a number of eggs by the morning of the 7th, which duly hatched on May 1st. Several of

the small larvæ, which I placed on a plant of the common ornamental *Genista* growing in a pot indoors, thrive well, the first pupating on June 25th; when reared in this manner larvæ of *B. cinctaria* do not require a sleeve, as they never stray from the food-plant. Towards the end of April *B. cinctaria* was particularly plentiful, the favourite resting-places of the species during the day being the trunks of pine trees growing on the heaths.

Attached to the hairs on a small larva of *Macrothylacia rubi* found on July 6th were several tiny, vermilion, spider-like parasites; these did not seem to incommode the larva in any way, and with its first ecdysis after capture they disappeared.

In the early spring the abundance of the larvæ of *Boarmia repandata* was very remarkable—they might be picked up in dozens at night while feeding on heather, honeysuckle, &c., in the rides of the enclosures. In previous years I have noticed that some five per cent. of the pupæ produced the var. *conversaria*, but in 1912 I bred only one specimen of the variety from over one hundred pupæ.

Larvæ of *Hylophila bicolorana* were also more plentiful than usual; unfortunately the majority of them, at any rate in captivity, were stricken with a fatal disease, which first manifested itself in the shape of minute red spots on the body of the larva, gradually increasing in size until the creature presented a blotched appearance and in a few days became flaccid and died.

Another oak-feeding larva which turned up in some numbers was that of *Hadena protca*; it is certainly some years since it was so common with us. During August, September, and October the larvæ one usually meets with at that time of the year were very scarce; in fact, it was difficult to meet with anything excepting a few *Chimabacche fagella*.

As is well known, the full-fed larvæ of *Sarothripa reveyana* may be found in June, I was therefore much surprised to "beat" a specimen on Sept. 4th; it pupated within a few days, and the imago duly emerged on Oct. 3rd.

As to insects of other orders, I find but few notes in my diary worth recording. On May 28th I noticed several *Osmylus chrysops* fluttering along under the banks of the Blackwater near Fletcher's Thorns, which is, I understand, a locality where they have been known to occur for some years past, and where larvæ have been found by Dr. D. Sharp.

Mr. C. B. Williams's notes on the life-history of *Raphidia maculicollis* (Entom. xlv. 1913, p. 6) greatly interested me, the more so as he was successful in rearing a parasite (*Pyracmon melanurus*) from the larva. In describing the ova of *R. notata* (Entom. xli. 1908, p. 233), which appear to be very similar to those of *R. maculicollis*, I mentioned that the eggs I obtained were in contact one with another, as is the case with the ova of

Sialis, and had a very short pedestal at the thicker end on which they stood. Mr. Williams calls attention to the fact that the "pedestal" which he describes as a "globular appendage" is at the head end, and thinks that I must be mistaken in saying that the eggs stood on this end. He has had the advantage of seeing the ova when laid more naturally than was the case with the few I figured and described, which were deposited in a chip-box under anything but natural conditions. My ova were in a batch (five or six) as mentioned, and certainly rested on the thicker end, but, judging from the additional evidence we now have, this may have been an accident. Both *R. notata* and *R. maculicollis* in the imaginal state were particularly plentiful with us in 1912. On May 18th in Irons Hill Enclosure they could be beaten in numbers from the small oaks growing under the pines, as many as five or six from a single tree. Placing two dozen or so in three large pill-boxes, I was surprised on my return home an hour or two later to find the great majority dead or dying, the bottoms of the boxes being strewn with *débris* of legs, antennæ, &c. The few mutilated survivors were still fighting, the superior size of *R. notata* apparently not giving it any advantage over its smaller relative.

ANOTHER ABNORMAL DRAGONFLY WING.

BY HERBERT CAMPION.

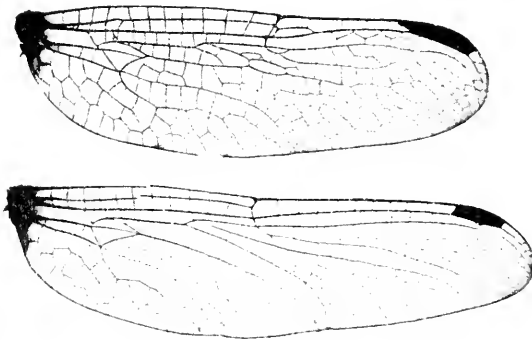


Photo F. W. Campion.

Hind wings of *Panothemis serrata*, Krüg., ♂. Enlarged 2½ times. Upper figure—right wing (teratological). Lower figure—left wing (normal), seen from below.

THE teratological hind wing now figured belongs to a male of *Panothemis serrata*, Krüg., from Borneo, and offers several

points of resemblance to the fore wing of *Libellula fulva*, Müll., of which photographs were reproduced in the March number of this magazine (Plate vii.). Thus, the wing is considerably shorter than it should be, and the homology of some of the longitudinal veins in the apical half is very obscure. The pterostigma is also greatly exaggerated, although it does not occupy more than one cell, and the subcosta affords another instance of prolongation beyond the nodus in the same sub-family (Libellulinae).

To facilitate comparison with a normal hind wing of *Pornothemis*, the under side of the left hind wing of the same individual is shown below the teratological wing, and it will be seen that in the last-named the triangle is modified in form and position, and that the anal loop takes on a distinctly Corduliine shape. Furthermore, M_1 , until it ceases to be recognisable, runs nearly parallel with the radius, and the branches of the cubitus curve downwards less abruptly than usual.

The specimen in question was taken at Matang Road, Sarawak, in 1909, by Mr. J. C. Moulton, and was forwarded to me, for examination, by Dr. F. F. Laidlaw.

58, Ranelagh Road, Ealing: April 28th, 1913.

FIVE MONTHS' BUTTERFLY COLLECTING IN COSTA RICA IN THE SUMMER OF 1911.

BY MARGARET E. FOUNTAINE, F.E.S.

THERE were two reasons why I went to Costa Rica, first, because the political situation in Mexico seemed leading on to conditions bordering on civil war, and secondly, owing to the fact that the cases of plague at La Guaira (the entrance port to Venezuela) seemed to be somewhat above the average; and so I went to Costa Rica. There I found a country abounding with butterflies, but most difficult to work, at least on the Atlantic side (which was practically as far as my experience extended), chiefly owing to the climate and the undeveloped conditions of the country. We had left a rather serious drought behind us at Kingston, Jamaica, here in Costa Rica to find a very persistent and perpetual rainfall. What wonder that the low, flat country round Limon was nothing but immense swamps, for the most part densely wooded, but quite impenetrable, through which indeed it was only possible to pass at all by following the railway tracks, as there are no roads whatever on the Atlantic side of this extraordinary country! Therefore the public thoroughfares are entirely along these railway lines, a system which naturally results in a good many deaths from misadventure, especially to animals, which are also allowed to feed freely on the rich, grassy

banks on either side of the track. Thick, impenetrable bush, all swamps beneath, skirt the greater part of these lines, and here the big, blue Morphos (*M. peleides*) fly fearlessly through the dense undergrowth, giving the breathless entomologist only a very meagre chance of effecting the capture of one of these magnificent creatures, as it flops across the track to pass from one snake-haunted bush to the other.

The snakes are very bad in Costa Rica, and we were constantly being warned to "be careful." A small and very beautiful scarlet and spotted species, commonly known as the coral snake, being especially dangerous—scarcely ever did anyone bitten by this venomous brute recover; and as for the blood snake, a rather larger species, dark crimson in colour, death with blood oozing from every pore of the body was the certain result of too close an acquaintance *there!* I only once saw one of these blood snakes, which was in a ravine near a mountain stream in the neighbourhood of San José; it was not more than a yard off when I first caught sight of it, but looking upon me with evident suspicion, it cleared instantly, a course of action which, all things considered, was scarcely to be regretted.

What struck me most about the collecting in Costa Rica is the immense variety of species, comparatively few of which were ever represented by any very great number of specimens. By far the commonest butterfly in every district we visited was *Anartia fatima*; it was common in the swampy lowlands, and common, too, in the wet grassy lanes round San José (3400 feet), in fact, common everywhere. Some of the *Callidryas* were also abundant in certain places, where they would sit in clusters on a patch of wet mud, and get up when disturbed in such bewildering multitudes that, in one's anxiety to net the rarer species amongst them, and only those in prime condition, it often resulted in very few being netted at all; for they are shy butterflies, and when once disturbed, they do not very readily re-assemble at the same spot. The Heliconidæ were well represented everywhere, but no one species could ever be said to swarm, and several of them were decidedly rare. We did better in the neighbourhood of San José than anywhere else, especially in July, but this was, I think, largely owing to the fact that the facilities of penetrating into the surrounding country were certainly greater than at Limon or Guapiles, though this last-named place was wonderfully fascinating in the abundance and beauty of the species occurring there, and wonderfully fearsome as regards the accommodation to be obtained in its one and only inn!

It was a never-ceasing mortification to me that there were no tracks leading through those prolific forest swamps of the lowlands, or even if there was a small path, it soon came to an end, and, moreover, more often than not was rendered useless and

impassable by the constant and heavy rainfall; for who can catch butterflies, be they ever so abundant, standing over one's ankles in mud, whose peculiarly sticky qualities would suggest to the most unimaginative mind that an extract of glue could surely be obtained from the mud of Costa Rica! In fact, it was not at all an unusual event to find oneself "stuck fast" in this black gluey mixture, and to see some beautiful unknown species of butterfly come and settle within easy reach of the net, only a few yards away from where the mud-bound biped would be standing exasperate but quite helpless and powerless to effect its capture, till the bright vision would vanish as it had come, all unconscious of the possible danger that had menaced it from below.

I could not make out that in the lowlands of Costa Rica, at least on the Atlantic side, there is ever a dry season; it rains all the time with, of course on some days, intervals, often of several hours, of fierce sunshine, and then it is that one sees the butterflies! At San José, and in the higher mountains, there is a dry season, from December onwards during the winter months, which, however, the inhabitants call the "summer," and the wet season is the "winter" for them, though, of course, as Costa Rica lies north of the equator, this is not really the case. On the Pacific side the climate is, I believe, much drier, but of that I can say nothing from personal experience; except for one day's collecting at Rio Grande, which only tended to give me some idea of what that side of Costa Rica would have been like had various circumstances not prevented me from even trying to work it. I was told, on more than one good authority, that, except for *Morphos* and *Caligos*, the Pacific side has certainly far better collecting even than the Atlantic side, and from that one day at Rio Grande alone, I can readily believe it.

The following is a list of the species taken during the five months, from March 23rd to August 14th, 1911, that we collected in Costa Rica—one hundred and fifty-seven in all:—

Papilio americus, Koll.—This butterfly (which seems to come closer to *P. hospiton* than any other *Papilio* I know) was common all round San José in June and July.

P. thoas, Linn.—Fairly common at Santo Domingo, near San José, in July. I secured two very fine females.

P. photinus, Doubld.—This *Papilio* was very common at Rio Grande on July 27th, but unfortunately the condition of the specimens left much to be desired, in fact, I only took one female I considered worth setting.

P. polydamus, Linn.—Observed at Limon; not very common. I did not succeed in taking a good specimen, and having already a fine series of bred ones from Jamaica, perhaps I did not trouble very much about it.

P. numitor, Cram.—A large *Papilio* larva, bearing a strong resemblance to the larva of *Polydamus*, found by me at San Antonio,

11 kils. from San José, produced a female of this species; this being the only specimen I have, for, though we occasionally saw what we believed to be the same butterfly flying over the flowers of tall forest trees, we never succeeded in netting one.

P. pandion, Feld.—This butterfly, which must be very closely allied to *P. anchisiades*, Esp., occurred at San José in July. It was not common, and I only seem to have got one specimen.

P. branchus, Doublt.—One female taken at Limon in August is all I have of this species.

P. mylotus, Gray.—The commonest of all the Papilios in the lowlands, especially at Guapiles in April and May. I took a good many specimens there, and a few at Limon.

Daptonoura isandra, Boisd.—Only seen at Limon in August, flying in some numbers round a flowering shrub, but very restless and difficult to catch, besides which all those that were netted were in poor condition.

Tachyris ilaire, Godt.—Occurred at San José in June and July, but was not abundant.

Pieris josepha, Godm. & Salv.—Only occasionally seen at San José; but was very common at Rio Grande on July 27th.

P. clodia, Boisd.—Common at Cartago and all round San José throughout the summer. I found a batch of *Pieris* ova one morning when we were gathering water-cresses for luncheon in an elevated meadow near Cartago, from which I eventually bred half a dozen specimens of this butterfly. Their fresh supplies of food-plant used to be purchased in the market at San José. The full-grown larva is rather like a green centipede to look at superficially, as it has an oily appearance; in colour it is dull, pale green, ringed regularly with darker green from head to tail.

P. calydonia, Boisd.—Common, but quite *passé*, at Rio Grande, July 27th.

Terias albula, Cram.—Fairly common at Limon and Guapiles.

T. delia, Cram.—Common at San José; also taken at Guapiles.

T. neda, Godt.—At Limon, San José, and Guapiles, but not very common.

T. cutterpe, Ménet.—Only fairly common. I have two males from Cartago in May, also a male and female from San José, the former of which is very grey on the under side of the hind wing.

T. westwoodii, Boisd.—Common all round San José, flying along the damp, grassy lanes throughout the summer. A magnificent form. The female was comparatively scarce.

T. danaris, Feld.—This lovely *Terias* was very common at San José in June and July, and the females were more easily to be met with than were those of the preceding species.

T. xanthochlora, Koll.—Very scarce, only taken rarely in one locality near San José; and I have also one specimen from Guapiles.

T. mexicana, Boisd.—Very common at San José, also taken at Cartago in May; the females were not very scarce either.

T. proterpia, Fabr.—This exceedingly beautiful butterfly occurred somewhat rarely near San José; but it seemed to be fairly well represented in the great crowd of butterflies at Rio Grande.

Acmepteron nemesis, Latr.—Occurred at Cartago and San José, but was very scarce at both places.

Dismorphia albania, Bates.—One specimen only taken at San José in July; I did not see any others.

D. praxinoë, Doubld. — One specimen only from Guapiles in May.

Megonostoma cæsonia, Stoll.—First seen at Cartago in May. At San José it flew fairly abundantly in the neighbourhood of the Pacific Railway Station, where there were some fields of a certain kind of vetch, on which I saw the females depositing their eggs; it occurred wherever this vetch was growing. At Rio Grande, like many other things, it fairly swarmed.

Callidryas fabia, Fab.—The males of this butterfly were very common at Guapiles, less so at Limon. I never saw it up country.

C. statira, Cram.—Common at Guapiles, also at San José, less so at Limon. The females were less scarce than those of the preceding species.

C. trite, Linn.—Taken at Guapiles and at Limon, but not at all common in either locality. I never saw a female.

C. eubule (*sema*), Linn.—Widely distributed. Bred from Limon and at San José. The larva, like all of this genus, feeds on cassias.

C. agarithe, Boisd. — This glorious butterfly was common at Guapiles, still more so at San José, flying wildly over the baranco at Santo Domingo, where the never-failing attraction of the *Lantana* flowers sometimes provided a possible chance of capturing this gaudy insect. One male taken in this locality has scarcely any of the brown markings on the under side, and is rather paler above (possibly another species?). *Agarithe* was much less common at Limon, and the females were always scarce everywhere.

C. philea, Linn.—Most of my specimens of this butterfly were bred from ova and larvæ found near Limon, where this species was commoner than I ever found it anywhere else. I bred about an equal number of both sexes. The larva feeds on a large kind of *Cassia*, of which I was unable to discover the specific name. It also occurred at Guapiles and San José, at which latter place I again found the larva.

C. cipris, Fabr.—I first made the acquaintance of this magnificent butterfly at Cartago in May; here in this earthquake-stricken city it flew in the streets amongst the ruins. At San José in June and July it was quite common, even the females being much less scarce than is usually the case with other species of this genus.

Gonepteryx clorinde, Godt.—This exquisite butterfly was very common all round San José from the end of June and throughout July. The females also were not scarce.

Morpho peleides, Koll.—This is the only *Morpho* I met with in Costa Rica, though I believe it is by no means the only one that occurs in that prolific country. We first saw it at Limon, where it would fly across the railway track from one forest swamp to the other, affording only a very poor chance of effecting its capture. At Guapiles it was more frequent and easier to catch, as it would fly up and down along a broad stream, a flash of blue light against the dark

foliage of the trees, a sight of loveliness not easily to be forgotten. I stalked what I believed was a female one day for about ten minutes through thick but not swampy undergrowth; she would settle repeatedly and low down, but always arranged to move on to another perch just before getting within reach of my net, till finally I lost sight of her, and then realized that I had been risking snakes, tarantula spiders, and other horrors all for nothing! Not to mention that I found myself covered with ticks from head to foot, so much so, in fact, that a rapid retreat homewards was the only course to be pursued.

Opsiphanes crameri, Feld.—Common and widely distributed. I bred it in some numbers at San José; the larva occurring commonly on a certain ornamental palm which grew in all the public parks and gardens. The females even laid their eggs on the plants of this palm growing in pots on the balconies of the houses, where the larvæ when found would be ruthlessly picked off and slaughtered by the Spanish señoritas, who looked upon them as nothing but a pest and a nuisance, to be got rid of as quickly as possible. The very young larva when it first hatches from the egg is extremely like a young *Charaxes*, but it soon becomes much more slender and elongate than are the robust larvæ of that genus; also it has a long forked tail.

Danaüs archippus, Fabr.—Not very common, flew on the Savannah at San José.

D. berenice, Cram.—Widely distributed and often common.

Lycorea ceres, Cram.—Not uncommon near San José in July; mostly taken on the *Lantana* flowers in the famous butterfly-haunted baranco near Santo Domingo.

Tithorea pinthias, Godm. & Salv.—One specimen caught at Guapiles, where others were seen. I also obtained some ova by watching a wild female depositing her eggs on a large thick-leaved creeper overhanging a small stream. Four of the larvæ grew and did well, but I was only able to get one of them into pupa before the leaves of the thick-leaved creeper that I had brought with me from Guapiles gave out; and all my efforts were unavailing to find that same creeper at the elevation of San José (over 3000 feet), so the remaining three had to be turned out when just full-fed to search out a food-plant for themselves or die of starvation. The larva is ringed with black throughout on a yellow ground at the two extremities, and bluish white in the centre, two long flexible horns protrude from the first segment behind the head, as in the larva of *Tithorea megara*, which occurs so commonly in Trinidad. The pupa was a suspended blob of glistening, polished gold, but retained nothing of its resplendent beauty when the butterfly had emerged,

Melinæa imitata, Bates.—One specimen only, caught at Guapiles.

Mechanitis scylax, Salv.—Also only one specimen from Guapiles.

M. labotus, Dist.—One specimen from San José.

M. doryssus, Bates.—Was taken at Limon, Guapiles, and San José.

M. isthmia, Bates (*callifornica*).—I bred a good series of this butterfly from a batch of ova found at Limon. The larva was identical with that of *M. polymnia*, of which I also bred several later

on in Trinidad. The pupa was bright shining gold. This butterfly occurred also at Guapiles, and (more rarely) at San José.

Thyridia melantho, Bates.—One female only taken at Guapiles.

Dircenna klugii, Hübn.—Common at Cartago in May, and at San José in June and July.

D. relata, Butl. & Druce.—One specimen only, from San José.

(To be continued.)

NOTES AND OBSERVATIONS.

THE THOMAS BOYD TYPES OF MICRO-LEPIDOPTERA.—It is satisfactory to put on record that these types, as detailed on p. 23 in the January number of this Magazine, are now placed in the National Collection at South Kensington Museum, having been generously presented by Mrs. W. C. Boyd, of The Grange, Waltham Cross.—WILLOUGHBY GARDNER; Deganwy, North Wales, May 19th, 1913.

THE SPRAYING OF OAK TREES IN RICHMOND PARK.—Some interesting experiments have just been carried out in Richmond Park, the object being the extermination of various leaf-eating caterpillars which have attacked the oak trees. The ravages of these caterpillars have been very serious, so that the trees have of late made but little progress owing to defoliation, and in numerous instances the trees have lost their tops. The experiments in question were carried out under the direction of Mr. H. Maxwell Lefroy, Professor of Entomology at the Imperial College of Science, who advised the trees being treated with a spray solution. The group of trees operated upon was the Ham Cross plantation, which comprises about four hundred oaks, and the spraying mixture was a solution of lead chromate, which was applied by means of a petrol-driven pump of the Merryweather "Ravensbourne" pattern, supplying solution to six spraying nozzles simultaneously. The spraying of the trees in the plantation mentioned occupied two days, and if successful the same treatment will be carried out to the other plantations in the Park. By means of the special apparatus employed, the lead chromate was well and evenly distributed, and it remained on the trees.

SOME LEPIDOPTERA NEW TO SUFFOLK.—During the past two seasons I have paid more attention to Hymenoptera and Diptera than to Lepidoptera, but as I have taken a few species of the latter order which are not, I believe, as yet on the Suffolk list, I think I should record them:—*Brachytenia hartmanniana*; three captured on the trunks of old willows near Bury St. Edmunds. *Laspeyresia servillana*; a specimen at Ampton. *Polychrosis abscisana*; not uncommon at Ampton. *Penthina capreana*; several at Tuddenham. *P. nigricostana*; two at Ampton. *Apodia bifractella*; one at West Stow. *Coleophora nutantella*; one at Tuddenham. I have to thank Mr. J. Hartley Durrant for determining most of the above insects for me.—(Lt.-Col.) C. G. NURSE; Timworth Hall, Bury St. Edmunds, April 28th, 1913.

CENONYMPHA TIPHON AND C. PAMPHILUS ON SAME GROUND.—I only know *C. tiphon* in one locality—near Achnasheen, in Ross-shire, where it is very plentiful. There it is found on the same ground as *C. pamphilus*, and I have netted large *pamphilus* in mistake for *tiphon*. I have noticed there that *tiphon* only flies in bright sunshine; directly a cloud partially obscured the sun this butterfly settled amongst the grass-stems close to the ground, though *pamphilus* would still continue on the wing.—J. HAMILTON LEIGH; Culloden House, Inverness-shire.

TORTRIX PRONUBANA.—A little incident has happened to me which may be worth recording. Early in April I discovered a *Tortrix* larva feeding in a geranium leaf in the greenhouse. I took care of it, and to-day (May 16th) the imago has appeared as *T. pronubana*, and a remarkable specimen of var. *ambustana* at that. I cannot account for it being where it was, as I have never found a trace of the species here. Anyway, it seems a new food-plant.—(Rev.) W. CLAXTON; Navestock, Romford.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*Wednesday, March 19th. 1913.*—Rev. F. D. Morice, M.A., Vice-President, and afterwards Mr. J. H. Durrant, Vice-President, in the chair.—Messrs. Thomas Alfred Coward, F.Z.S., Brentwood, Bowdon, Cheshire; William H. Edwards, Natural History Department, Birmingham Museum; Lewis Gough, Ph.D., Entomologist to the Government of Egypt, Department of Agriculture, Cairo; John Hewitt, B.A., Director of the Albany Museum, Grahamstown, South Africa; Carlos E. Porter, C.M.Z.S., Professor of Zoology, Agricultural Institute, Santiago, Chile; and Gilbert Storey, Entomological Research Commission, Natural History Museum, South Kensington, S.W., were elected Fellows of the Society.—Mr. C. B. Williams exhibited two larvæ of *Coniopteryx tineiformis*, eight of which were beaten from pines at Oxshott, on the 16th inst.—Mr. Donisthorpe, various species of ants of the genus *Eciton*, the "Wander Ants," and gave some account of their interesting habits.—Mr. W. C. Crawley, a few ants collected during September, 1909, in Pennsylvania and Cleveland, Ohio, including *Polyergus lucidus* and *Formica rubicunda*, two of the slave-makers, with their slaves; and some species collected with Dr. Forel in Switzerland, August, 1912. Among the latter were *Camponotus lateralis* and *C. æthiops*, two species of special interest, as they belong to the xerothermic fauna, relics of a post-glacial period.—The Rev. F. D. Morice made the following exhibits by means of the epidiroscope:—1. Lantern-slides showing the pectinated antennæ of the male in the sawflies *Lophyrus pini*, L., and *Monoctenus juniperi*, L., the latter new to Britain and not yet recorded. It was taken pretty freely on juniper, at Nethy Bridge, in June, 1907, by Messrs H. Scott and C. G. Lamb. 2. Lantern-slides showing paradoxical (secondary sexual) characters in the legs of numerous male Aculeates (bees, wasps, and fossors). 3. Microphotos of the apex of the female "terebra" in *Cimbex lutea*, L., and *C. femorata*, L. (magnified ninety

diameters). 4. Entomological Congress groups at Oxford and Tring. (Lantern-slides.) During the course of this exhibit, Dr. Chapman, at Mr. Moriec's request, explained the manner in which he had seen the wings of the female *Odynerus spinipes* imprisoned between the tridentate middle femora and excavated middle tibiae of the male.—A paper by Mr. H. Eltringham, M.A., F.L.S., "On the Scent-apparatus of *Amauris niavius*, L.," was read by the author, the black-and-white drawings by which it was illustrated being thrown on the screen.

Wednesday, April 2nd, 1913.—Mr. G. T. Bethune-Baker, F.L.S., F.Z.S., President, in the chair.—Messrs. André Avinoff, Litecny, 12, St. Petersburg; W. Bowater, Russell Road, Moseley, Birmingham; J. S. Carter, Warren Hill Cottage, Eastbourne; James Davidson, M.Sc., Imperial College of Science and Technology, South Kensington, S.W.; Arthur H. Foster, M.R.C.S., L.R.C.P. (Eng.), M.B.O.U., Sussex House, Hitchin; J. A. de Gaye, King's College, Lagos, South Nigeria; Oliver Hawkshaw, 3, Hill Street, Mayfair, W., and Millard, Liphook; and Ernest Edward Platt, 403, Essenwood Road, Durban, Natal, were elected Fellows of the Society.—The Rev. G. Wheeler explained that he had been mistaken in some of his observations on *Argynnis auresiana*, which he exhibited on October 16th. The name *auresiana* was given by Fruhstorfer, not by Oberthür, and a few specimens were already known before Mr. Powell discovered it in numbers at Lambessa, as previously stated. It had also been figured by Turati.—Mr. E. Ernest Green exhibited cards showing the transferred wing-scales of butterflies.—Mr. Donisthorpe, a specimen of *Tetramorium cespitum*, L., worker, from a colony found by Mr. Evans on the Bass Rock in Scotland, March 21st, 1913; the most northern records known in Britain were Denbigh in Wales, and Cambridgeshire and Suffolk in England.—Mr. W. C. Crawley, numerous species, subspecies, &c., of ants from Egypt, which were taken at Helouan during December and January last.—Dr. Jordan gave a short account of the Zoological Congress at Monaco, with special reference to entomological nomenclature, and thanks were voted to the Society's delegates for their work at the Congress, and to Dr. Jordan in particular, for his interesting and satisfactory account of it.—The following papers were read:—"On the Classification of British Crabronidæ (Hymenoptera)," by R. C. L. Perkins, D.Sc., M.A., F.L.S. "Descriptions of New Species of the Syrphid Genus *Callicera* (Diptera)," by the late G. H. Verrall, F.E.S. Edited by J. E. Collin, F.E.S. "Neue Pyrgotinen aus dem British Museum in London," von Friedrich Hendel, Wien. — GEORGE WHEELER, M.A., *Hon. Secretary*.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—April 10th.—Mr. A. E. Tonge, F.E.S., President, in the chair.—Mr. Buckstone exhibited living larvæ of *Scodionia fagaria* (*belgaria*) from Oxshott.—Mr. Newman, a remarkable aberration of a hybrid between *Ephyra annulata*, male, and *E. pendularia*, female, in which the outer half of all the wings was melanic.—Mr. A. E. Gibbs read a paper entitled "Through the Balkans with a Camera," illustrating his remarks with a number of lantern-slides of views and

scenes in Bosnia and Herzegovina, where he made a collecting tour in 1912.

April 24th.—Mr. A. E. Tonge, F.E.S., President, in the chair.—The evening was devoted to a special exhibition of specimens of orders other than Lepidoptera, and was a most successful meeting.—Mr. R. Adkin exhibited an original copy of 'A Naturalist's Calendar' (1795), being extracts from Gilbert White's diaries, and a facsimile reprint of Gilbert White's 'Flora Selborniensis' by the Selborne Society in 1911. Also he exhibited a spider's web and spider mounted between glass by the late Mr. H. McArthur.—Mr. W. West (Greenwich) placed on the tables sixteen drawers of the Society's reference collections (British), *viz.* two of Orthoptera, presented by Dr. Malcolm Burr, &c., two of Neuroptera, presented by Mr. W. J. Lucas, Mr. W. J. Ashdown, &c., one of Hymenoptera, and eleven of Coleoptera.—Mr. West also exhibited twelve drawers of his own collection of British Heteroptera, Homoptera, and Psyllina.—Mr. E. A. Newbery, a number of new and rare species of British Coleoptera, including *Apion selousi*, *Trachyphloeus digitalis*, *Lathrobium ripicola*, *Homalota aquatilis*, *Myrmecopora brevipes*, *Thinobius pallidus*, *Cartodere argus*, *Dermestes peruvianus*, *Bledius denticollis*, *B. filipes*, *B. sacerdentus*, *Ceuthorhynchus parvulus*, *Laccobius purpurascens*, *Orthochaetes insignis*, &c.—Mr. Priske, varied forms of the coleopteron *Geotrupes mutator*, from Hanwell.—Mr. Ashdown, examples of the species of Hemiptera and Hymenoptera taken in Switzerland, including *Cicaletta montana*, *Elia acuminata*, *Harpactor iracundus*, *Mutilla europæa*, &c.—Mr. Sheldon, two species of "firefly" met with on the Continent.—Mr. Hy. J. Turner, Homoptera from S. America resembling Lepidoptera in form and marking, including the beautiful *Psephenoptera phalænoides*; Heteroptera of bizarre form and marking from Colombia, &c., including *Apiomerus hirtipes* with two curious processes ("flags") at the anal extremity of the abdomen; two large-bodied Orthoptera from the Transvaal used as food by the natives; and a box of large and conspicuous insects from the up-country of Western Australia—Aculeata, Diptera, Ichneumonidae, Odonata, &c.—Mr. K. G. Blair, living scorpions, earwigs, and glow-worms from Monaco, and gave his experiences in the States of the "flashing" of the fireflies, and an account of the experiments there carried out with artificial "flashing."—Mr. Buckstone, insects of various orders from New South Wales.—Mr. Main, two species of cockroach and a large glowworm, &c.—Mr. Ashby, Hemiptera and Coleoptera from Oyo, Southern Nigeria, and his collection of *Donacia*, *Chrysonela*, and *Cryptocephalus* (Coleoptera).—Mr. Gibbs, a case containing specimens of *Sirex noctilio* and *S. gigas*, the sawflies whose larvæ cause much damage to fir timber, and examples of the damage caused. He also showed a case of the various groups of the suborder Hemiptera, and gave notes on the two exhibits.—Mr. H. Moore, two drawers of Orthoptera, one mainly European, the other large exotic leaf crickets; a box of Xylocopidae, violet carpenter-bees from all over the world; a case of lantern-flies, Fulgoridae; foreign insects introduced to Deptford by shipping, such as *Blabera cubensis*, *Achetu bimaculata*, *Acridium ægyptium*, &c.; and a selection of Orthoptera and Homoptera to illustrate a note on "Singing

Insects."—Mr. Andrews, specimens of "Witches' Broom" fungus-gall *Ascomyces* sp. ? on willow, and types of sixty-three species of Diptera taken in the months of March and April, chiefly at sallow-blossom.—Mr. Coxhead, specimens of plant-galls and some very beautiful water-colour drawings of the same, and the gall-fly *Uromyces ficarie* under the microscope.—Mr. West (Ashtead), four species of *Collembola* under the microscope.—Mr. Edwards, large and conspicuous species of Phasmidæ, Mantidæ, Gryllidæ, and Hymenoptera chiefly from British North Borneo, together with the remarkable chelifer, *Thelyphenus lucanoides*, and the curious Arachnids, *Actinacantha arcuata* and *Gasteracantha vittata*.—HY. J. TURNER (*Hon. Rep. Sec.*).

THE MANCHESTER ENTOMOLOGICAL SOCIETY.—*April 2nd, 1913.*—Meeting held in the Manchester Museum.—The Secretary read on behalf of the Rev. S. Proudfoot, F.E.S., a paper entitled "The Delights of Entomology."—Mr. B. H. Crabtree, F.E.S., exhibited a long and remarkably varied series of *Noctua primula* (*festiva*) var. *conflua* bred from the Shetlands.—Mr. J. H. Watson showed some interesting Javan lepidoptera from the Leyden Museum. These were *Cricula andrei* var. *elazia* female, hitherto undescribed; a very curious aberration of *C. andrei*, without any fenestræ; *Antherea* nov. sp. (?), closely allied to *A. helferi* from Assam. He also showed *C. andrei* and *trifenestrata* from Assam, and *C. trifenestrata* from Burma.—Mr. R. Tait, junr., showed his series of the genera *Pachmobia* and *Taniocampa*, which included a fine lot of *P. leucographa*.—Mr. J. E. Cope exhibited coleoptera from Robertson, Cape Colony, including two large species of *Psanmodes*, a large Adephagus beetle, and a small chafer similar to our own *Rhizotrogus*.—A. W. BOYD, M.A., *Hon. Sec.*

OBITUARY.

By the death of MR. HERBERT DRUCE, the Entomological Society of London loses one of its oldest and most prolific workers in the wide field of universal Lepidoptera. Born on July 14th, 1846, from his earliest boyhood he developed deep interest in entomology, and his election to the Society took place when he was just one and twenty. From that time onward he soon made a name as a diligent collector and describer, among the more important of his contributions to contemporary scientific literature, and to our knowledge of the world's species, being the three volumes (with plates) dealing with Heterocera in the 'Biologia Centrali Americana,' upon which he concentrated his energies over a considerable number of years. In addition to this, he published several monographs of genera, and described a large number of species new to science in the 'Transactions' of the Entomological Society of London, the 'Proceedings' of the Zoological Society, the 'Entomologist's Monthly Magazine,' and the 'Annals and Magazine of Natural History.' Serving on the Council of the Entomological Society in 1885 and 1892, he was also a Fellow of the Linnean, the Zoological, and the Royal Geographical Societies. We hear that his magnificent collections are shortly to be sold.

RECENT LITERATURE.

The Theory of Evolution in the Light of Facts. By KARL FRANK, S.J. With a Chapter on Ant Guests and Termite Guests. By ERICH WASMANN, S.J. Translated from the German by CHARLES T. DRUERY, F.L.S. London: Kegan Paul. 5s. net.

It is not easy to conjecture with what object this little book on Evolution has been written. Some parts of it might serve as a useful introduction for anyone who was about to read Darwin's 'Origin of Species' for the first time. The author is almost as keen an advocate as Darwin himself of the theory of modification of species by adaptation and descent, and although he puts down to "a purposeful striving" of the individual certain of those variations or adaptations which Darwin could only explain by the use of the word "chance," he seems to admit that the species which are not purposefully adapted to their environment are doomed to extinction. Father Frank, however, is by no means a whole-hearted Darwinian; nor is he always quite fair to Darwin, for, while objecting strongly to the expression "chance variation," he forgets to mention that Darwin, who had no theological view to maintain, pleaded ignorance of the cause of variation as his excuse for making use of what he called "that wholly incorrect expression." The arguments brought forward in this book in an attempt to show the limitations of Evolution, and that no one class of plants or animals has been derived from another, are based chiefly upon the imperfection of the palæontological record, and are anything but convincing. Entomologists who are left free to believe that the whole of our existing insects, in all their diversity of form and structure, are but the modified descendants of a single pre-existing order, the ancient Palæodictyoptera, will hardly be restrained from going a step further to seek the ancestor of the insect in some other form of animal life. They are puzzled even now to know to what class they can assign those interesting little creatures, the Protura, which exist, it appears, in abundance, and yet have only been discovered within the last half-dozen years. If these have remained unknown so long, what is there strange in the fact that so few transitional forms have been discovered as fossils in the rocks?

Father Frank claims to have "dealt fully" with the "chief postulate" of the theory of Evolution—the origin and development of the animals from the plants. But his claim is scarcely justified. It is one thing to discuss the difference between the "psyche" of an oak tree and of a donkey, and another to discover the soul of an amœba, and to show wherein it differs from that of a lowly organized plant; and Father Frank has not attempted the latter task.

The chapter which Father Wasmann has contributed is very interesting, and the student of Coleoptera will find something of interest also in the table, taken from Handlirsch, which illustrates the pedigree of the beetles and their distribution in time. Faults in the translation give rise to contradictory statements in the book, and especially noticeable is the use of the word "family" in several cases where "phylum" or "group" should appear instead.

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DR. STAUDINGER & BANG HAAS, Blasewitz, Dresden, in their *Key to the Families of Lepidoptera, 1909*. Species of well-named LEPIDOPTERA, 1000, in 100 papers, arranged in parts of the work, of fine type, dated 1909, 1910, 1911, LEPIDOPTERA, 1912, 1913, 1914, 1915, 1916, 1917, 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000. Price 10s. 6d. (including postage).

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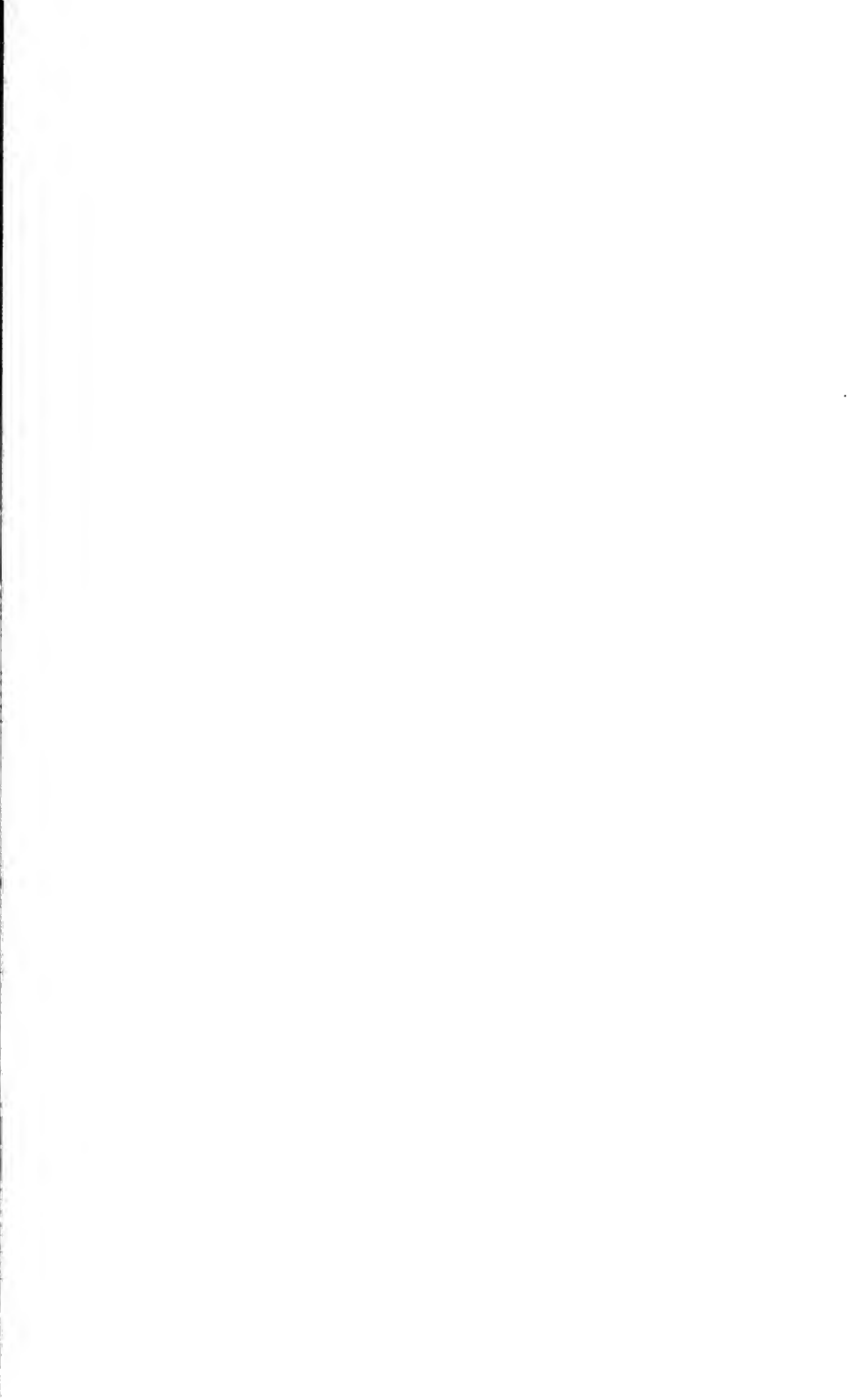
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FÆCES EJECTOR OF LEPIDOPTEROUS LARVÆ.

BY F. W. FROHAWK, M.B.O.U., F.E.S.

(PLATE X.)

CERTAIN lepidopterous larvæ are provided with a remarkable comb-like apparatus for the forcible ejection of their excreta, which probably is most highly developed in the Hesperidæ.

This organ has been referred to by Dr. O. Hofmann in his description of *Secaphila minusculana*, published in the 'Entomologist's Annual,' 1873, p. 62; stating:—"Immediately behind and under the anal plate, exactly above the anal opening, is a small semicircular plate of black chitine, about half the size of the anal plate itself, which is extended posteriorly in six long black thorns, and probably has for its object to assist in the evacuation of the excrement. This formation is entirely wanting in the closely allied *S. wahlbomiana*, but, on the other hand, it occurs again in the closely allied *communana* and *virgaureana*." Also, in 'Novitates Zoologicæ,' vol. xvi. p. 331, Dr. K. Jordan describes and figures the anal comb or fork which he and the Hon. Walter Rothschild found in the larva of *Somabrachys*. In all the specimens examined each had either three or four tines; these, he states, were "always practically of equal length. They vary in shape, inasmuch as some are pointed and others truncate and dentate. . . ." Dr. Jordan also adds: "We ascertained its use by observing the live larva under a lens. When the fæces leave the anus the rake is employed to push them outside, and give them a final jerk, which sends them rolling off the anal segment."

In the life-history of *Carterocephalus palemon*, which I published in the 'Entomologist,' 1892, vol. xxv. p. 256, I noted the fact that the larva of this species "has the power of casting its excrement sideways with considerable force, as if propelled by a spring, sending it a foot or more, which undoubtedly is a means to prevent fouling its domicile." This habit, I have noticed, is common with the Hesperidæ larvæ.

While recently figuring the fully-grown larva of *H. sylvanus*, I carefully watched it under a lens to ascertain the exact way in which the pellets of excreta are ejected. This enabled me to make a momentary sketch of the performance, reproduced in the accompanying Plate, fig. 3. Just previous to the act the larva crawls backwards along its tubular dwelling (composed of either two or more blades of grass spun together in the form of a cylinder) until its extremity is either at or slightly protruded beyond the tube; it then raises its anal segments, elevating the plate or flap, and evacuates the faeces, which remain adhering to the anus. The comb is then brought down to the rim of the anal orifice, and remains so fixed for a moment or two, as if to obtain a firm pressure with the tips of the tines or teeth; then, apparently with considerable power, it is suddenly released, spring-like, the comb flies up with a violent jerk, casting the pellet with remarkable force in an upward direction. In order to learn the distance the larva can cast the excrements, I placed three examples in a vertical position on a white cloth, and found the distance they fell (without rolling) between 2 ft. 6 in. and 3 ft., the furthest being exactly 3 ft.

It will be seen by fig. 2 (posterior view) the comb consists of eighteen asymmetrical teeth, solidified over the greater portion, then separated and turned slightly outwards at the tips; they gradually decrease in length from the long central ones, the whole forming a semi-ovate structure. The middle tooth or tine is dentated, the others being simple pointed. The colour is pale ochreous yellow, the four longest having black tips. Fig. 1 shows the anal flap and comb slightly raised (lateral view).

NOTES ON BUTTERFLIES OF HONG KONG AND JAPAN.

By MAJOR B. TULLOCH, F.E.S.

THE most curious butterfly I have taken at Hong Kong is *Pieris rapæ*. Not, of course, that the insect itself is curious, but the fact of this species being captured so far south, right in the Tropics, is curious. I have never heard of it having been seen or taken before in Hong Kong. The insect was quite perfect, evidently just emerged from the chrysalis. It approaches in appearance a small specimen of *P. rapæ* var. *crucivora*, with a well-marked yellow basal streak on the under side of the hind wing. I captured it quite accidentally, under the impression that it was a small specimen of *Huphina nerissa*, dry forms of which I was trying to catch. The capture was made on December 12th, 1912. The other butterflies on the wing at the spot in which I took it were *P. helcnus*, *Leptocircus curius* var.

walkeri, *Hebomoia glaucippe*, and *Huphina nerissa*, all tropical species.

The manner in which *H. glaucippe* emerges from the chrysalis is very remarkable, if all butterflies of this species emerge in the same way as the one did which I watched coming out, in a breeding-cage. The pupæ of this species are very bent back in the middle, so that in the pupal stage the legs of the insect are, as it were, in the air, the back of the unformed butterfly being downwards, when the pupæ are attached to a vertical object. Whilst I was looking at the chrysalis in question, the butterfly began to emerge. After all its legs and wings had been withdrawn from the pupal case, it lay still for a few seconds with the body in the pupal case, the legs being free and pointing upwards. But there was nothing above the insect which it could catch hold of in order to enable it to get a purchase and withdraw the body from the case. The way in which the problem was solved was very interesting. After a pause of a few seconds in order to take breath, as it were, the insect suddenly gave a great heave by contracting and expanding its body quickly, and out it came, backwards, falling right over and making a complete back somersault. As it fell it seized the lower extremity of the pupal case with its legs, and there it remained and dried its wings, as if turning heels over head backwards was the easiest possible thing for emerging butterflies. What happens if they miss the empty pupal case is, I suppose, that they catch hold of the nearest leaf or twig and hold on to that.

On page 108, vol. ix. of Seitz's 'Macro-Lepidoptera of the World,' it is stated that the earlier stages of *Leptocircus curius* are unknown. I have bred many of these butterflies, of the variety *walkeri*, so the following account may be of interest:—

The egg is laid singly on the upper side of the climbing plant *Illigera cordata*, which is very local in Hong Kong. The egg is round, and pale shining green. The newly emerged caterpillar is dark olive-brown. Until a quarter grown it remains the same dark greenish brown colour, with a greyish white stripe along the spiracles. The legs are greyish white. As is usual in many "swallowtail" caterpillars the anterior segments of the young larvæ are swollen, so that looking at the caterpillar from above it has the exact shape of a tennis racket, the swollen segments being very flattened out sideways. The young caterpillar eats irregular patches off the thick upper surface of the leaves. It begins to feed at the edge of a leaf when about a quarter grown. When full grown the larvæ are one inch in length, of a dull dark apple-green colour, the skin being rough like shagreen. The head is pale yellowish green, and on the neck are four small circular shining black dots. A whitish line runs along the spiracles, and the legs are greyish white.

The full-grown caterpillar resembles a small caterpillar of *P. eurypylus*. When about to pupate the larvæ become very pale semi-transparent green, exactly in the same way as do the caterpillars of *P. agamemnon* and *P. eurypylus*. The pupæ in a wild state attach themselves to the upper surface of the leaves on which they feed. In the breeding-cage they wander off the leaves and fasten themselves to the glass or woodwork. The colour varies according to their surroundings. Ordinarily, if attached to leaves, the pupæ are dull apple-green, the same colour as the caterpillar. On the thorax is a sharp projecting prominence which points forward, and from the apex of this prominence run five greyish brown fine lines, one down to the front of the head, two along the sides, and two along the back. These last four meet at the tail. In the breeding-cage the pupæ which attach themselves to the glass are very pale green, almost transparent; those which prefer wood on which to pupate assume the colour of the wood. The eggs, caterpillars, and pupæ are exactly the same in colour and shape as those of *P. eurypylus*. As the food-plant is extremely local, so also is the perfect insect, but it is common where it occurs. I have never seen it hovering over water, as is described in Seitz, but it may do so. There is no water where the food-plant grows in Hong Kong. The butterfly has the usual *Papilio* habits, that is to say, it flutters its wings when feeding at flowers, and when resting sits with the wings open, the upper ones half covering the lower ones. The long thin tails are not moved independently from the hind wings, the apparent movement up and down being caused by the vibration of the hind wings themselves. During the hot weather a succession of broods come out, the pupal stage only lasting ten days at the outside. In the cold weather the pupal stage lasts from December to March. I am unable to give further minute details or illustrations, as my duties in South China as a general staff officer kept me too busy during the Chinese Revolution to keep exact records of dates as to the various changes of the larvæ skins, &c.

I notice in 'Butterfly-hunting in Many Lands,' by Dr. Longstaff, the statement on page 539 that *P. sarpedon* does not flutter when feeding. He is quite right to say does not "flutter," as the insect "vibrates" its wings. Does Dr. Longstaff mean that it keeps its wings quiet when feeding? If so, I must differ. *P. agamemnon*, *P. eurypylus*, and *P. sarpedon*, all "vibrate" their wings so rapidly that the insect only rests on flowers on the tips of its toes as it were, when feeding, the rapid movement of the wings keeping the insect almost poised like a "humming-bird" hawk-moth. Indeed, so rapidly does *sarpedon* vibrate its wings that it is difficult to see whether the insect is perfect enough to be worth catching.

There is another point with which I am not in agreement

with Dr. Longstaff. He puts forward the theory that butterflies possibly orient themselves, or lie over sideways, in order to escape detection. From observations I have made on many hundreds of butterflies in South Africa, India, Malta, Mauritius, Japan, and South China, I am convinced that the so-called orientatation, or lying sideways, is only done in order to enable the sun to warm an additional wing area. A large number of butterflies orient themselves roughly towards sundown, and open their wings for the very obvious purpose of getting the warmth from the sun as it gets lower down in the heavens. Even "swallowtails" of various kinds do it, and I have seen *P. rapae* do it in Malta. The most obvious cases of inclining sideways for purposes of warmth were two I noticed in Hong Kong on two separate days in December last. The weather was bright and sunny, but a cold east wind was blowing, cold, that is to say, for the Tropics, and few butterflies were about. On each occasion the butterfly under observation was a *Catopsilia pomona*, one a male, and the other a female. Now *C. pomona*, ordinarily, is a very rapid flyer, and when it settles it does so suddenly, with a snap of the wings as it were, and when it does settle it is generally almost impossible to see, as it closes its wings on its back and remains perfectly upright. However, on each of the two occasions now mentioned the butterflies inclined sideways, so that the wings nearest the sun were at right angles to its beams. As the season was not the usual time when *C. pomona* is out, and the day was unusually chilly, obviously the butterflies had inclined sideways for warmth and not for concealment. The result was, that instead of the butterflies being invisible when at rest, the moment they inclined over to the angle of 45° they became visible on the foliage at a distance of over fifty yards as bright yellow spots. The question of lessened shadows, as mentioned on page 551 of Dr. Longstaff's book, could not possibly arise as a means of protection. A bird would have made a bee-line for the yellow spots representing the butterflies, and the shadows would not have been seen until the bird, or the observer, was almost touching the butterflies.

Last summer, 1912, I managed to get in two months' leave to Japan. Considering the heat of the climate in July and August, and the luxuriance of the vegetation, I was disappointed on the whole with the butterfly fauna. I managed, however, to take some fifty odd species of butterflies which I wanted, and managed to get a good series of each. Among my best captures were *P. bianor* var. *maacki*. These splendid butterflies were of two different types, some having metallic green markings others metallic blue markings. The blue varieties are very fine to look at. The most local insect was *Letho callipteris*, which I only found in the woods round Lake Chuzenji, above Nikko, some 4000 ft. up. Here it was quite common. In

Seitz's 'Macro-Lepidoptera,' vol. i., page 86, there is a statement that possibly *L. callipteris* is only a local race of *L. labyrinthica*. Now *L. callipteris* is a very feeble flier. In fact, when flying it does not look like a *lethe* at all, as butterflies of this genus, at least those I have come across, *L. europa*, *L. confusa*, *L. sicelis*, and *L. diana*, are all rapid fliers, darting up and down and pitching suddenly on leaves, whereas *L. callipteris* flaps about slowly and deliberately. If, therefore, anybody can say whether *L. labyrinthica* is a butterfly of rapid flight, or a feeble flier like *L. callipteris*, the matter would be nearer settlement as to whether they are one and the same species, but local races, or not.

On the road up to Umoto from Chuzenji *Apatura ilia* var. *substituta* was common. It is easy to catch, as it likes settling on the roadway. The marsh near Umoto is a grand collecting ground. *Neptis lucilla*, *Argynnis daphne*, and *A. adippe* var. *xanthodippe* (?), occurred in crowds amongst other things, the day I spent there.

On page 10 of Seitz's work there is a statement that the caterpillar of *P. demetrius* is similar to that of *P. xuthus*, and also that the caterpillar of *P. bianor* is on the whole similar to that of *P. demetrius*. As I have bred the three above-mentioned butterflies from the larvæ, and also *P. polytes* and *P. helenus*, I must beg to differ from Seitz's statement. The caterpillars of *P. polytes*, *P. helenus*, and *P. demetrius* are almost identical in marking, colour, and size. The larvæ of *P. bianor*, at all events in Hong Kong, are quite different in appearance from the three preceding ones, and the larvæ of *P. xuthus* is, again, quite different in appearance from any of the others.

Whilst at Miyanoshita, Japan, I collected a number of larvæ which puzzled me somewhat, as I thought they belonged to *P. polytes*, of which I have bred scores. But I knew that *polytes* did not occur in that locality. Then I thought they might belong to *P. helenus* var. *nicconicolens*, but Seitz was doubtful of its occurrence in the central island of Japan. However, the puzzle was solved by the resultant butterflies turning out to be *P. demetrius*. There is no apparent difference between the larvæ of *P. polytes* and *P. demetrius*, but those of *P. helenus* are somewhat larger, and the green is brighter. Otherwise all three look the same.

On page 11 of Seitz's 'Macro-Lepidoptera,' vol. i., there is a statement that the occurrence of *P. nicconicolens* on the central island, at Nikko, requires confirmation. I saw the insect myself at Kyoto and Miyanoshita, in the central island, in August, 1912. As Miyanoshita and Nikko are both in the same island, and of the same altitude, viz., about 2000 ft., there appears to be no reason why it should not occur at Nikko.

In vol. ix. of Seitz's work, page 163, one reason for

separating *Catopsilia pomona* from *C. crocale* that is adduced is that *C. pomona* has red antennæ and *C. crocale* black ones. Judging from the behaviour of *C. pyranthe* in Hong Kong, however, this is no distinguishing mark. Looking at a series of twelve I bred here in June, 1912, I find that six are wet season (form *chryseis*) with grey antennæ, five are dry season with pink antennæ, and the twelfth, a sporting individual determined to take no chances, has one grey antenna and one pink one; otherwise being of the dry form!

There are one or two points in connection with the mimicry theory which puzzle me in Hong Kong.

P. polytes has two forms of the female here, one of which is like the male and the other is a "mimic" of *P. aristolochiæ*. The mimicking form is almost as common as the ordinary form of the female (*polytes*), yet I have never seen a specimen of *P. aristolochiæ*, either on Hong Kong island itself or in the New Territory, though it has been known to occur in Hong Kong.

Again, *Argynnis niphe*, which is very common in Hong Kong and on the mainland, has a female which might be said to "mimic" *D. chrysippus* or *D. genutia*, both of which are also common, especially the latter, which the female *niphe* most resembles. But *A. niphe* does not, as a rule, occur at either the same place or time as *chrysippus* or *genutia*.

Niphe loves the open grassy hilltops, and *genutia* the woods and edges of woods, keeping off hilltops altogether; and *chrysippus*, although not liking such woody spots as *genutia*, does not occur on the breezy uplands with *niphe*. Moreover, *niphe* occurs chiefly during the wet season, i. e., spring and summer, and is hardly ever seen in the autumn here. *Genutia*, on the other hand, is most plentiful in the late autumn, and *Chrysippus*, when it occurs in the summer, does so in places where *niphe* is practically never seen. *Chrysippus* also occurs in the autumn, but is not so common as *genutia*. It seems, therefore, to be waste of energy on the part of the female *niphe* in Hong Kong to copy the colour-scheme of insects which she very rarely comes across. Why is it done at all? She ought to have reverted locally to the colour-scheme of the male.

Hong Kong, 1913.

THE FIRST FOSSIL MYDAID FLY.

BY T. D. A. COCKERELL.

HANDLIRSCH, in his great work 'Die Fossilen Insekten,' quotes Scudder as reporting "several" Mydaiidæ (Midasidæ) from the Florissant shales. On looking up Scudder's exact words, we find that he merely said he had "several species of Midasidæ or Hermoneuridæ." Since the latter family is represented by

several described species from Florissant, Scudder's statement cannot be taken as positive evidence that he had any Mydaidæ at all, and up to the present time there has been nothing definite on the palæontology of the family. It is therefore with considerable pleasure that I recognize a veritable Mydaid among some materials gathered by one of the University of Colorado expeditions.

Mydas miocenicus, n. sp.

Represented by a wing lacking the apex, which was probably about 12 mm. long, the breadth (depth) being a little over 4 mm. : hyaline, with a broad dusky suffusion along the veins, as in some of the living forms; there is especially a fuscous cloud at the end of the discal cell. I cannot see anything in the venation which does not accord excellently with the modern genus *Mydas*. Compared with the wing of *M. vittatus*, as figured by Verrill ('British Flies,' v. p. 607), the following differences are apparent:—

- (1) Alula is broader and less produced.
- (2) End of anal cell is more distant (about 560 microns) from margin of wing.
- (3) Apex of fourth posterior cell more produced and acute, its lower apical side (from divergence of upper branch of fifth longitudinal vein to apex) 1010 microns long.
- (4) Discal cell on the combined second and third posteriors broader, the breadth 290 microns.
- (5) End of first basal cell rather broader, the breadth about 320 microns.
- (6) Stump of vein projecting into submarginal cell from base of second submarginal longer, about 560 microns.

The costa carries many short black bristles.

M. miocenicus was found at Station 14, in the Miocene shales of Florissant, Colorado, by Mr. Geo. N. Rohwer.

According to Williston, the known living Mydaidæ include about a hundred species, especially found in Australia, Africa, and South and Central America. *Mydas* occurs in New Mexico and Arizona.

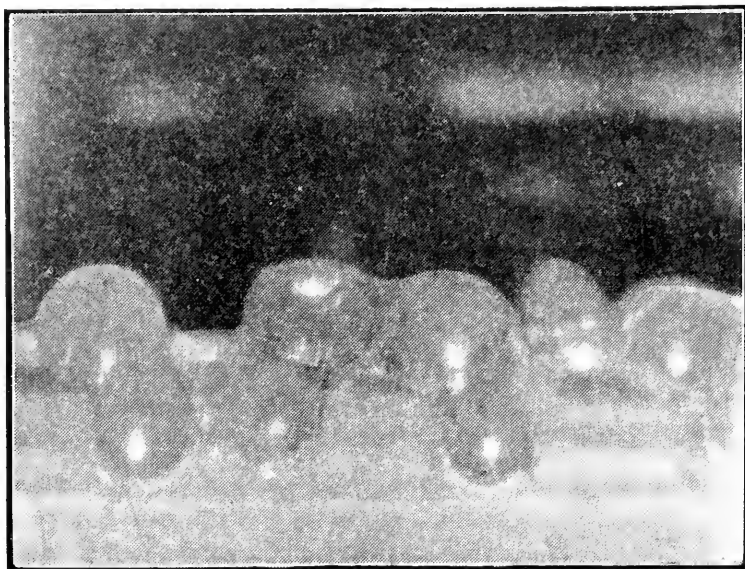
NOTES ON THE OVA OF *LEUCANIA UNIPUNCTA*
(*EXTRANEAE*).

BY R. GEOFFREY TODD, F.E.S.

I was last year on the South Devonshire coast, and had the good fortune to take two specimens of *Leucania unipuncta* (*extranea*). A few notes on the ova of this uncommon migrant may be of interest.

The first specimen was taken at sugar on August 28th. It was a female, and in hope of ova was placed in a tin containing grass-heads and dead reed-stems, and fed with sugar and water. It was very sluggish, and as it did not seem inclined to lay, it

was killed on September 3rd. A second specimen, also a female, was taken at sugar on August 31st, and was kept in the same way, with the result that on September 11th three small batches of ova were deposited. The moth died on September 14th, without laying any more eggs. The ova were laid in irregular



batches, in the sheathing leaf of a dead reed-stem; they were $1\frac{1}{2}$ mm. in diameter, yellowish in colour, round, with a smooth surface, devoid of markings. Each ovum was surrounded with a thick glutinous substance. A slight shrinking of the ova was observed on September 16th, and they ultimately proved to be infertile. I am indebted to Mr. Tonge for the photograph.

The Limes, Hadley Green, Barnet.

LIFE-HISTORY OF *EREBIA EPIPHRON*.

By F. W. FROHAWK, M.B.O.U., F.E.S.

As there is apparently no published description of the larva of *E. epiphron* in its last stage, I append the following complete life-history, having recently succeeded in rearing this species through all its various stages from eggs obtained from captive females last summer.

The egg is rather less than 1 mm. high, standing erect, of an oblong shape, rather fullest below the middle, a flattened crown

and rounded base. There are from eighteen to twenty longitudinal keels, some rising just below the crown, where they form a ridge, above which are angular projections; the surface between the keels is very finely ribbed transversely; the micropyle is very slightly sunken. The whole structure is irregular and asymmetrical. The colour when first laid is a bright clear yellow, which gradually becomes rather duller; on the fourth day it is speckled and blotched with pale reddish brown—these gradually deepen into rust-red; afterwards it assumes a deeper drab hue, and finally the young larva shows plainly through the delicate shell, and hatches on the eighteenth day. The larva makes its exit by eating away the crown of the egg.

Eggs laid July 6th hatched July 24th, remaining eighteen days in the egg state.

Directly after emergence the larva measures 2 mm. long. The head is large and rounded, the surface rather deeply punctured, the clypeus very finely outlined; about two dozen minute brown warts are scattered over the surface, each emitting a short whitish bristle; the eye spots are black and brown, the mouth parts ochreous and dark brown; a few longer curved bristles surround the mouth. The colour of the head is pale ochreous, the punctures rather darker.

The body has the first segment larger than the rest, and gradually tapers to the anal extremity. The surface is finely granulated, of a very pale yellowish buff, rather yellower over the ventral surface. There are in all seven longitudinal orange-tawny lines, one medio-dorsal and three on either side above the spiracles. The segments rather deeply subdivided, and have each a number of shining black warts, each bearing a short, curved, whitish, thorn-like spine, three above and two below the spiracle on each segment. The spiracle is black and shining also. The legs and claspers are unicolorous with the body.

Directly after it has emerged it eats a large portion of the empty shell, which forms its first meal.

Before first moult, when nineteen days old, it measures 4 mm. long; it is then rather stoutish about the fourth segment, whence it gradually tapers posteriorly. The colour is green, with darker green longitudinal stripes and a subdorsal and subspiracular white stripe, the dark stripes being the orange ones before feeding. The head remains unchanged.

It feeds principally at night, resting on the grass-blades during the day in a straight attitude, and falls to the ground at any disturbance. It is exceedingly sluggish in its movements. The first moult takes place about the end of the first week of August.

Shortly before second moult it measures 6 mm. long. The colour is a pale green; a medio-dorsal darker green line; a whitish subdorsal line, bordered on either side by a fine darker

green line; a grass-green spiracular band, bordered above by a fine subcutaneous whitish line, and below by a broad and conspicuous white stripe, terminating in the anal point, which is again bordered below by a grass-green band blending into the pale green of the ventral surface. The head is pale ochreous green, marked with brownish pink above the mouth, which is brown. The body is sprinkled with extremely minute dark brown warts, each emitting a tiny whitish spinous hair. The legs and claspers are tinged with pinkish brown.

Second moult end of third week of August.

After second moult, forty-five days old, it is 9 mm. long. The head is now light grass-green; in other respects it is similar in colour and markings to the previous stage. The stripes are strongly defined and conspicuous.

In this stage they enter into hybernation, gradually becoming less active and feeding at longer intervals between each meal. Hybernation commences during September, usually during the last ten days, and is continued for about five months, *i. e.* lasting until March.

During the first week of March, one larva was observed feeding on the tip of a blade of fescue-grass. During this month the larva fed by day, when the sun sufficiently warmed the temperature.

On March 31st this particular larva, when two hundred and forty days old, had attained a length of exactly 12 mm. All the colours had become richer, and the markings clearly defined; the lateral stripe pale yellowish white, and the subdorsal stripe white. In all its movements it is very slow and slug-like.

On April 6th it spun itself up for the third moult, but owing to the continuous cold, sunless weather of the first half of the month, the average day temperature being only about 40°, the larva remained undergoing the change for eight days, moulting on April 14th.

The following day it fed a little, and again once on the 16th. The next day being warm with sunshine, shade temperature 52° to 54°, it fed two or three times.

After the third and last moult, fully grown, it measures 19 mm. long. The head is globular and green, roughly granulated, and sprinkled with minute whitish bristles; mouth parts and eye spots brown and ochreous.

The body is fusiform, the anal extremity terminating in two points similar to those of *Cænonympha pamphilus* in structure, but tinged with dull ochreous instead of pink. The ground colour is grass-green, with a darker green medio-dorsal longitudinal stripe bordered by a whitish green line. It is boldly marked longitudinally with two conspicuous dull white stripes; the first is subdorsal, bordered on each side by a darker green line; the second is lateral, and stands out in strong contrast against the

darker green ventral surface; midway between these two stripes is a faint and fine whitish green line, and another broader subcutaneous line of the same colour immediately below the spiracles, which are small and have a pale yellow anterior blotch. The legs are pale olive and the claspers green. The entire surface is granular and sprinkled with minute black claw-like points, each rising from a pale spot.

Although the larvæ in captivity readily feed on *Poa annua*, *Festuca ovina*, and other grasses, its natural food-plant in a wild state is *Nardus stricta*.

When feeding on *P. annua* and other soft grasses it eats away the sides of the blades, but with *Festuca*, *Nardus*, and other hard rush-like species it eats away the ends, always starting at the extreme tip of the blade, taking slow and deliberate bites, apparently biting it through with some difficulty.

During the last stage the larvæ frequently feed in the daytime, but mostly so at night.

A larva which moulted on April 14th, 1913, for the third and last time, ceased feeding on May 14th, and pupated on the 19th, remaining thirty-five days in the last stage, and its total larval existence occupied a period of two hundred and eighty-eight days.

The pupa measures from 10 mm. to 11 mm. long; it is more elegantly formed than that of *E. blandina*, as it is without the dorsal swelling of the second and third abdominal segments, and rather more slender in proportion.

Lateral view: The head is somewhat square in front, thorax rounded, metathorax sunken, abdomen swollen at the middle, conical and tapering, anal segment terminating in a decurved elongated cremaster without any hooks, abdomen and wings running in a continuous curve ventrally.

Dorsal view: Head truncated, slightly angular at base of wings; these and the abdomen are uniform in outline, later conical, cremaster pointed.

The ground-colour varies from light yellow-green to cream. The palest cream forms have the thorax and wings pale ochreous buff, abdomen cream or pale primrose-yellow. In all forms the head is slightly darker. The head, thorax, limbs, and wings are streaked with olive-brown; the wing-streaks run parallel between the nervures and along the discoidal cell; the antennæ, tongue, and eye are strongly outlined with the same colour, and a medio-dorsal streak extends from the head to the metathorax, blending into the green dorsal vessel, which forms a slightly darker longitudinal stripe; the abdomen is more or less speckled with olive and dusky dots, some very minute, mostly running in longitudinal series; the largest spots are on the ventral surface. The thorax and abdomen are sprinkled with minute spines, and the surface is finely granular. Being without cremastral hooks, the pupa is detached, merely resting low down among the grass-stems, which

are loosely spun together, forming a very slight cocoon-like structure. At first the colour is a translucent yellow-green, palest on the abdomen, which is streaked exactly similar to the larva, each stripe corresponding precisely in form and colour; all the markings and speckles are pale olive.

The pupal state occupies about twenty-one days.

A FOSSIL ASILID FLY FROM COLORADO.

By T. D. A. COCKERELL.

Cophura antiquella, n. sp.

Slender, length to end of fourth abdominal segment, $8\frac{1}{2}$ mm.; wings 6 mm. long and 2 broad, hyaline, without markings, venation extremely pale, but apical half of costa darkened; head as preserved obtusely subconical, not as broad as thorax; antennæ about $640\ \mu$ long, the third joint broad and fusiform, its width near base about $160\ \mu$; the part basad of the third joint exhibits what look like three lateral stout processes or pectinations, but these are discordant with the other characters of the insect, and are probably due to imperfection of preservation; thorax dark, doubtless black in life; abdomen elongate, pallid, with large quadrate dark dorsal patches on the segments, as in the living *C. fur* (Williston); legs pale ferruginous, the tibiæ with a very thin, microscopical pilosity; tibiæ long, the anterior ones $1\frac{2}{3}$ mm., the posterior ones about 3 mm., conspicuously longer than their femora, gently broadening (not abruptly swollen) apically; hind tarsi thick. Venation (measurements in microns): marginal cell open; five posterior cells, all open; anal cell closed a short distance before margin; venation normal for the genus; width (depth) of first submarginal cell at level of base of second 430; length of upper side of second submarginal 1760, its apical width 530, its width 320, from apex of wing 480; anterior cross-vein to base of second submarginal cell 1090; discal cell on first posterior 800, on second posterior 160, on third posterior 160.

Miocene shales of Florissant, Station 13 B (*Geo. N. Rohwer*).

Small *Dioctria*-like Asilidæ were evidently common at Florissant in Miocene times. The species of this group so far known may be tabulated as follows:—

Anterior cross-vein about as distant from base of second submarginal cell as the length of that cell (a good character also for recent *Dioctria*)

Dioctria florissantina (Ckll.).

Anterior cross-vein not nearly so far from base of second submarginal cell as the length of that cell . . . 1.

1. Second submarginal cell over 2400 microns long, its base 1309 from anterior cross-vein; anal cell open

Nicoles miocenicus, Ckll.

Second submarginal cell less than 1920 microns long . . . 2.

2. Second submarginal cell comparatively narrow, its depth 320 microns, from apex 256μ . . . *Taracticus contusus*, Ckll.
 Second submarginal cell broader toward apex, its depth 320 microns, from apex 480μ ; wing 6 mm. long . . . 3.
3. Apical sides of discal cell equal (160μ), as in the living *Taracticus octopunctatus* and *Cophura fur*, the apical angle of the cell little greater than a right angle; venation pale *Cophura antiquella*, Ckll.
- Apical sides of discal cell unequal, that on third posterior twice as long as that on second, as in the living *Nicoles rufus* and *Cophura clausa*, the apical angle of the cell very much greater than a right angle; venation dark *Taracticus renovatus*, Ckll.

These can be readily distinguished from typical *Leptogaster* by the base of the second posterior cell, which is strongly produced in *Leptogaster*. I have not found *Leptogaster* in the Florissant shales, but Professor Melander has kindly sent me a photograph of a very good specimen he found among the Florissant materials now in his hands. This fossil has the second posterior cell produced in the manner of the European *L. cylindrica* and *L. guttiventris*, and the European fossil, *L. hellii*, Unger; but the latter, if Heer's figure is correct, is very peculiar in having the anterior cross-vein meeting the basal end of the second posterior cell, and the anal cell broad in the middle and greatly narrowed apically. In the American *L. badius* the anal cell is narrowed apically as in *L. hellii*, but the second posterior cell is no more produced basally than in *Cophura*. *L. cylindrica* (*tipuloides*, Fabr.) is the type of *Leptogaster*; *L. badius*, Loew, may stand as the type of a new subgenus (or genus?).

TIPULOGASTER.—This also has the second submarginal cell shorter than in typical *Leptogaster*, while the distance between its base and the anterior cross-vein is much greater.

FIVE MONTHS' BUTTERFLY COLLECTING IN COSTA RICA IN THE SUMMER OF 1911.

BY MARGARET E. FOUNTAINE, F.E.S.

(Concluded from p. 195.)

Dircenna euchytna, Feld.—Five specimens, including two females from Guapiles; and one only from San José. Much rarer than *klugii*.

Colloleria tutia, Hew.—One female from Limon in August.

Ithomia heraldica, Bates.—Two males in June, and one female in July; all from San José.

I. patilla, Hew.—Not common at San José. I bred it from a larva found at San Antonio; it was greenish, and most insignificant

looking, but the pupa was polished gold on a green ground, and most beautiful.

I. jucunda, Godm. & Salv.—Taken at Guapiles and Limon, not at all abundant.

Pteronymia fulvescens, Godm. & Salv.—A pair from San José in July.

Actinote anteus, Doubl. — Only seen on the wet grassy field in front of the Pacific station at San José.

A. melampelos, Godm. & Salv.—One specimen only from Guapiles in April.

A. nox, Bates.—One specimen caught at San Antonio, near San José, in May.

Heliconius zuleika, Hew.—This fine *Heliconius* we first saw at Limon in March and April. It was, however, in greater numbers and more easily caught in the baranco near Santo Domingo in July.

H. leuce, Doubl.—At Limon in March, April, and August. It flew high, and was difficult to catch in consequence.

H. galanthus, Bates.—Of this closely allied, but even more beautiful, species, one was taken at Limon in March, one at Guapiles, and two near Limon in August. It was less common at Limon than *leuce*, though I do not recollect seeing the latter at Guapiles at all.

H. demophoon, Mén.—Mostly from San José, where it was common, though I have two specimens from Guapiles.

H. amaryllis, Feld.—Two only, from Limon in March and April.

H. charithonia, Linn.—Two from San José, where (especially at Santo Domingo) it was fairly common. They are larger, and the black is more extended than in the specimens I have from Jamaica.

H. montanus, Salv.—Very scarce. Only observed at San José.

H. sara, Fabr.—Common at Guapiles in April and May, but much less so at Limon, where it occurred in the spring, and again in August.

Eueides hübnéri, Mén.—Fairly common near San José, especially at Santo Domingo. I have also one very large female taken at Rio Grande on July 27th.

E. aliphera, Godt.—Occurred at Limon in March and April. The specimens seem rather paler than those from Trinidad.

E. olympia, Feld.—Occurred also at Limon. Not very common.

Colænis delila, Fabr.—Common at San José, also seen at Guapiles.

C. pharusa, Linn.—Common at Guapiles, less so at Limon. Only one specimen taken at San José, and no others seen. I bred it from Guapiles, the larva when full grown is a rich, deep, purple-brown, covered with long black spikes; it feeds like that of all the closely allied genera on a kind of *Passiflora*.

Dione juno, Cram.—Very common at San José in July. Occasionally seen at Limon and Guapiles.

D. vanillæ, Linn.—Widely distributed, but most common at San José. A huge form, nearly twice as large as some of the Jamaican specimens; the larva, too, differed somewhat from those I had bred in that island, besides of course being a good deal larger.

D. moneta, Hübn.—Rather scarce at Cartago in May; abundant at San José in July. The larva is black, broadly speckled with yellow, and has the usual black spiracles. Feeds on *Passiflora*.

Euptoiete hegesia, Doubl.—Common at San José, still more so at Rio Grande.

Phyciodes anieta, Hew.—One specimen from Guapiles.

P. lelex, Bates.—Taken only at Limon. Four specimens.

P. subota, Godm. & Salv.—A much darker species. Common at San José; taken also at Cartago.

P. cassiopea, Godm. & Salv.—One female only, from Limon in March.

P. theona, Mén.—Scarce at San José; common, but *passé*, at Rio Grande on July 27th.

Eresia clara, Bates.—Two specimens from Limon in March and April.

Synchlœ janais, Drury.—Occurred everywhere. I found some larvæ at San José feeding on a kind of *Pilea*. It is black with red spots, and is thickly covered with short brown spines. The pupa is pale straw colour, streaked and spotted with black.

S. lacinia, Hübn.—One specimen taken at Cartago. Fairly common at Rio Grande.

S. hippodrome, Hübn.—This beautiful species we first saw flying over the smooth surface of a slowly flowing river, which crept through the swampy forest near Limon. We did not see it at Guapiles or San José; but at Rio Grande it was one of the commonest species there.

S. pæcile, Feld.—Two females only, both taken at Rio Grande.

S. narva, Fabr.—One male only from Guapiles.

S. quadialis, Bates.—Not uncommon at one place in the bush near Guapiles; females very scarce.

Dynamine ate, Godm. & Salv.—At Limon in March and April.

D. salpensa, Feld.—Two males from Limon in April.

D. thalassina, Boisd.—A male and female from Limon in April.

Callicore astata, Guér.—Bersa caught one specimen of this lovely butterfly on wet mud in the neighbourhood of the Savannah, at San José.

Ectima rectifascia, Butl.—One only from Guapiles.

Pyrrogyra otolais, Bates.—One specimen only from Limon in March.

Adelpha iphicla, Linn.—One taken at Limon in March.

A. cytherea, Linn.—Not uncommon at Limon in March and April. Difficult to take in good condition.

A. mephistopheles, Butl.—I caught one specimen on the Savannah, at San José. We did not see any others.

Vanessa huntera, Fabr.—Several taken at San José.

V. cardui, Linn.—This cosmopolitan butterfly was flying about the flowers in the Public Gardens at Cartago in May.

Timetes chiron, Fabr.—Occurred at Guapiles, and much more plentifully at San José.

T. coresia, Godt.—At Cartago and San José; scarce in both localities.

T. marcella, Feld.—Cartago and San José; also rather scarce.

T. petreus, Bates.—One specimen from Guapiles. A continuous occurrence of individuals of this species was observed by me one day at San José, passing overhead, always in the same direction, though not more than one at a time. Unfortunately they were invariably out of reach of the longest handled net, which was all the more annoying as they appeared to be in perfect condition, suggestive of recent emergence.

Eurema lethe, Fabr. — Taken only near San José. Not at all common.

Eiphile adrasta, Hew.—Only one taken at San José; no others observed.

Junonia lavinia, Cram.—Recorded only from San José, but I feel sure I saw it in every other locality we visited.

Anartia jatrophae, Linn.—Common in one place just outside the town of Limon. Occurred, but not very commonly, at Guapiles.

A. fatima, Fabr.—Abundant everywhere.

Anne glycerium, Doubld. & Hew.—Only seen near San José, not uncommon, but rather difficult to catch, and often damaged.

Cæa cadmus, Cram.—One specimen only from Guapiles, where a few others were observed.

Amphirene epaphus, Latr.—Scarce at Guapiles in May, but very common at San José in June and July, especially on the *Lantana* flowers, in the baranco near Santo Domingo.

Ageronia ferentina, Godt.—One from Guapiles, and one from Limon; several others were seen.

Gynæcia dirce, Doubld. & Hew.—I did not once see this butterfly on the wing in Costa Rica, and am only able to include it in this list because a small larva I found at Limon, feeding on the leaves of the trumpet-tree (*Cecropia peltata*), produced a fine male of this species, which was previously quite unknown to me: though some months later in Jamaica and Trinidad, in localities where *dirce* was fairly common, I bred a good many more. The larva is velvety black, with two long, spiky horns protruding from the head, of a brownish-drab colour, and it is ornamented throughout with spiky spiracles of a pale lemon-yellow colour, changing to white in the immediate region of the head.

Smyrna karvinskii, Hübn.—I took one specimen of this butterfly close to the station at Rio Grande, while we were waiting for the train to take us back to San José. It was so cryptic when settled that had it not been for the sharp eyes of a small Spanish boy, who earned a well-merited half-colon for his most desirable assistance, I should never have detected it. The specimen was absolutely fresh, but had two slight injuries to the lower wings, so entirely alike and symmetrical that at first I thought it was their natural shape.

Limnas pixe, Boisd.—First taken at Guapiles, fairly common at San José in June; but unfortunately I failed to discover that it was not a moth till later on in July, when but few of the specimens were worth netting.

Nymphidium lyorias, Hew.—One from San José in July.

Euchenais aristus, Stoll.—Two from San José in June.

Lemonias lilina (?), Butl.—One from San José in July.

Emesis ops, Latr.—One from San José in July.

E. ocyppore, Geyer.—One from Guapiles in May.

E. lupina, Godm. & Salv.—Neither sexes scarce at San José in July.

Cremna umbra, Boisd.—One from Guapiles in May.

Charis macularia, Boisd.—Also only one from Guapiles in May.

Pierella luna, Fabr.—A few taken in a cocoa plantation at Sabborio, near Limon, in August. Seen nowhere else.

Euptychia hermes, Fabr.—At Guapiles and Limon.

E. hesione, Staud.—Also only seen at Guapiles and Limon. Very difficult to find in good condition.

Thecla hesperitus, Butl. & Druce.—One specimen only from San José in July.

T. empusa, Hew.—One specimen caught at San José the same day as *hesperitus*.

T. azurinus, Butl. & Druce.—I caught one beautiful specimen at Guapiles in April.

T. beon, Cram.—Not uncommon at Limon in April.

T. aufidena, Hew.—One male and one female, both caught by Bersa on the same day at Limon in April.

T. togarna, Hew.—Occasionally met with at Limon, and afterwards at Guapiles.

T. phœa, Godm. & Salv.—Two specimens from Herr Brade's garden near San José in July.

Timolus basatides, Geyer.—Two specimens from San José in June and July.

Rekoa meton, Cram.—Occasionally seen and captured near San José.

Chilades theonus, Lefebvre.—One from Limon in March.

Epargyreus zestos, Hübn.—One from San José in July.

Telegonus alardus, Stoll.—One from San José in July. Others were seen, but it seemed to be very difficult to come across this beautiful "skipper" in good condition.

Pyrrhopyge venezuelæ, Doubl. — One (very fine) taken at Rio Grande.

Thymele fugerator (?), Walsh.—I bred several of what I believe to be this species at San José, in June and July, from larvæ found when very young on a kind of wild sweet pea. The young larva creates for itself a little tent-shaped covering on the edge of the leaf by eating away a narrow groove, and then turning over a piece of it, and securing it by a web in the position desired, from which it only emerges to feed. When full-grown it is a beautiful object, bright apple-green, thickly irrorated with lemon-yellow. The head is shiny russet-brown, with an orange spot on either cheek; the rudimentary legs are red.

Eudamus proteus, Linn.—I saw this butterfly not unfrequently but having already secured a long series in Cuba, all I seem to have from Costa Rica is one bred specimen from a larva I found while searching for the preceding, which it resembles in its habits.

E. nigricauda, Mabille.—Bred on a coarse kind of grass, from an ovum I saw laid by a wild female at Limon in April. The full-fed larva is a rich russet-brown, with a row of seven white dots on either side. The head is shiny black.

Achlyodes ozotes, Butl.—Fairly common at San José in June and July.

Antigonus nearchus, Latr.—Taken only at Limon in April, and again in August.

Eantis (?).—A large dark brown velvety species, which is well represented at South Kensington, but appeared to be at present unnamed. I have one from Limon.

Thanaos clitus, Edw.—This pretty white-fringed "skipper" was very common at Santo Domingo in June and July.

Pellicia bipuncta, Schaus.—One specimen from Limon in August.

P. nyctineme, Butl.—Also only one specimen from Limon in August.

Systasea crosus, Hübn.—One specimen from Limon in April, and one from Rio Grande in July. Several others were seen.

Chiomara mithrax, Möschler.—One specimen from Limon in April.

Cocceius pylades, Scudder.—Two specimens from San José in June and July.

Xenophanes tryxus, Cram.—One from Limon in April, and one from San José in July. Several others were seen.

Theagenes hamatospila, Feld.—One worn female from Limon in April.

Carystus cynara, Hew.—The larva of this "skipper" feeds on the palm-leaves, and I occasionally came across it while looking for the larvæ of *Opsiphanes crameri* at San José. I have three specimens bred from larvæ, and one from a pupa found by Mr. Alan Wood. Both are white and chalky in texture.

Atarnes sallei, Feld.—One from San José in July; no others observed.

Mylon zephus, Butl.—One from San José in July; few others were seen.

Heliopetes laviana, Hew.—Fairly common at Santo Domingo in June and July.

H. arsalte, Linn.—Males very common at Limon in March, April, and August. One specimen (a female) from San José, the only female I have, and the only specimen I took in that locality, where this butterfly was decidedly scarce.

Hesperia syrichtus, Fabr.—Common all over.

Before concluding these notes, I should like to express my grateful thanks to Mr. N. D. Riley, and also to Mr. W. Schaus, for the very kind help they gave me in the somewhat difficult task of identifying my specimens in the National Collection at South Kensington.

February 16th, 1913.

NOTES AND OBSERVATIONS.

THE KING AND THE ENTOMOLOGICAL SOCIETY OF LONDON.—At the last meeting of the Entomological Society of London it was announced that H.M. the King had been pleased to become a patron of the Society. This is the first occasion when the Sovereign has demonstrated officially his interest in our branch of science and the work associated with it, and we offer, therefore, our brother entomologists hearty congratulations upon the honour conferred on them. For those of us who have been present when His Majesty has been the guest of the Royal Society know very well that his interest in matters scientific is something more than formal. But many years have elapsed since a meeting of the Society was honoured by the presence of Royalty. The first (and last) royal names signed in the Fellows' Obligation Book are those of the Princess Victoria (afterwards Queen-Empress), and of her mother, the Duchess of Kent, who were present soon after the foundation of the Society in 1833.

CRANE-FLIES AND SWEETS.—In a lane here on May 23rd I was much struck by the unwonted attitude of a female *Tipula peliostigma*, which was sitting on a dog-wood leaf in the hedge with her body closely adpressed. This appeared so unusual in the insects of the present genus, which seem to invariably stand high upon the tips of their elongate legs, that I looked more closely, and found that she was greedily sucking the honeydew which had fallen from a batch of the Aphidid, *Drepanosiphum acerina*, Walk., on a superimposed maple shoot. I have never met with *Tipulæ* on honeydew before, and consider the incident remarkable; but that the genus is fond of sweets is, I believe, a well-known fact. *Tipula marmorata* and *T. confusa* were both taken on overnight "sugar" in a north-east wind on the afternoon of September 23rd, 1898, in Bentley Woods, near Ipswich (along with several *Limnobia bifasciata*, Schr., which had occurred in the same situation on both the 13th of the same month and August 10th, 1895); and I find in my diary a note under September 9th, 1907, that on that day a female *Tipula oleracea* was observed by me "distinctly sucking the sweets from the stylopods of *Angelica sylvestris* by the River Waveney" at Beccles, in Suffolk.—CLAUDE MORLEY; Monks Soham House, Suffolk.

INDIAN ICHNEUMON SYNONYMY.—It may be well to put on record the synonymy of the fourteen species inadequately described by Peter Cameron in 1897 (Manchester Phil. Soc. Memoirs, 1897, no. 4, pp. 3 *et seqq.*), of which I have examined all the types:—(1) *I. agrensis*, male, = *Ischnojoppa luteator*, Fab. Ent. Syst. Suppl. 1798, p. 222. (2) *I. appropinquans*, female, = *Myermo rufipes*, Cam. Ann. Nat. Hist. vii. 1901, p. 524, female. (3) *I. buddha*, female, = *Ichneumon buddha*, Cam. (closely allied to *I. extensorius*, Linn.). (4) *I. clotho*, female, = *Lareiga alboannulata*, Cam. Zeits. Hym.-Dip. 1905, p. 246, female. (5) *I. confusaneus*, female, = *Phaeogenes confusaneus*, Cam. (hardly distinct from *P. impiger*, Wesm.). (6) *I. hypocrita* = *cratoeryptus* (Thoms. = *finchra*, Cam. Zeits. Hym.-Dip. vii. 1907, p. 463) *hypocrita*, Cam. (7) *I. inquietus* = *Oiorhinus inquietus*,

Cam., female (the clypeal structure is distinct). (8) *I. intaminatus*, male, = *cratocryptus* (Thoms., nec Cam., Journ. Str. Br. R. Asiatic Soc. xlv. 1905, p. 141 = *suvalta*, Cam.) *intaminatus*, Cam. (9) *I. integratus*, male, = a *Fileanta*, very like the next species. (10) *I. numericus*, male, = *Fileanta numerica*, Cam. (closely allied to *F. balteata*, Cam. Ann. Nat. Hist. vii. 1901, p. 526). (11) *I. rothneyi*, female (sic male), = *Protichneumon* (= *Amblyjoppa*, Cam.) *rothneyi*, Cam. (near *P. pisorius*, L.). (12) *I. taprobance*, female, = a typical *Amblyteles*, possibly a mere form of *A. uniguttatus*, Grav. (13) *I. vacillans*, male, = *Eretastes vacillans*, Cam. (allied to *E. lucifer*, Morl.). (14) *I. vishnu*, male, = *Barichneumon vishnu*, Cam.—CLAUDE MORLEY: May, 1913.

GIFT OF BUTTERFLIES TO LEEDS UNIVERSITY.—The University of Leeds has recently received a valuable addition to its scientific collections in the presentation by Mrs. A. H. Clarke, of Earl's Court, of the collection of Continental and Exotic Macro-Lepidoptera made by her late husband, who was one of the Senior Fellows of the Entomological Society, and, up to a few years of his death in 1911, a frequent contributor to the 'Entomologist's Record.' Mr. Clarke's pursuit of entomology was a lifelong recreation in the intervals of a busy City career. In earlier years he was an active butterfly hunter, both in England and upon his holiday tours abroad, and the specimens so acquired formed the basis of his British and European collections, the latter of which (containing some 6500 specimens) is included in Mrs. Clarke's donation to the University. Mr. Clarke also got together, by judicious purchases extended over many years, one of the most representative collections of exotic butterflies in the possession of any amateur. This part of the collection consists of nearly 6000 specimens from all parts of the world, and is particularly valuable as a reference collection, not merely from the number and careful selection of the forms represented (some being of great rarity), but from the perfect condition and beauty of the specimens themselves. The whole donation enriches the entomological resources of the University by over 12,000 specimens, all carefully set, arranged and labelled; and to this Mrs. Clarke has generously added her husband's working library of entomological literature, itself a present of great value and utility. The University authorities wish it to be known, in conformity with Mrs. Clarke's desires, that, after the immediate work of arranging and cataloguing has been concluded, the collections will be available for reference by entomologists generally upon application to the Professor of Zoology at the University.

PHRYXUS LIVORNICA AT CLIFTON.—It may be of interest to record that a fine male *Phryxus livornica* was captured by Mr. Cyril H. Walker, F.R.C.S., on June 2nd last. It was hovering over flowers in his garden in Oakfield Road, Clifton.—GEO. C. GRIFFITHS; Penhurst, 3, Leigh Road, Clifton, Bristol.

COLIAS EDUSA NEAR COLCHESTER.—On June 14th I saw a specimen of *Colias edusa* flying swiftly just outside Wivenhoe Station near here.—B. S. HARWOOD; 62, Station Road, Colchester.

COLIAS EDUSA IN ESSEX.—While I was cycling yesterday on the high-road between Brentwood and Chelmsford, twenty-two miles from London, a fine male specimen of *C. edusa* passed within a yard of me, going at a great rate before the wind and was over the hedge before I could dismount. The day was very hot and sunny, with a strong south-west wind, and there was a large clover field in the direction it had come from. It was apparently freshly emerged. Is not this very early and unusual?—R. S. GWATKIN-WILLIAMS, Commander R.N.; 70, Lissenden Mansions, Highgate Road, N.W., May 31st, 1913.

COLIAS EDUSA IN HERTFORDSHIRE.—On May 30th I took a fine male specimen of *Colias edusa* on the chalk hills about five miles from Hitchin. It appeared to be perfectly fresh. I hear that another specimen, also a male, was seen near Hitchin on or about the same date. We do not commonly see this butterfly in Herts except in "*edusa*" years. Perhaps this year will be one?—A. H. FOSTER; Hitchin, Herts.

COLIAS EDUSA IN KENT.—I have pleasure in recording the capture of two female *C. edusa*, a pair *in cop.*, and several males at Folkestone on June 15th and 16th. All, especially the females, were in very bad condition and evidently immigrants. I may add that I only saw one specimen of *Pyraucis atalanta* and two examples of *P. cardui* during four days' stay.—L. W. NEWMAN; Bexley.

COLIAS EDUSA NEAR LONDON.—On June 3rd, about 12.45 p.m., I had the pleasure of seeing a female *Colias edusa* flying in Kew Gardens.—B. W. ADKIN; 8, Hope Park, Bromley, Kent.

COLIAS EDUSA IN SUSSEX.—On June 2nd I saw three specimens of *C. edusa* (two males, one female) near Hailsham; and on June 13th I found males of the species flying freely at Beachy Head.—J. T. DEWEY; 79, Hurst Road, Eastbourne.

I have to-day seen three specimens of *Colias edusa*; I was so surprised that I stopped to watch them, and one settled close to my feet.—WM. A. CAREY; 36 and 38, Devonshire Road, Bexhill-on-Sea, June 17th, 1913.

DRUCE COLLECTION OF LEPIDOPTERA.—A magnificent collection of butterflies and moths, with its many types, formed by the late Herbert Druce, Esq., has passed into the Joicey Collection at "The Hill," Witley, Surrey, with the exception of the Lycaenidæ and Hesperidæ, which are retained by Hamilton H. Druce, Esq. Entomologists are cordially invited to use the collection for naming and comparing.

ENTOMOLOGICAL CLUB MEETINGS.—May 19th, at Simpson's Tavern, 100, Strand. Mr. Alfred Sich in the chair. Other members present were Messrs. Adkin, Rowland-Brown, and Donisthorpe. June 17th, at Wellfield, 4, Lingards Road, Lewisham, S.E. Mr. Robert Adkin in the chair. Messrs. Hall, Rowland-Brown, and Sich

were the other members who attended. Several other entomologists were present, as guests, on each occasion.—RICHARD SOUTH (*Hon. Sec.*).

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*May 8th.*—Mr. A. E. Tonge, F.E.S., President, in the chair.—Mr. E. B. Haynes, of Wimbledon, was elected a member.—Mr. H. E. Page exhibited a short series of *Erebia zapateri* taken by him in Spain, and which he was placing in the Society's cabinet.—Mr. Hugh Main, two living field-cricket from Lisbon in the curious cage in which they are kept for "singing." One specimen gave an exhibition of his power in the room.—Mr. J. Platt Barrett, larva and pupa of *Thera variata* on spruce from the New Forest, and two fine Saturniids from Nairobi.—Mr. Sich, Rhopalocera from the South Tyrol, *P. machaon*, *P. podalirius*, *Lybithea celtis*, *Scolitantides orion*, *Glaucopsyche iolas*, &c., and read a paper entitled "Spring in the South Tyrol."

May 22nd.—Mr. A. E. Tonge, President, in the chair.—Messrs. Edwards, West (Ashtead), and Carr, exhibited pale blotched examples of *Epinephele jurtina*; Mr. Adkin, a series from various British localities, some near var. *hispulla* and one ab. *splendida*; Mr. Gibbs, a series from Algeria, Corsica, Balkans, Vosges, Jura, &c., including var. *hispulla*, var. *fortunata*, var. *taurica*, &c., and short series of other species of the genus, *E. junioides*, *E. ida*, *E. pasiphaë*, *E. tithonus*, with many vars. and aberrations; Mr. Hy. J. Turner, a series from Portugal, Spain, Pyrenees, Teneriffe, Hyères, Corsica, Algeria, Crete, Greece, Turkey, Switzerland (many places), Niederwald, Juras, French Alps, &c.—Mr. Main, colour photographs of *Tephrosia crepuscularia* taken by himself.—Mr. Tonge, bred series of *Lobophora carpinata* from Tilgate Forest; two specimens were distinctly green tinged.—Mr. Turner read a paper entitled "One of our Common Butterflies, *Epinephele jurtina*," showing the growth of our knowledge of the species from the time of Linnæus, 1758, and the consequent growth of the nomenclature.

June 12th.—Mr. A. E. Tonge, F.E.S., President, in the chair.—Mr. R. Adkin exhibited tobacco leaves that were much infested by a species of beetle which was afterwards identified as *Anobium panicum*. The tobacco came recently from Turkey.—Mr. West (Greenwich), a series of the new hemipteron, *Psylla albipes*, discovered by him on white-beam tree.—Mr. Coxhead, blackthorn leaves with galls of the dipteran, *Cecidomyia pruni*, from Shooter's Hill.—Mr. Cowham, an aberration of *Abraxas grossulariata* with the black markings on the fore wings coalesced to a wide band suppressing the usual yellow markings.—Mr. H. Moore, larvæ of the stag-beetle, *Lucanus cervus*, from Lewisham.—Mr. Blenkarn, a series of *Bruchus pisi*, a coleopteron found by Mr. Main in split peas in a Woodford shop, and a pair of the rare *Pterostichus parumpunctatus* taken at Chopwell,

Northumberland, in May, 1912.—Several reports were made of the occurrence of *Colias edusa*, *Pyrameis atalanta*, and *P. cardui*.—H. J. TURNER (*Hon. Report. Sec.*).

THE MANCHESTER ENTOMOLOGICAL SOCIETY.—Meeting held in the Manchester Museum on March 5th, 1913.—Mr. J. H. Watson exhibited male and female *Hypolimnas anthedon* from British East Africa; the female mimics *Limnas chrysippus* (which was also shown) to a remarkable degree. He also showed a series of *Hypolimnas bolina*, male and female, from Fanning Island, in the Central Pacific. This is the only butterfly found on the island, and the female is the most brilliant form of *bolina* female known. Mr. Watson suggested that the female is reverting to the brilliant male colour, because it cannot profit from mimicry of another insect which does not occur there; in other localities the *bolina* female mimics other butterflies of a more sober appearance.—Mr. A. E. Salmon gave a lecture with lantern illustrations entitled "Plants that Prey on Insects." He divided these into three classes: (1) Plants which capture insects without making any definite movement for that purpose, such as the bladderwort, the pitcher-plant, and the toothwort. (2) Those which make definite movements to capture after stimulation has been given by the insects themselves, such as the sundews, the Venus fly-trap, and the butterwort. (3) Those which have sticky or lined leaves, such as the Spanish fly-catcher or dew-leaf. He exhibited leaves of the pitcher-plant containing many insects.—A. W. BOYD, M.A., *Hon. Sec.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Meeting held at the Royal Institution, Colquhoun Street, Liverpool, April 21st, 1913.—Mr. F. N. Pierce, F.E.S., President, in the chair.—Messrs. Alan Cookson, Blundell Sands, and Alfred Watts, Oxtou, were elected members of the Society. — Mr. R. Wilding gave an address entitled "Notes on Some Rare and Local Coleoptera, in the course of which he gave details of the haunts and habits of the following species, viz.:—*Miscodera arctica*, *Amara rufocincta*, *Bembidium 5-striatum*, *B. nigricorne*, *Cymindis vaporariorum*, *Perileptus areolatus*, *Ocyopus fuscatus*, *Quedius auricomus*, *Pseudopsis sulcatus*, *Heptaulicus villosus*, *Ægialia rufa*, *Ammæcius brevis*, *Anisotoma ciliaris*, *A. rugosa*, *Anthicus bimaculatus*, *Antherophagus silaceus*, and *Chrysomela cerealis*. Mr. Wilding exhibited series of all these species in illustration of his remarks. A discussion ensued on the bionomics of the less known species occurring on the sandhills, from which it appeared that a good deal of research is still required, especially in connection with the larval habits.—Mr. Alfred Watts exhibited two specimens of *Heliaca tenebrata* captured by himself near Birkenhead.—Mr. W. Mansbridge showed *Epinephela janira*, *Ino statices*, and *Lycæna icarus*, all very brightly coloured, from Co. Cork.—W.M. MANSBRIDGE, *Hon. Sec.*

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THE ENTOMOLOGIST

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A SUMMARY OF THE PRESENT KNOWLEDGE OF THE PROTURA.

BY C. B. WILLIAMS, B.A., F.E.S.

THE only publication at present on the Protura in English is a rather short and popular article by Mr. R. S. Bagnall [1],* in which he gives the first record of their occurrence in Britain. The object of the present paper is to give more fully an account of this order, in the hope of calling the attention of English entomologists to the many interesting and unique characters which they possess, and also to give some account of the different views held on the much-debated question of their systematic position.

The Protura are a group of minute, wingless arthropods, probably insects, the largest of which are not two millimetres in length. The most notable feature on first examination is the absence of antennæ, which differentiates them immediately from all known insects (except the almost structureless female of the Strepsiptera) and, together with their lack of wings and elongate general appearance, has doubtless long caused them to be mistaken for larvæ when, or if, they had been seen. A pointed head, three pairs of rather long legs, and a truncate many-segmented abdomen without cerci are also characteristic features, while on closer examination minute appendages may be made out on the ventral side of the first three abdominal segments.

The group was first described so short a time ago as 1907 by Silvestri [18], from Italy, one species *Acerentomon doderoi* being described. In the following year Berlese published two short papers, the first [3] describing a new genus and four new species, the second [4] describing three more species, and giving some account of their internal structure. In 1909 appeared a short note by Börner [7, p. 125 footnote]; descriptions of a species from America by Silvestri [19]; and then Berlese's large monograph [5] which still remains by far the

* The numbers in square brackets refer to the Bibliography at the end.

most complete work on the group. Since that date many other papers have been published, which will be referred to later as necessary.

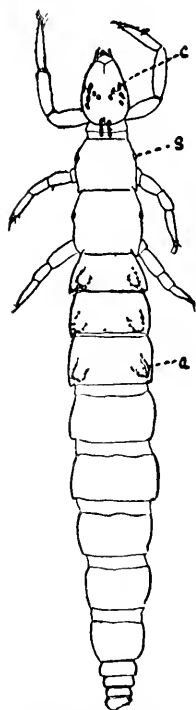


Fig. 1.—Diagram of *Eosentomon*. a. position of ventral abdominal appendages (shown dotted). s. spiracle. c. "concretions" in the head and prothorax.

The Protura are found in various habitats. In this country Bagnall has taken them under stones and under bark of trees, and I myself, by means of a Berlese funnel,* in peat and turf. Abroad they have been found in similar situations and also in moss. Rimsky-Korsakow [15] describes them as being solitary, and usually I found them only one or two at a time, but on one occasion I obtained fifty from one small block of peat, while Bagnall [1] alludes to finding them "in profusion."

In connection with the absence of antennæ, they have developed the interesting and remarkable habit of walking on the two hind pairs of legs, with the rather elongate front pair held forward in front of the head, and acting as tactile organs. Moreover, it is found on examination that the tarsi of the front legs are provided with a number of well-developed sense hairs, which enable them the more efficiently to take on their unusual function. This habit, which is extremely interesting to watch in living specimens, recalls a somewhat similar one seen in several Acarids, more especially those with long front legs.

Their food is not definitely known, but the structure of the mouth indicates that hard food is not taken, and it is probable that the bark-inhabiting species eat soft tissue or sap, and the ground species decaying vegetable matter. They have never been bred, but larval forms of several species have been taken, differing from the adult in having a smaller number of abdominal segments. Eggs have not yet been found, but the comparatively large size of those seen in the oviducts seems to indicate that only one or two are laid at a time.

The systematic position of the Protura has been the subject of much debate and cannot yet be said to be finally settled. There are so many conflicting and unusual characters that it is doubtful whether to consider them as insects, as Myriapods, or as a separate class intermediate between the two. It will be best before discussing the various views to consider in more

* I hope to give an account of this interesting apparatus in a future number of this Journal.

detail the chief structural points on which their systematic position will depend.

The antennæ are completely absent in all known forms, Schepotieff's account of the antennæ of *Protapteron indicum* [16] having been shown by Rimsky-Korsakow [13] to have been an error.*

The mouth parts are entotrophic and somewhat resemble those of the Collembola. There are a pair of simple style-like mandibles and two pairs of maxillæ (or maxillæ and labrum), each consisting of an inner and an outer lobe and a jointed palp. The maxillary palp is much larger than the labial palp and projects beyond the head at each side of the mouth.

The number of abdominal segments in the adult is twelve, a number which is not found in any insect except in the embryonic stage. The earliest known larval stage, however, has only nine segments, the remaining three being interpolated, one at a time, between the ultimate and penultimate segments. This increase in the number of segments during life, or anamorphosis, is a Myriapod character, though in these the segments appear in groups (*e. g.* in *Julus terrestris*, five at a time).

The abdominal appendages are situated in pairs on the first, second, and third abdominal segments. In the family Eosentomidæ (see later for classification) all are two-jointed, the second joint being small, retractile into the first, and with a small protrusible vesicle at the tip; in the Acerentomidæ, however, only the first pair are two-jointed, the others consisting of a single joint and all being much smaller than in the previous family.

Anal cerci are completely lacking, and the terminal segment is truncate and shaped not unlike the telson of a crustacean, to which character they owe their name "Prot-ura," "primitive tail."

The genital system in the female consists of two ventral paired ovaries and oviducts, each side forming a large straight unbranched tube reaching from about the metathorax to the ninth segment, where they unite into a short vagina and open by a single pore between the eleventh and twelfth segments. In the male there are two large testes which unite in front at about the level of the mesothorax, and long curled vasa deferentia opening separately on the penis, which can be protruded between the eleventh and twelfth segments.

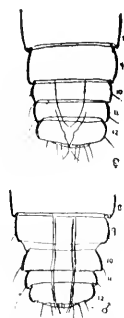


Fig. 2.—Diagrams of terminal segments of male (below) and female (above).

* Rimsky-Korsakow also states that Schepotieff was mistaken in his accounts of the mouth parts, abdominal appendages, and genital opening, and that his species *Protapteron indicum* is a quite typical member of the genus *Eosentomon*.

The sexes may be distinguished by the structure of the genitalia in the last few segments as shown in fig. 2.

The tracheal system is completely absent in the Acerentomidæ, but in the Eosentomidæ there are two pairs of lateral stigmata, one pair on the mesothorax and the other on the metathorax. According to the most recent account, that of Prell [10], the tracheæ from the front spiracle supply the head, thorax, and the two hind pairs of legs; and those from the posterior spiracle supply the hind pair of legs and the abdomen. The front legs are without tracheæ, while the hind pair are supplied from both spiracles, but the two systems do not communicate. Berlese's account differed slightly from this, and may be consulted in his monograph [5].

The nervous system consists of a supra-oesophageal ganglion in the head, which has a prolongation behind into the prothorax, a sub-oesophageal ganglion fused with the prothoracic ganglion, and a double ventral nerve-chord with ganglia in the meso- and metathorax and on each of the first six abdominal segments, that in the sixth segment being larger than the preceding ones. There are also supplementary ganglia in the thorax at the base of each leg.

In the head and prothorax of some species of *Eosentomon* there are several remarkable structures called "konkremente" (concretions) by Rimsky-Korsakow [14]. These are small, dark, almost round bodies, apparently isolated, of which there are five pairs near the dorsal surface in the head, and three pairs in the prothorax near the ventral surface. They are arranged symmetrically, but are liable to be displaced and pressed over one another in mounted specimens. They were first described by Schepotieff in his *Protapteron indicum* [16] as "innere einschlüsse"; he, however, only mentions five as present in the prothorax. They were next mentioned by Rimsky-Korsakow [*l. c.*] in his species *Eosentomon silvestrii*, and they occur in a species of the same genus, closely related to and possibly identical with this last, which I have taken in some numbers in England. Their function is quite unknown. Rimsky-Korsakow suggests that they are the accumulated secretion of some gland, while Schepotieff [16, p. 341] considers them similar to Belese's "corpora allata," which the latter describes on the head of *Acerentomon* and *Eosentomon*.

True eyes are lacking, but there are, one each side of the head, rather nearer the front end, a pair of organs called "Pseudocelli" by Berlese. Their function is not understood. Becker [2, p. 398] considers them related to the "post-antennal organs," which he describes in *Collembola*, and suggests that they may have a vibratory function.

The alimentary canal is a simple, straight tube, widening in

the mesothorax to a long cylindrical mesenteron. About the region of the sixth abdominal segment this contracts again to the narrow hind intestine, and at the junction there are six very short Malpighian tubes, arranged in two groups of three.

The muscular system, which is not of much interest in the present discussion, has been fully worked out by Berlese [5] and Prell [12], while other points of interest are the paired glands which open on the eighth abdominal segment, and the presence of a single claw on the tarsus which is a Collembolon and Myriapod feature.

The various views which have been put forward as to the systematic position of the Protura depend chiefly on the relative importance which the writers assign to the various structural characters we have considered, the whole question being the more difficult as, in the absence of any knowledge of their embryology, it is often impossible to decide whether any particular feature is primitive or the result of specialization.

Silvestri [18] first described them as an order Protura of the subclass Apterygota of the Insecta. Berlese [5], considering the lack of antennæ, the anamorphosis, and the large number of segments, removed them from the Insecta and treated them as an order Myrientomata of the class Myriapoda.

Schepotieff [16] united them with Campodea as a suborder Prothysanura of the Thysanura.

Borner [8], considering the entotrophic mouth-parts, and the lack of anal cerci to be more important than the lack of antennæ, which he believes to be secondary, makes them an order of the Apterygota, and proposes the following classification for that subclass:—

Subclass APTERYGOTA.

Super Section Ectotropa.

Order 1. Archeognatha ... Machilidæ.

Order 2. Thysanura Lepesmatidæ and Nicoletidæ.

Super Section Entotropha.

Section a. Archinsecta.

Order 3. Diplura Campodeidæ, Japygidæ, and Anagapygidæ.

Section b. Ellipura.

Order 4. Protura..... (Protapteridæ) Eosentomidæ, Acerentomidæ.

Order 5. Collembola Poduridæ, Entomobryidæ, Ne-elidæ, Sminthuridæ.

At this time the supposed possession of antennæ by *Protapteron* had not been contradicted, and their presence in a Proturon would have given more justification to the close relation which Borner supposes between these insects and the Collembola.

Rimsky-Korsakow [13] considers the absence of antennæ may

be secondary, and draws a comparison between the small head, lack of antennæ, and prolongation of the head ganglion into the prothorax as found in the Protura, and a similar combination in many insect larvæ. He does not attach much importance to the mouth-parts for deciding the systematic position, but believes that the anamorphosis and the large number of abdominal segments must be primitive, and also the abdominal appendages and the position of the genital opening, which separate them at once from the Collembola. He proposes to consider them as a class Myrientomata, between the Myriapoda and the Insecta.

Prell [10] regards the anamorphosis as the most important and primitive character, while the number of abdominal segments, the position of the genital opening, and the abdominal appendages, although also primitive, are of less importance. The lack of antennæ and cerci, on the other hand, are secondary, as also is the reduction of the tracheal system in the Acerentomidæ. He proposes the following arrangement:—

Class INSECTA.

Subclass Anamerentoma (with anamorphosis).

Order Protura (with twelve abdominal segments; no antennæ, &c.)

Subclass Holomerentoma (with no anamorphosis).

All the other Insecta.

This classification seems to be the most sound yet put forward, as it points out the undoubted affinities which the Protura have with the Insecta, but at the same time recognizes the fact that they differ from the other orders of Insecta to a greater extent than these do among themselves.

Prell does not think that the Protura are to be considered as in any way the direct ancestors of the Holomerentoma, but as a group which branched off from the ancestors of the Insecta at a very early date, long before the origin of wings, and which has since become largely modified and specialized.

The further subdivision within the order presents no great difficulties at present. The species fall naturally into two families, containing three genera, with the chief characteristics as follows:—

Family I.—ACERENTOMIDÆ. Tracheal system absent. Second and third abdominal appendages consisting of a single joint. Dorsal pleurites of the eighth abdominal segment with comb-like posterior margin.

Genus 1.—*Accrentomon*. Labrum produced anteriorly into a long process. Maxillary palps 4-jointed. Labial palps 3-jointed. Mandible terminating in a very long pointed style.

Three species.—*A. doderoi*, Silvestri [18]; *A. micro-rhinus*, Berlese [5]; *A. affinis*, Bagnall.*

* The description of this species, hitherto [1] only mentioned by name, will, I believe, appear in the Ent. Mo. Mag. for August, 1913.

Genus 2.—*Acerentulus*. Labrum not produced. Mandible without long style. Maxillary palps 3-jointed. Labial palps 2-jointed, but the basal joint is very indistinct.

Six species.—*A. confinis*, Berlese [3]; *A. tiarneus*, Berlese [4]; *A. cephalotes*, Berlese [3]; *A. gracilis*, Berlese [4]; *A. minimus*, Berlese [3]; *A. perpusillus* Berlese [5].

Family II.—*Eosentomidae*. Tracheal system present. Three pairs of abdominal appendages, larger than in the *Acerentomidae*, and all 2-jointed. Palps as in *Acerentulus*.

Genus 3.—*Eosentomon*. With the characters of the family.

Seven species and one variety.—*E. transitorium*, Berlese [3]; *E. ribagai*, Berlese [5]; *E. Wheeleri* and var. *mexicana*, Silvestri [19]; *E. (Protapteron) indicum*, Schepotieff [16]; *E. Silvestrii*, Rimsky-Korsakow [14]; *E. germanicum*, Prell [12]; *E. jabanicum*, Berlese [6].

Both species, which I have taken in England, belong to the genus *Eosentomon*, but representatives of all three genera have been taken by Mr. Bagnall.

Abroad their known distribution is being rapidly extended, and now includes EUROPE: Italy (Berlese, Silvestri), Russia, Austria, Finland (Rimsky-Korsakow), Norway (Prell), Sweden (Traghardt), Germany (Borner, Prell, Rimsky-Korsakow); ASIA: India (Schepotieff); AMERICA: United States, Mexico (Silvestri). There is no doubt that within the next few years they will be found over a still greater area.

My specimens have been collected in either 70 per cent. alcohol or Bouin's picro-formal (the latter for section-cutting), and double staining the whole insect with methylene blue and eosin has given fair results. The abdomen should be pricked with a fine needle to facilitate staining.

Rimsky-Korsakow [14] suggests killing with boiling water or Gilson's fluid, and stains with dilute borax-carmine in 75 per cent. alcohol. Schepotieff used concentrated sublimate solution or Gilson's fluid, and Berlese uses hot acetic acid to produce extension of the mouth-parts and genitalia. The other writers, following an unfortunate custom among many entomologists, give no particulars of their methods.

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The John Innes Horticultural Institution,
Merton, Surrey: June, 1913.

BUTTERFLIES NEAR VENICE.

BY GERARD H. GURNEY, F.E.S.

THE following is a list of butterflies which I took on the Lido, near Venice, on September 3rd of last year. It is necessarily short; but may be of interest as showing that even in so unlikely a locality as those lagoon-girt swamps a variety of species are common. The "Lido" is the name given to the long strip of land formed by those islands which extends along the mouth of the lagoon, and forms the outer bulwark of Venice against the Adriatic: it is seven miles in length and, roughly

speaking, half a mile in breadth, and is well described by the poet Symonds as:—

“A tract of land swept by the salt sea-foam,
Fringed with acacia flowers and billowy-deep
In meadow-grasses, where tall poppies sleep,
And bees athirst for wilding honey roam.”

Recently, much of the land has been cultivated, numerous villas and hotels built, while charming pergolas covered with vines and roses run each side of the road. Innumerable visitors and tourists come over daily from Venice in the different steamers which every half hour cross in twenty minutes from the mainland; the people come for the sea bathing for which the Lido is justly famous, and it was on my first visit to the shore for that purpose that I saw numerous butterflies, which resulted in my paying several more visits, during which I was able to devote my time to insects instead of the bathing.

There is still a good deal of land uncultivated and not yet built over on the Lido; rough ground with scattered pine trees, and fields of a few acres in extent on which grew a most luxuriant third crop of hay full of flowers, amongst which clover and a blue flowering lucerne were the commonest. In these places butterflies were numerous, and also on the high rough bank running the whole length of the shore; this bank is very wide and is covered with brambles, small acacia trees, and poplars, and on each side long grass and flowers with open patches of ground, quite a good place for insects.

At the far end of the Lido is still a good deal of wood and virgin ground, but this I was not able to visit, otherwise I should no doubt have turned up more species than I did. The majority of species seen were generally quite fresh, and were all of them no doubt second and some third broods.

Erynnis alcea. A few were flying in the hay-fields, but they had seen their best days, and I only kept a couple which could be considered worthy of cabinet rank.

Nisoniades tages. Quite common and fresh, rather small perhaps, but in no way remarkable.

Argiades sylvanus. Plentiful; apparently a third brood recently emerged, as they were all quite fresh.

Chrysophanus thersamon. I only took two specimens of this “Copper,” both males and both much worn. They were in the same hay-field flying along one of the numerous little dykes which are dug in all directions to irrigate the land. I think I saw another specimen in a different locality, but it was blown away before I could secure it. I presume the two specimens I took were examples of a second brood. *C. thersamon* was common near Budapest on May 23th, and I found it then quite fresh.

C. phleas var. *eleus*. One specimen caught, the only one seen.

Nomiades semiargus. A few rags of this species on the flowers

by the side of the tram-lines, covered with dust and looking generally very dissipated!

Polyommatus icarus. Very common and quite fresh, a fine large form, the females brown with no blue at all; several ab. *icarinus*.

P. astrarche. Only one or two seen: they were not very brightly coloured examples.

Everes argiades. I found a few specimens of this species in one hay-field. They were rather small and all of them worn.

Lampides telicanus. A very abundant species everywhere on the Lido, but its headquarters appeared to be the long bank running the whole length of the sea-shore; I saw a specimen fly across the Grand Canal in the middle of Venice, and it was common in the public gardens at the end of the town. Specimens varied a good deal in size, but on the whole were rather large, and in the series I took, nearly all are notably larger than those which I have from Egypt. The females have fine black borders to the wings. The species was generally fresh, though it was difficult to get perfect specimens, quite two-thirds of those caught having to be released as they were too torn to keep.

Pieris brassicæ. Freshly emerged specimens of *brassicæ* were flying about, with enormous females; full-fed larvæ of this species were also seen.

P. rapæ. Common and fresh, the form was in no way remarkable.

Pontia daplidice. Very frequently seen on the shore, settling on the flowers of the sea-aster; the females laying on various Crucifers growing out of the sand, but well beyond the reach of the tide.

Colias hyale. Fairly common.

C. edusa. Very common, and var. *helice* frequent.

Issoria lathonia. A single rather worn male was caught close to the Excelsior Hotel.

Melitæa didyma. This species was very common and extremely fine. The males of a rich brown-red colour, the females large and of only a slightly deeper colour than the males; they were generally in good condition.

Pyrameis cardui. Exquisitely fresh *cardui* flew about nearly everywhere on the Lido.

Vanessa io. I am not quite sure that I identified this species; a large black looking butterfly flew over me one day when I was in a gondola, and I think it must have been *io*, but I did not see any others.

Pararge megera. Fine, richly coloured specimens were common.

Epinephile ianira var. *hispulla*. Fairly numerous on the lucerne flowers, which proved so attractive to *telicanus*; both this and the preceding species were quite fresh.

Cænonympha pamphilus. Common, and in good condition.

Keswick Hall, Norwich.

TWO NEW SPECIES OF THE GENUS *ISCHNURA*
(ODONATA) FROM NORTH INDIA.

By F. F. LAIDLAW, M.A.

THE specimens described below were sent to me for examination amongst a small collection of dragonflies from the N.W. and Central Provinces of India by Dr. A. D. Imms, of the Indian Forest Research Institute at Dehra Dun.

They present several features of interest, and belong to two species which do not appear to have been described previously.

Ischnura gangetica, sp. nov.

Two males Sat Tal Kumaon 12.5:12 (fully mature).

Three males Shamket Kumaon 16.12:12 (two males imperfect, fully mature; one male not quite mature).

Length of abdomen, male 24 mm., of hind wing 15 mm.

Build of *I. senegalensis*, but a trifle more robust.

Venation. Postnodals on fore wing eight, exceptionally seven or nine. Arculus on fore wing placed well beyond the level of the second antenodal (but in one instance, on the left side, it lies before the level of this nerve). Pterostigma of fore wing black with milky white front border, its fore margin shorter than the hinder; its antero-posterior diameter greater than its length from within outwards. Its hinder margin is strongly convex, and covers about three-quarters of the subjacent cell. Pterostigma of hind wing pale grey in colour, much smaller, oblique, its inner and outer margins nearly parallel, covering barely half of the subjacent cell.



Ischnura gangetica,
sp. nov.

Head. Under surfaces yellowish-white, anterior surface green, including the first joint of the antennæ; there is a fine black line at the base of the upper lip, and the nasus is black. The upper surface and distal joints of the antennæ are black, with a round green (or blue?) postocular spot.

Prothorax. This is black above, with a green margin in front, and pear-shaped lateral green mark on either side, and a very fine, green edge to the posterior margin. When looked at from above, this margin is seen to have a small, medium, angular projection, but there is no marked prominence.

Thorax black dorsally, green at the sides, yellowish-white below; with a fine, complete, green antehumeral band on either side.

Abdomen black above, the anterior segments blue-green at the sides and below; in the hinder segments the ventral colour develops an orange tone. Segments eight and nine entirely blue; ten black above, blue ventrally. The articular rings are black, and the black dorsal band on each segment, after the first and second, is contracted at the very beginning of each segment, dilates, and then contracts again abruptly at its extreme hind end.

Legs yellowish-green; femora with a broad, longitudinal, dorsal

band of black, tibiæ with a similar but narrower band extending along the proximal two-thirds. Spines and tarsal articulations black.

Anal appendages. Upper part black, with a square yellowish-white patch on each of their opposed surface. Lower pair yellowish-white, the apex black. Seen in profile the upper pair are stout, slightly bowed downwards, truncate, with their posterior margin concave, the upper end of this margin a little hooked; the lower pair appear conical, tapering to an incurved apex.

When looked at from behind the upper pair are divaricated, the white mark on each is conspicuous, while each has a very strong downwardly directed spur near its base on its inner side; round this spur, which is not seen in profile, the apex of the lower appendage is hooked from without inwards on either side. The tubercles at the apex of segment ten are perfectly white, very small but, on account of their colour, rather striking in appearance.

The colouring is described from the least mature of the males, which is much more vividly marked than are the older specimens. These differ chiefly in having the green of the head, thorax, and prothorax less brilliant, and in having lost the white colour of the small apical tubercles of segment ten. On the other hand, the whitish patch on the upper anal appendages retain distinctness.

The species may be defined shortly as an *Ischnura* with segments eight and nine wholly blue, and ten blue with black dorsum. Tubercles on ten very small. Colour green for the most part, with black markings. Pterostigmata of fore wings of male considerably larger than those of hind wings, their colouring black, with upper part white, not covering an entire cell; pterostigmata of hind wings grey. Posterior margin of prothorax not forming definite lobes. Anal appendages with conspicuous white patch on opposed surfaces of upper pair; these have also a large downwardly directed spur.

Ischnura immsi, sp. nov.

One male Sonder Bhandara, Central Provinces 8. 12: 1912.

Length of abdomen 17 mm. ; of hind wing 11 mm.

Build of an *Agriocnemis*.

Venation. Postnodals on fore wing seven. Arculus at level of second antenodal; anal vein separating from the hind margin a considerable distance before the level of the cubito-anal cross vein, and at the level of the first antenodal. Upper side of quadrangle of fore wing quarter the length of its lower border, in hind wing about half. Pterostigmata of all wings grey, about equal in size, the outer border very oblique; covering two-thirds of the subjacent cell.

Ischnura immsi,
sp. nov.



Colouring blue with black marking.

Head. Under surface white. Anterior surface blue, including first and second joints of the antennæ, but the nasus black; upper surface velvety black, a linear postocular mark on either side, blue, meeting its fellow in the middle line.

Prothorax black, fore margin blue, blue marks on each lateral border, hind margin not lobed, with a fine blue edge.

Thorax black dorsally as far as the first lateral suture, with a pair of blue antehumeral bands, which are rather broad; sides blue, under surface pale.

Abdomen blue; segments one to seven with a black dorsal longitudinal band and black articulations, eight, nine and ten entirely blue. The black band on three to six is narrow for the greater part of its length; at its posterior sixth it widens slightly, so as to form a diamond-shaped mark, narrowing again to join the black articular ring. Tubercles of ten rather prominent.

Legs white, small; femora with a narrow black band posteriorly, spines black.

Anal appendages. Upper pair black; lower pair white, their apex with a fine black point. In profile the upper pair are blunt and curved downwards; the lower pair are a little longer, conical, directed upwards. When looked at directly from behind their appearance is as shown in the text-figure. Above them lies the square hollow projection formed by the tubercles of segment ten. The upper appendages show as a pair of crescentic structures, their concavities lying to their inner sides. That part of the appendage which is visible in profile is here seen as a small projection directed backwards, rising from the margin of each of the upper pair. The lower pair have each a small dark apical projection approximated to the lower margin of the upper pair, though extending backward beyond them, and to be seen in profile.

The species may be characterized briefly as follows:—

A very small *Ischnura*, with feebly petiolated wings; the pterostigmata of all four wings similar and unicolorous. Posterior margin of prothorax not lobed. Colouring blue with black marks, segments eight, nine, and ten entirely blue; postocular spots linear, confluent.

The smaller of these two species, *I. immsi*, approaches *Agriocnemis* very closely in the characters of its venation, the small extent of the petiolation of the wing being very marked. On the other hand, whilst the arculus lies in line with the second antenodal nerve in this species, in *I. gangetica* it usually lies beyond the level of that nerve (though it is apparently somewhat variable in position; and in this respect *I. gangetica* also approximates to *Agriocnemis*). It is worthy of remark that in *I. gangetica* the strong downwardly directed spur of the superior anal appendage recalls strongly that found in many species of *Agriocnemis*. The whitish patches occurring on these appendages are possibly "recognition marks." When the appendages are divaricated, these marks may be conspicuous in the living insect. One of the specimens has died with the appendages in this position. Compare Tillyard's note on the male of *Hemiphysalis mirabilis*, de Selys, and his remarks on the position of *Ischnura* and *Agriocnemis* amongst the Agrioninae (Proc. Linn. Soc. N.S. Wales, 1912, vol. xxxvii. pp. 443-464).

The type specimens will be returned to the Indian Forest Research Institute.

DESCRIPTIONS OF THREE NEW SPECIES OF *LEMA*,
BY THE LATE MR. M. JACOBY, AND OF A
FEW OTHER NEW SPECIES OF CRIOCERINI.

By F. W. BOWDITCH.

AMONG the papers of the late Mr. Jacoby I find descriptions of three new forms of *Lema* which he had prepared for publication, and which I now have the pleasure of presenting. The types of all three of Mr. Jacoby's species are in the British Museum; while, through the courtesy of Mr. Gahan, co-types are in my collection.

Lema sheppardi, Jac.

Narrow and elongate, black, vertex of head dark fulvous, thorax somewhat elongate, purplish-black, strongly punctured anteriorly and with two deep rows of punctures, elytra fulvous, with deep, round and closely arranged punctures, the interstices at the apex, strongly and acutely costate. Length 8 mm.

Head deeply constricted behind, eyes very large and prominent, deeply notched, interocular space obscure fulvous, clothed with short golden pubescence, the lateral grooves very deep, frontal tubercles broad, distinctly raised, labrum black, antennæ extending to the middle of the elytra, black, the third and fourth joint equal, small, the following joints much longer, slightly flattened and nearly equal; thorax slightly longer than broad, deeply constricted near the base, the lateral excavation bounded at the sides by a perpendicular ridge, the anterior portion widened, their angles forming a slight tubercle, the disc with a shallow transverse sulcus at the sides which does not extend to the middle, the latter with two longitudinal rows of deep punctures; other equally deep punctures are placed near the anterior angles, scutellum black; elytra with ten rows of large and deep punctures and another short row near the scutellum, dark fulvous, the interstices strongly costate near the apex, where the punctures are smaller and more closely placed; under side and legs black.

Habitat.—Beira, E. Africa (P. A. Sheppard).

This is one of the narrowly elongate species of *Lema* allied to *L. longula*, Quedenf. and probably *L. Mechowi*, Weise, well distinguished by the shape and structure of the thorax and its strong punctuation; also by the colour and pubescence of the head. I received two specimens from Mr. Sheppard.

Lema beiraensis, Jac.

Fulvous, antennæ (the basal two joints excepted) and the tibiæ and tarsi black, thorax widened anteriorly, minutely punctured at the middle, elytra strongly punctate, striate, with a deep basal depression, each elytron with a longitudinal black band from the shoulder to below the middle and strongly narrowed at the base. Length 5 mm.

Head impunctate, fulvous, frontal elevations highly raised, joined in front but deeply divided behind, lateral grooves deep, finely pubescent, labrum and palpi fulvous, antennæ black, the lower two joints and the base of the following two joints fulvous, third and fourth equal; thorax not longer than broad, the anterior portion rather strongly widened, the sides deeply constricted near the base, the cavity bounded above by a short perpendicular ridge, the basal sulcus very deep, the middle of the disc with some few punctures arranged in rows, all the rest of the surface impunctate, scutellum truncate at the apex; elytra with a rather deep depression below the base, strongly punctate-striate, the ninth row of punctures entire, fulvous, each elytron with a posteriorly strongly widened black band which does not quite extend to the apex; this band is rather suddenly obliquely narrowed anteriorly and extends to the shoulders in a narrow stripe; under-side and legs fulvous, the tibiæ (the base excepted) and the tarsi black.

Habitat.—Beira (P. A. Sheppard).

A well-marked species, of which three specimens are before me. The shape of the elytral dark bands obliquely narrow at the base, so as to separate the fulvous portion at the base into a somewhat elongate triangular space, below which only the sutural and lateral margins remain narrowly fulvous, which colour is again widened at the apex. *L. atrofasciata*, Jac., is of somewhat similar coloration but has differently coloured legs, and the elytral band is of nearly equal width and slightly narrowed at the middle; the labrum and sides of the breast are black, &c.

Lema fulgentula, Jac.

Fulvous, the breast, the posterior femora at the apex and the tarsi more or less black, head finely pubescent, impunctate, thorax with deep basal and feeble anterior sulci, impunctate; elytra cylindrical, rather finely punctate-striate, feebly depressed below the base; posterior femora with a minute tooth. Length 4 mm.

Very closely allied to *L. pubifrons*, Jac., and *L. planifrons*, Weise, so that it will be sufficient to point out the differences. From the first-named species the present insect differs in the longer antennæ, which have their terminal joints distinctly widened, in the much more feeble anterior thoracic sulcus, the more cylindrically shaped elytra, and in the much more strongly developed legs and their colour. From *L. planifrons* the species may be known by the entirely impunctate head, the colour of the antennæ, very feeble elytral basal depression, the minutely dentate posterior femora, and the partly fulvous, partly black tarsi; all the other characters are nearly similar.

Habitat.—Beira (P. A. Sheppard).

Lema callangaensis, nov. sp. (Jac. in litt.).

Elongate, ferruginous, labrum, antennæ (first joint excepted) knees, tibiæ (almost entirely) and tarsi black. Length $3\frac{1}{2}$ –4 mm.

Type, Callanga, Peru (coll. Bowditch).

Two examples sent by Messrs. Staudinger & Bang Haas with the foregoing manuscript name, and three others among the unnamed Jacoby material apparently from the same place. Exceedingly close to *similis*, Lac., the most obvious difference being the black labrum, the other differences being opinionative; the thorax of *callangaensis* is perhaps a trifle more elongate and less compressed, the punctuation is similar, the elytra of *callangaensis* are a trifle stouter, and the punctuation somewhat stronger; but these differences are slight, and more of degree than anything definite; the black labrum is the same in four of my five examples, and rather dubious in the other.

The above description will serve to draw attention to the two forms until they have further study.

Lema marcapatensis, nov. sp. (Jac. in litt.).

Head black, antennæ black, becoming fuscous at tip, thorax rufous, shining, scutellum black, elytra, cyaneous blue or green, with two small dots on the basal margin, a curved fascia behind the middle, the apex broadly and the lateral margin narrowly, yellow; body beneath and part of the first abdominal segment black, remainder of abdomen yellow, feet black with trochanters, and an elongate spot on the underside of the femora yellow, tarsi fuscous. Length $6\frac{1}{2}$ mm.

Type, Marcapata, Peru (coll. Bowditch).

Head with usual frontal puncture, transversely depressed behind the vertex, the extreme neck rufous, thorax rather strongly constricted and depressed behind, shining, impunctate, elytra with humeral and basal depressions fairly well marked, the elytral punctures becoming obsolete behind, and the intervals correspondingly costiform; the fulvous band is placed behind the middle, and narrow, of equal width and convex in front, the front edge attaining the middle of the elytra; the anterior edges of the apical yellow spot are slightly oblique or almost straight, the small yellow dot at the base is doubtless often absent, and probably the middle band varies a good deal; beneath, the black colour of the body is extended into the first segment of the abdomen by a lunate spot on each side, occupying about half the space; the elongate femoral spots are particularly well developed on the four posterior legs.

The above description is made on the basis of the elytra being cyaneous with yellow bands, but it could equally well be termed yellow with cyaneous markings.

Distributed by Messrs. Staudinger & Bang Haas with the above manuscript name; very close to *violaceo-marginata*, Clark.

Lema rufocincta, nov. sp.

Violaceous, with head, thorax, femora, body beneath, and elytral margins (except part of the suture) yellow, antennæ (except the first joint), tibiæ, and tarsi black. Length 8 mm.

Type, one example, Playa Vicente, Mexico (coll. Bowditch).

Head with smooth, polished vertex, and deep side grooves, not

constricted behind, antennæ not quite reaching the middle of the clytra, the first joint rufous, second short, third shorter than fourth; pubescent from first to end, which is slightly fuscous, thorax smooth polished, rather strongly constricted behind the middle, a few very fine punctures at the anterior angles, which are obsolete; also two fairly regular rows on the disk (with scattered ones between), but all very fine and obsolete after the middle; scutellum fulvous, elytra shining violet, the punctures arranged in striae but not impressed, and obsolete behind, where the striae become plainer, sides parallel, a deep intrahumeral impression and a well-marked transverse impression below the base (where, as usual, the punctures are the largest), the margin thickened at the sides, the yellow colour is confined at the sides to this margin; it suffuses the tip and is again visible in the scutellar region, but does not extend below the basal depression. It shows, also, very narrowly at base where it connects with the lateral margin.

My example bears five labels: "Playa Vicente," "Mexico Salte coll.," "12," "n.i.m.," "Jac. 2nd coll." It was unnamed in the Jacoby material. It seems to come near *peruana*, Jac. (type in my coll.).

Lema balsas, nov. sp.

Rufous, elytra dark shining, cærulean blue, antennæ except the basal joints, the posterior legs wholly, and the four anterior tarsi wholly, and tibiae partly, black, body beneath, except the thorax, dark shining, almost impunctate blue-black. Length 8 mm.

Type, one example, Rio Balsas, Guerrero, Mexico (Wickham) (coll. Bowditch).

Head with clypeus swollen, nearly smooth, with a deep foveate puncture in the middle; head not constricted behind the eyes, vertex swollen, transversely strigose with a deep foveate depression in the centre, antennæ with four basal joints, smooth, first two rufous, three and four equal, rufous blackish, remainder black pubescent, not reaching the middle of the elytra; thorax rather short, anterior angles (viewed from above) rather prominent, coarsely, moderately punctate; also a median row of finer punctures three or four wide, beginning at the anterior margin and running down the middle of the disk, and gradually tapering off to a deep fovea in the transverse depression at the rear; sides deeply coarctate a little behind the middle, the extreme base narrowly margined, scutellum rufous, slightly blackened; elytra stout, parallel, finely punctate in regular striae (only the sutural being impressed), a well-marked short intrahumeral impression and a deep, transverse basal depression (foveate) and a large lateral, foveate puncture on the edge below the shoulder; the four anterior tibiae are rufous below, shading into black above, the mesosternum punctured anteriorly.

I place it near *chalybeipennis*, Lac.

Lema wickhami, nov. sp.

Rufous, elytra chalybeate blue, lower part of face, antennæ and legs black. Length 5 mm.

Type, one example, Chihuahua, Mexico (Wickham) (coll. Bowditch).

Front with a few fine punctures and a small frontal fovea, neck slightly constricted behind the eyes, thorax tubular, moderately constricted near the base, a few very fine punctures near the front, scutellum rufous; elytra deeply, coarsely quadrate punctate, arranged in regular striae, the punctures becoming smaller behind, where the intervals become costulate; the femora are rather swollen and then suddenly constricted near the end; allied to the small similarly coloured forms like *amabilis*, Jac., but easily distinguished from all by the black legs and antennae, with entirely rufous body.

Crioceris chiriquensis, nov. sp. (Jac. in litt.).

Uniformly bright metallic green, with labrum and joints 5-11 of antennae, blue-black and dull, underside more or less bluish; elytra finely and nearly regularly punctulate striate, the entire surface minutely alutaceous, and with irregular fine wrinkles, giving a semi-dull appearance. Length 11 mm.

Type Chiriqui, eight examples (coll. Bowditch).

Size and form of *nullicedo*, Lac., and its allies; head with a deep longitudinal groove in the vertex, with fine punctures on either side, surface alutaceous, joints three and four of antennae equal, the latter reaching beyond the middle of the body, thorax strongly constricted at middle, vaguely quadrifoveate on the disk (the foveae placed in a square), the surface alutaceous, and finely punctate and obsoletely strigose near the anterior angles and along the sides; elytra nearly parallel, faintly punctulate striate, almost obsolete in places in some specimens, a faint lateral impression slightly one side of the middle, similar to *nullicedo*, Lac., and its allies; as compared with *nullicedo*, the surface of *chiriquensis* is more distinctly alutaceous and wrinkled; there is no trace of any transverse coloured band; the curving of the tibiae is about the same in both; there are other minor differences of punctuation; *nitida*, Lac., has a sparsely but distinctly punctate thorax.

Crioceris tumida, nov. sp.

Head rufous, elongate, clypeus swollen, sparingly punctured and pubescent, antennae with first 4 joints short, 3 and 4 equal, remainder broadened (slightly more so at tip) and closely articulated, vertex punctate, deeply grooved, neck strongly constricted; thorax rufous yellow, elongate, faintly transversely depressed near base, strongly compressed laterally a trifle behind the middle, with a double line of very fine punctures down the middle, vanishing behind in a vague depression, and with a faintly marked fovea in either side before the middle; scutellum hairy; elytra much wider than the thorax, squarely truncate, with the scutellar region raised into a peaked hump; general colour yellow, with a more or less interrupted rufous band behind the middle, and the apex and shoulders also indefinitely rufous, the surface polished and shining, as if varnished, with a few scattered deep foveate punctures between the shoulders and scutellar region; only one or two on the hump, which is limited behind by a

rather regular row, the deepest of all, a few along the lateral margin and ante-apical region, the rufous colouring being as a rule exempt from foveæ; beneath the glaze of colour can be easily seen regular rows of fine punctures, vanishing behind, body beneath rufous more or less pubescent. Length 8 mm.

Type, two examples, N. Luzon (5-6000 ft.), Whitehead *leg.*, among the Tring material.

Most nearly related to *gibba*, Baly, and differing as follows: Joints 5, 6, 7 of the antennæ are proportionately much longer in *gibba*, the double line of punctures on the thorax is much better defined in *gibba*, the thorax in *gibba* is more elongate, and viewed from above shows a well-marked anterior angle, which is very faint, almost lacking in *tumida* where the sides are almost completely rounded; the elytral punctuation, as shown under the glazed surface, is coarse, quadrate, almost confluent in *gibba*, but very fine and distant in *tumida*. The general colour of *gibba* is old mahogany, *tumida* almost yellow. The body beneath in *tumida* is almost wholly dark rufous with abdominal rings edged with lighter colour; femora strongly clavate, with pubescence more or less gathered into rings, tibiæ and body more or less covered with grayish pubescence.

Crioceris foveipennis, nov. sp.

Form stout, colour yellow, with smooth black or very dark rufous spots on the elytra; the scutellar region raised into a prominent hump, like *gibba*, Baly.

Head with swollen, punctate, and pubescent clypeus; smooth in front, the vertex deeply sulcate, punctured, pubescent, antennæ short (like *severini*, Jac.), joints 2-4 short, equal, shining, the second with a marked constriction, 5-11 pubescent, gradually broadened to 7, 8, 9, which are wider than long, and darkened, thorax cylindrical, with a well-marked anterior angle and very faint double row of discal punctures, moderately constricted back of the middle towards the base, so as to give the appearance of a wide collar, scutel pubescent; elytra very shining, rather thickly covered with deep foveate punctures, arranged without order, the dark spots of varying size and without any particular order, a prominent post median and rounded apical being the most marked, and scattered patches round the hump and shoulders; as a general rule the foveæ avoid the colour, but when they do occur they form a circle of the ground yellow colour; this tendency to form circles is noticeable at many points where the foveæ approach the dark patches; body beneath, fulvous, with dark spots on the sides and middle of the metasternum and each segment of the abdomen; legs fulvous pubescent, with darker clouds on the femora, knees, and middle of the tibiæ; claws black. Length 8.5 mm.

Type, one example, Belihul-Oya, Ceylon (Kannegieter), formerly part of Mr. Van de Poll's collection (coll. Bowditch).

Belongs to the *gibba*, Baly, group; allied to *dromedarius*,

Baly, by the colour and punctuation of the thorax, and to *severini*, Jac., by the shortened antennæ, which hardly do more than reach the elytra; the scattering of the dark colour patches on the elytra gives the species the most speckled appearance of any of the group.

DESCRIPTION OF A NEW SPECIES OF
METEORUS (BRACONIDÆ).

By G. T. LYLE, F.E.S.

Meteorus niger, sp. nov.

Thorax and abdomen entirely black with the exception of the prosternum (sometimes the whole prothorax), which is flavous. Legs with coxæ flavous, hind tibæ apically darker above, claws black. Head narrower than the thorax, occiput and vertex fuscous, with the orbits flavo-testaceous, face, clypeus, cheeks, mandibles, and palpi flavous. Antennæ filiform, as long as, or slightly longer than, the body, fuscous, lighter beneath, radicle flavous, annellus and base of post-annellus testaceous. Wings hyaline; stigma nigropiceous; nervures piceous, occasionally lighter; recurrent nervure everted (I possess a female in which it is interstitial in the right wing only), second cubital areolet not, or scarcely, narrowed towards the radius. Tracheal grooves distinct; terebra black, rather longer than half the abdomen.

Length, female without terebra, $4\frac{1}{2}$ to 5 mm., expands $9\frac{1}{2}$ to 10 mm.; male slightly smaller.

Described from ten males and twenty-eight females.

It should be noted that the terebra is very slightly longer than half the abdomen; the stigma is infusate throughout; the lower basal nervure is distinctly postfusal; the recurrent nervure is emitted from near base of the second cubital cell; and the radial cell of the hind wing is not germinated by a transverse nerve.

Meteorus niger is most closely allied to *M. melanostictus*, Capron, but differs therefrom principally in that the recurrent nervure is not continuous with the first intercubital; the mesosternum and metasternum are never testaceous; the terebra is at least as long as half the abdomen; the wings are hyaline; the postbrachial cell is shorter when compared with the præbrachial; and the insect is smaller.

This species (already referred to by me—but not described—in Entom. vol. xiv. p. 128) exhibits astonishingly little variation and is easily distinguished from its near relatives. In the New Forest it is a common solitary parasite of the larva of *Hygrochroa* (*Pericallia*) *syringaria*, from which host I have bred it in some numbers every year since 1903. Mr. Claude Morley informs me that he has received it from Mr. E. R. Buckell, who bred it from

New Forest specimens of the same host. Oviposition takes place in the autumn, and soon after the host larva starts feeding in the spring the parasite larva emerges. It spins a cocoon which is pendulous (suspended by a fine swing rope generally some 10 or 12 mm. in length), brown, shining and brighter in colour than those of *M. pulchricornis*, Wesm., *M. melanostictus*, and *M. scutellator*, Nees. The imago appears some fortnight or so later, and has occurred to me from April 4th to May 20th. So far this parasite has not been bred from any other hosts, though, undoubtedly, it is not confined to *H. syringaria*.*

In connection with the above I venture to transcribe a very interesting letter I received respecting the same host and parasite on June 5th, 1911.—CLAUDE MORLEY.

I found some larvæ of *H. syringaria* in the New Forest in late March; I got in all thirty larvæ; they grew a little until the first week in April, and then each larva, before attaining its full growth, hung itself to the food-plant or to the roof of the breeding-cage by a thread of between two and four inches. The body was kept doubled up. The next day a larva so suspended was found to have a pupa-case of an ichneumon suspended from it. The larva was then practically dead and quite unable to feed, and had become very shrunken. They subsequently died from these ichneumons, whose pupæ were suspended by some two to eight inches of thread, which was coarser than that by which the larva had suspended itself. The upper end of the parasitic pupa-case was dark, and in the lower part, after about a fortnight, one could see the body of the ichneumon. The fly emerged by cutting off a circular cap from the lower end of the pupa-case, or in a few cases by eating a rather irregular hole through the side of the case. The darkest specimens, the males, all came out first; and then the rather softer-bodied females, which had a yellowish patch in the centre of the dorsal surface of the abdomen. Out of the thirty New Forest larvæ, not one was free from an ichneumon, and in no case did more than one come out of each larva, and they all acted in the same manner. Four larvæ found ten miles from the New Forest were unattacked, and the imagos have come out.—E. R. BUCKELL; Gonville & Caius College, Cambridge.

NOTES AND OBSERVATIONS.

DELAYED DEVELOPMENT OF WINGS IN LITHOSTEGE GRISEATA.—Delayed development of the wings has been noticed in various species of Lepidoptera. Blenkarn wrote a note on it in the case of *Chesias rufata* (*obliquaria*) and *C. spartiata* (Proc. South London Ent. and Nat. Hist. Soc., March 23rd, 1911). A delay of ten hours was

* [I have examined Mr. Lyle's types of both sexes, and feel no doubt respecting the novelty of the species.—C. M.]

observed, but on removal from a damp to a dry cage rapid expansion took place. I have myself noticed a delay of ten or twelve hours in *Chesias rufata*. This year I bred eleven *Lithostege griseata*; of these three never showed any signs of expansion, two expanded partially, and six completely. Most of them emerged about six p.m., and one evening I was fortunate in seeing two run up out of the moss, and at once transferred them both to dry breeding-cages. One showed no sign of expansion till twenty-four hours after emergence, and then its wings grew rapidly and completely; the other did not begin to expand until sixty-six hours after emergence, and then its growth was not quite complete. Under certain conditions these allied species of Geometers show a tendency to delay in the expansion of their wings, and if this occurs under natural conditions it must add greatly to their risks of death before propagating their kind. Mine all emerged in a damp box, in which some were left, but others were transferred to dry cages as soon as observed; but absence of development and perfect development appeared to take place in either case. The numbers bred were too few to draw any conclusions as to the cause of the phenomenon. I should like to know if a delay of sixty-six hours has ever been noticed before.—E. A. COCKAYNE; 16, Cambridge Square.

THERA VARIATA AND *OBELISCATA* BRED FROM SPRUCE.—During a short visit to Brockenhurst early in April of this year I succeeded in repeating my experience of last season, as recorded by Mr. L. B. Prout in his article on *Thera variata* (Entom. vol. xlv. pp. 241-246). I obtained from the same row of spruces some thirty *Thera* larvæ in various stages of growth. The larvæ were much scarcer than on my previous visit, and nearly all of those secured proved to be ichneumonid. They were fed entirely on spruce, and in May began to emerge. The first two were typical *obeliscata*, both large females of a red-brown shade, quite indistinguishable from other south-country specimens in my series. Three days later, on May 6th, a pair of true *variata*, exactly resembling those bred by me last year, and the pair figured by Mr. Prout, emerged. Unfortunately, I failed to secure a pairing. These were followed on the 12th by a female *obeliscata*—a pale form with a narrow dark bar—and on the 18th by a female *variata*, exactly similar to the earlier specimen. Since then nothing else but ichneumonids have arrived; but the evidence of these six, all obtained from the same row of spruce trees and bred under the same conditions, seems to prove clearly that the variation does not depend merely upon difference of food-plant. I had hoped to be able to cross the two forms, and the result of such a cross would be of considerable biological importance, but my material this season has been insufficient, and I can only trust that other entomologists with greater skill and fuller opportunities will try the experiment, which should not be a difficult one.—(Rev.) C. E. RAVEN; 4, Park Terrace, Cambridge.

ÆGERIA (SESIA) SCOLLEIFORMIS IN STAFFS.—It may be of interest to record that at the end of May I succeeded in extracting from a birch-trunk on Cannock Chase, Staffordshire, a pupa of *Æ. scolice-*

formis, which emerged on June 21st. Visiting the same locality again to-day, I was fortunate enough to take a fine female, flying round a tree-trunk in the afternoon sunshine, doubtless in search of a suitable place to deposit ova. I do not know whether the insect has been recorded from this locality before, but without doubt a considerable colony is established there. I had previously found empty pupa-cases which I had supposed to be this species, but as they are rather small compared with the older Welsh specimens I have seen in collections, I could not feel certain that they were not merely *Æ. culiciformis*.—H. C. HAYWARD; The Croft, Repton, July 1st, 1913.

PAPILIO XUTHUS AT WOKING.—The occurrence of a living specimen of an exotic butterfly in this country is always of sufficient interest to be placed on record, even if no satisfactory explanation of its appearance can be offered. On May 27th, at about 4.15 p.m., Miss Eleanor Balfour noticed a strange butterfly hovering over some bushes of *Skinmnia japonica* in the garden at Fisher's Hill, Woking. She netted the specimen, and, recognizing that it differed materially from our only native "swallow-tail" (*P. machaon*), sent it to me for inspection. It was obviously a stranger to this country, and a reference to the British Museum Collection enabled Sir George Hampson to identify the insect as *Papilio xuthus*, a native of China, Japan, and Corea. I am quite at a loss to account for its presence here; it must, of course, have been imported, but how?—as larva, pupa, or imago? There are no conservatories about the premises where directly imported exotic plants are cultivated, and such foreign shrubs, &c., as are grown in the garden are procured in the usual way through nurserymen. So far as concerns scaly covering, the wings are in good condition, but large notched pieces are symmetrically jagged out of the hind wings, thus suggesting that the butterfly had emerged from the pupa here, and had been attacked by some bird (?) as a stranger. At any rate, apart from the mutilation referred to, the condition of the wings is such that the specimen cannot be regarded as a casual immigrant in the ordinary sense. I am quite ignorant of the life-history of this species; perhaps some entomologist who is familiar with its history may be able to make some more definite suggestion as to the possible mode of introduction of this exotic—I vouch only for its capture as a living specimen.—RAPHAEL MELDOLA; 6, Brunswick Square, W.C., July 11th, 1913.

ARASCHNIA LEVANA AT CARDIFF.—Whilst out yesterday in search of *Brethtis euphrosyne*, I caught a good specimen of *Araschnia levana* (as described by Kirby), and was naturally surprised to find it near this locality. I could not find this fritillary mentioned in 'Butterflies of the British Isles,' and consequently conclude it is not a recognized British species; I should therefore be glad to hear whether this is so.—T. BUTT EKINS; Cardiff, May 29th, 1913.

SCARCE SYMPETRA (ODONATA).—On looking through a box of dragonflies taken by Mr. C. B. Williams, I was pleased to find a specimen of *Sympetrum fonscolombii*, male, and another of *S. flavicolum*, male. The former was taken on August 12th, 1911, at Merton,

Surrey, while the latter was taken in the same year, and, Mr. Williams thinks, on the same day. It is generally supposed that these species are both migrants to Britain, and there appears to have been in 1911 a considerable flight of the former to our islands.—W. J. LUCAS; Kingston-on-Thames.

COLIAS EDUSA AND PYRAMEIS ATALANTA IN SURREY.—On June 15th, at Ranmore, I took a male *Colias edusa*, a fine large specimen in good condition. My friend Mr. B. S. Williams took a very worn and, as it laid no ova, apparently spent female. Two others were also seen. On June 12th a *Pyrameis atalanta* was seen in the garden at Dulwich.—F. H. STALLMAN; "Braemar," 58, Thurlow Park Road, West Dulwich, S.E.

CHEROCAMPA ELPENOR, ab.—I have to-day had an "elephant hawk-moth" hatch out, which I think is rather interesting. The left side is quite normal but for two white spots on the costal margin of the fore wing towards the apex. The right fore wing is a much paler olive-green than the left, and the pinkish suffusions are replaced by pale lilac, and there is partly a third band of this colour across the base of the wing. The pink markings on the right side of the thorax are partly replaced by the same shade of lilac. The hind wings are quite normal.—ARTHUR MINTON; 9, Park Road, Bexhill, June 15th, 1913.

RECENT LITERATURE.

1. *Annals of Tropical Medicine and Parasitology*. Series T. M. Vol. vii. No. 1. March 31st, 1913. Liverpool.—This part contains a lengthy, well-illustrated article on "Contributions to the Study of Colour Marking and other Variable Characters of Anophelinae, with Special Reference to the Systematic and Phylogenetic Grouping of Species," by Major S. R. Christophers. Besides this the references to entomology are of a most general nature in connection with disease-carrying Diptera.

2. We have from E. Leitz (18, Bloomsbury Square) a copy of an illustrated pamphlet (38 pp.)—*Guide to Photomicrography*—primarily prepared for users of apparatus made by this firm. Anyone interested in this subject should obtain a copy. Another pamphlet of a similar character is *Directions for the Use of the Large Metallurgical Microscope with the Camera*.

3. *Review of Applied Entomology* (Series A, Agricultural, and Series B, Medical and Veterinary), issued monthly by the Imperial Bureau of Entomology (Dulau & Co., London), is intended to keep its readers up to date by giving abstracts, &c., of publications connected with these subjects.

W. J. LUCAS.

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LIFE-HISTORY OF *ARGYNNIS HECATE*.

BY F. W. FROHAWK, M.B.O.U., F.E.S.

MR. K. PREDOTA, 'Verhandlungen und Mitteilungen des Siebenbürg. Vereins für Naturwissenschaften,' vol. lxii. p. 4, 1912, states that he observed females of this butterfly selecting plants of the Dropwort (*Spiræa filipendula*), and then depositing their eggs in the ground round their roots, but he failed to find the eggs.

The Hon. N. Charles Rothschild and Miss Charlottée de Wertheimstein, who observed the butterfly both at Peszér and at Cséhtelek, in Hungary, tell me that it only occurs where the *Spiræa filipendula* grows, and in those spots in the Peszér Wood where the plant is absent *Argynnis hecate* is not to be found.

As this insect probably deposits only one or two eggs on a plant in a state of nature, it is not surprising that the above-mentioned observers failed to find the egg. It may further be remarked that, as this species hibernates in the egg-stage, this position is remarkably secure, as neither mowing the meadows nor grazing them with cattle can injure the egg of this butterfly either during the summer or the autumn.

On June 10th, 1912, I had the pleasure of receiving from the Hon. N. Charles Rothschild four living females of *Argynnis hecate*; these I immediately fed with sugar and water, and placed them on plants of *Spiræa filipendula*, covered with gauze netting. During the remaining three weeks a large number of eggs were deposited; nearly all were laid on the base of the stems of the plants, in many cases as low down as the butterfly could possibly reach with the ovipositor, *viz.*, below the surface where the soil separated from the stems, forming a small narrow fissure, while some were laid in and upon the soil itself close to the stems. Several of the eggs were kept on the plants as laid out of doors throughout the whole period of the egg-state, from June, 1912, to March 7th, 1913; others were removed in February from the plants (the stems cut up with eggs attached) and brought indoors; and some were kept indoors throughout the winter near a window facing north-west. All three lots started hatching on March 7th, 1913.

The egg measures .79 mm. high and 1.06 mm. in diameter at the base; it is of a pointed conical shape. Of several specimens examined, each had nine very prominent keels, six running the entire length and rising high above the crown, the three remaining keels originate much lower down, being two-thirds the length of the others; all are transversely ribbed by about fourteen in number, these extend across the intervening spaces of the shell, which is granular. The micropyle is sunken, the keels standing high around it.

When first laid, it is primrose-yellow in colour, which gradually deepens to coppery-reddish, then to a warm lilac-brown, and the keels pearl-grey with an ochreous tinge in shadow. They remain thus coloured throughout hibernation and until hatching.

The young larva directly after hatching is rather large in proportion to the butterfly, measuring 1.33 mm. long. In structure it exactly resembles that of *A. laodice*, with the exception that on the lateral lobe of each segment *hecate* has only four hairs, while *laodice* has five, and the ground colour is a deeper olive-ochreous; the head is shining olive-black beset with fine pectinated whitish bristles; on the first segment is a transverse chitinous shining olive-brown disc. The dorsal surface of the anterior half of the body is darker than the rest. The surface is granular and densely sprinkled with dusky points. In other details of structure it is similar to *laodice*. The globose warts turn olive-brown when a day old.

Owing to the continuous dull, chilly weather throughout the greater part of March and April, the larvæ remained in a sluggish condition, feeding only at intervals, which proved fatal to a large number. The survivors remained fully six weeks in the first stage.

The first moult occurred on April 25th, 1913. After first moult (shortly before second) it is 4.75 mm. long; the head is shining black beset with bristles. The ground colour of the body is pale ochreous checkered with purplish-brown, and a medio-dorsal and subdorsal line of the same colour. There are six longitudinal rows of blackish tubercles, each beset with a number of finely pectinated bristles, the base of each tubercle is pale amber blending into creamy-whitish, forming a series of pale square spots. The legs purplish and claspers olive.

After second moult the ground colour is pearly-grey white, checkered and speckled with purplish-brown; the tubercles cream-coloured with amber bases, and beset with black pectinated bristles. The head shining black mottled with ochreous; legs black, claspers olive-brown and whitish-ochreous.

After third moult it is 12.7 mm. in length. Similar to the previous stage, excepting the markings are more numerous and all clearly defined, also deeper in colour, with a conspicuous

medio-dorsal line and a lateral white stripe. The black head is mottled on the crown with pearl-white, and the clypeus is yellow.

After fourth moult, fully grown, it measures 30.16 mm. long. The head is black mottled with pearl-white and orange, face black, clypeus orange; beset with numerous finely pectinated bristles of various lengths. Body slightly attenuated anteriorly, more so posteriorly; all the tubercles are pearl-white with deep orange-amber bases amply beset with simple black-pointed spines, and small blackish hairs and bristles are scattered over the surface of the body. The segments are divided into four subdivisions, the largest occupying the anterior half, which bear the six tubercles, three on either side, which are dorsal, sub-dorsal, and subspiracular; the latter situated on a conspicuous yellowish-white lateral stripe. The ground colour is pearly whitish, vermiculated, speckled and checkered with purplish-black; a medio-dorsal longitudinal stripe of the same colour extends the entire length, and terminates at the apex of the anal conical point; it is broken up at the segmental divisions. A series of black bands extend between the dorsal and subdorsal tubercles, one on each segment. The ventral surface is mottled with purplish-brown and roughly granulated.

The first larva became fully grown and ceased feeding on May 24th; it suspended itself on the 25th, and pupated May 27th. The larval existence occupying 111 days.

The pupa measures 18 mm. long. Excepting its smaller size it very closely resembles that of *Argynnis laodice* both in form, colouring, and general structure.

Dorsal view: Head with a pair of lateral angular horns, base of wings with similar angulated points, inner margin with a prominent ridge; body narrowed across the middle, swollen at hind margins, abdomen attenuated.

Lateral view: Head beaked in front, thorax angular and keeled, sunken at metathorax and base of abdomen, the latter strongly curved posteriorly, which terminates in a truncated cremaster furnished with hooks. Ventral surface of abdomen almost straight; wings bulging near apex; antennæ slightly serrated at tip.

The ground colour is pale pinkish-brown, entirely covered with a fine reticulated fibrous pattern, and a dark ashy marginal border to wings and a paler median bar. The abdomen is faintly striped longitudinally with dusky-brown, one stripe enclosing the spiracles, the other is subspiracular. There are two rows of prominent dorsal conical points, those on the thoracic segments and first and second abdominal segments are brilliant silver-gilt; on the fifth, sixth, and seventh segments is a very small medio-dorsal point.

The first one, which pupated on May 27th, produced a fine

male imago on June 17th, the pupal stage occupying twenty-one days.

A. hecate partakes of the characters of other Argynnidæ in its different stages. The egg mostly resembles *A. adippe*. The larva in the first stage is almost identical with *A. laodice*, and in the last stage closely resembles *A. lathonia* in structure. The pupa is similar to *A. laodice*.

As already stated, the first stage of the larva was abnormally prolonged. This stage should probably last twenty days or less instead of forty-two days, and the emergence of the imago would take place during the first week of June, the usual time of its appearance in Hungary. It is interesting to note that March 7th, the date when the ova hatched, corresponds with the date when spring is considered to supersede winter in the plains of Hungary.

ORTHOPTERA OF DEVON, WITH NORTH AND EAST CORNWALL.

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

MR. C. W. BRACKEN has been good enough to send me a list of the records known to him of Orthoptera that have occurred in Devon and in North and East Cornwall. The publication of this list may not only be of use to those who are working at this order of insects, but it may also be the means of bringing to light other captures in a district that is well calculated to supply them.

Forficulodea.

Anisolabis annulipes.—Taken by Dr. Swale amongst the ashes of a bakehouse in Tavistock. Mr. J. H. Keys of Plymouth has some given him in June, 1894; but the bakehouse is now pulled down.

Labia minor.—Said to be abundant in South Devon, but Mr. Bracken does not find it so. It was taken "swarming" over cut grass at Beaumont Park, Plymouth, in 1899, and in Bloye's Infirmary, Week Street, Plymouth, October, 1890 (J. H. K.). Mr. Keys has pointed out its resemblance to the beetle *Lithosia ochracea*.

Forficula auricularia is of course common everywhere.

F. lesnei.—Sidmouth.

Blattodea.

Ectobius lapponicus.—Exeter. Torquay, August 5th to 16th, 1899; at sugar.

E. panzeri (with var. *nigripes*).—Tregantle and Whitsands, fairly often; June 13th, 1891; July 6th, 1897; July and September, 1911 (J. H. K.). Abundant under old bark and

rotten wood on posts adjoining Churston golf links (G. T. Porritt).

E. perspicillaris (= *lividus*).—Occurrence somewhat doubtful.

Blattella germanica.—Forty young ones bred from one egg-capsule by Keys and Bignell, 1895, taken in a Plymouth restaurant. Probably still found in bakehouses in Plymouth.

Blatta orientalis and *Periplaneta americana*.—Common in Plymouth in houses, bakehouses, &c. (C. W. B.).

Rhyparobia maderæ.—A specimen taken in Great Western Docks at Plymouth, now in the Athenæum Museum in that town.

Gryllodea.

Gryllotalpa gryllotalpa.—A full-grown male was taken alive on the sandhills at St. Enodoc near St. Minver, North Cornwall, during the week ending December 20th, 1912 (C. W. B.). Near Exeter?

Gryllus domesticus.—Wrangaton, September, 1908 (P. de la Garde); considered "general in Devon."

G. campestris.—Mr. Bracken does not find it "general in Devon," as it has been stated to be.

Locustodea.

Leptophyes punctatissimus.—Very abundant at Bude, and Woolacombe in North Devon, amongst herbage, brambles, &c., August, 1911, and 1912 (C. W. B.). Saltash, in Priory Garden, common, September, 1912 (C. W. B.). Shaugh Bridge, September 23rd, 1912 (C. W. B.). Common at Churston at sugar (G. T. P.). Torquay, at sugar, August 5th to 16th, 1899. Cann Woods, frequently.

Meconema thalassinum (= *varium*).—Torquay, at sugar, August 5th to 16th, 1899. Cann Woods, not common, September 7th, 1913. Shaugh Woods, not common, September 19th, 1912. Common at Saltash, in Priory Garden, September 23rd, 1912. Brampford Speke, September, 1910 (C. W. B.). Found on oak, except in Priory Garden where it was most abundant on bay; there were no limes in the garden, and only one oak, with high lower branches. Common at Churston and taken at sugar (G. T. P.).

Conocephalus dorsalis.—Abundant in marshy ground, Broadlands, Churston (G. T. P.).

Phasgonura viridissima.—Common generally in Devon and Cornwall. Taken at Mawgan, August, 1910; Loddiswell, 1904; Bovey, 1906; Bude, 1911; Woolacombe, 1912 (C. W. B.). Nymphs common at Beer, July, 1910 (G. T. Lyle). Common at Churston and taken at sugar (G. T. P.).

Pholidoptera griseo-aptera (= *cinerea*).—Ivybridge, Torquay, at sugar, August 5th to 16th, 1899. Churston (G. T. P.). Bovey, August, 1906 (C. W. B.). Common at Bude in coarse

herbage, August, 1911; similarly at Woolacombe, August, 1912; one taken at the latter place, August 8th, 1912, distinctly reddish chestnut colour (C. W. B.).

Metriopectera albopunctata (= *grisea*).—Torquay, at sugar, August 5th to 16th, 1899. Dawlish (Vict. History). One at Tregantle, September, 1911 (T. V. Hodgson). One at Braunton Burrows, very light straw-colour, August 24th, 1912 (C. W. B.).

M. brachyptera.—Haldon Heights.

Acridiodea.

Gomphocerus rufus.—Wembury; Bolt Head.

G. maculatus.—Woolacombe, open spaces.

Stenobothrus lineatus.—Wembury.

Omocestus viridulus.—Perranporth, August, 1909; Woolacombe, August, 1912 (C. W. B.).

O. rufipes.—Coast of Devon. Churston (G. T. P.). Woolacombe, August, 1912 (C. W. B.).

Stauroderus bicolor.—Common everywhere, with vars. *mollis purpurascens* and *nigrina* (C. W. B.).

Chorthippus parallelus.—Common everywhere, North and South Devon and North Cornwall (C. W. B.); with var. *purpurascens* (C. W. B.).

Pachytylus migratorius.—Casually in Devon.

P. danicus (= *einerascens*).—Casually in Devon.

Schistocerca peregrina.—Thirty taken in Plymouth, October 9th, 1869; the specimens in the Athenæum Museum (G. C. Bignell).

Tetrix bipunctatus.—Widemouth near Bude, North Cornwall, abundant in one field only, amongst short herbage near hedge in company with *T. subulatus*, August, 1911 (C. W. B.). Odd specimens at Wanson Mouth near Bude, August, 1911 (C. W. B.). Shaugh Bridge, April 1st, 1893, and Walkham Valley, June, 1891 (G. C. B.). Watergate Bay near New Quay, August, 1910, and Newnham near Plympton, Sept. 1911 (C. W. B.). Abundant in short grass on the border of Lee Woods near Woolacombe. North Devon, in company with *G. maculatus*, August 8th, 1912 (C. W. B.).

T. subulatus.—As common as *T. bipunctatus* in North Cornwall, but much rarer in North Devon. Braunton Burrows, August 22nd, 1912 (C. W. B.). Bickleigh, April 22nd, 1891 (G. C. B.).

LOCALITIES REFERRED TO.

North Cornwall.—Watergate Bay; Wanson Mouth; Widemouth; Bude; Mawgan; Perranporth.

North Devon.—Near Ilfracombe; Woolacombe; Braunton; Lee.

Mid Devon.—Bovey.

South Devon.—Loddiswell; Bolt Head.

Near Torquay.—Churston; Haldon Heights.

East Devon.—Beer; Sidmouth

Near Exeter.—Brampford Speke.

South-east Cornwall.—Tregantle; Whitsands near mouth of Tamar, on coast within fifteen miles of Plymouth; Wembury; Cann Woods; Shaugh; Bickleigh; Plympton; Newnham; Walkham Valley; Saltash (across River Tamar); Tavistock.

Kingston-on-Thames, 1913.

ADDITIONS TO THE MYMARIDÆ AND TRICHOGRAMMATIDÆ OF AUSTRALIA.

BY A. A. GIRAULT.

SINCE my treatment of these families as they occur in Australia, I have gathered some additional material, which is recorded in the following pages.

1. A NEW SUBGENUS OF MYMARIDÆ.

Belonging to the subfamily Gonatocerinæ, the following new subgenus:—

GONATOCEROIDES, n. subg.

Female.—The same as female *Gonatocerus* in all structures, but the antennæ only 10-jointed, the third funicle joint nearly as long as the pedicel, decidedly longer than either of the proximal two. Tarsi 5-jointed, abdomen subsessile.

Male.—Unknown.

Type.—The following species.

Gonatoceroides australica, n. sp. (normal position).

Female.—Length, 0.80 mm. General colour dusky brown, the knees and proximal three tarsal joints, together with the cephalic femora and tibiæ, pallid yellowish, the cephalic femora dusky beneath proximad. Venation dark brown, the wings hyaline. Fore wings with a straight margin at extreme apex, moderately broad, bearing about thirty-three lines of fine discal cilia, the latter absent under the venation, excepting a line or two just under the marginal vein, and a fine, stiff, straight line along the caudal margin, running distad for some distance. Marginal cilia of fore wing short; posterior wings narrow, not as wide as their longest marginal cilia, the extreme discal cilia confined to a few scattered ones at apex. Fourth funicle joint longest. (From one specimen, $\frac{2}{3}$ -inch objective, 1-inch optic, Bausch and Lomb.)

Male.—Not known.

Described from a single female captured by sweeping in a forest near Ayr, Queensland, November 7th, 1912. The species resembles closely *Gonatocerus darwini*, Girault.

Habitat.—Australia : Ayr, Queensland.

Type.—No. *Hy 1273*, Queensland Museum, Brisbane ; the above specimen in xylol-balsam.

2. NEW HABITATS OF SOME MYMARIDÆ.

Mymar tyndalli, Girault, Proserpine, Queensland, November 3rd, 1912 ; sweeping miscellaneous vegetation and grass near a small pond in an open semi-cultivated field ; this specimen was much darker along the dorsum of thorax and distal half of abdomen ; it was also smaller.

Anagrus armatus australiensis, Girault, was captured from a window at Nelson, North Queensland, November 11th, 1912 ; female. Also from windows at Proserpine, Queensland, November 4th, 1912 ; a female.

Stethynium euvieri, Girault, was captured at Nelson, North Queensland, from a window, October 19th, 1912 ; female.

Gonatocerus comptei, Girault (two males), was captured at Proserpine, Queensland, November 4th, 1912, by sweeping grass, forest. Also the same species at Ayr, Queensland, represented by a female taken from a window in a smith's shop, November 6th, 1912. In this species the distal funicle joints are sometimes longer than usual, longer in relation to their width, and thus not more or less subquadrate (funicles 4-8).

Stethynium lavosieri (female) was captured at Ayr, Queensland, November 7th, 1912, from a window in a smithy. The funicle joints were visible, and all are not subglobular, for the second joint is twice longer than broad and longest ; the other joints are subquadrate or subglobular.

3. SEVENTH NEW SPECIES OF STETHYNIUM FROM AUSTRALIA.

Genus STETHYNIUM, Enoch.

Stethynium latipenne, n. sp. (normal position).

Male.—Length, 0.58mm. Robust for the genus. Lemon yellowish ; the pronotum, mesocutum excepting lateral and caudal margins and more obscurely along the median line, the tegula, the cephalic third of the parapside and all of the abdomen (including that part of the phragma projecting into it) contrasting velvety black ; antennæ and legs pallid yellow, the former somewhat suffused with dusky ; distal tarsal joints dusky. Wings subhyaline. Phragma with a longitudinal median sulcus.

Differs from all the Queensland species of the genus in bearing much broader fore wings, distinctly much broader than those of *lavosieri*, and bearing at their widest part about thirty lines of fine discal cilia ; longest marginal cilia of fore wings somewhat over half those wings' greatest width and subequal in length to the longest cilia of the posterior wings ; the latter moderately broad, with about six lines of discal ciliation at apex, the mid-longitudinal cilia fading out not far caudad from apex. Cephalic marginal cilia of posterior wings distinctly longer than the greatest width of the blade.

Differs from *peregrinum* in general coloration, and in having the median thoracic sulcus.

(From one specimen, magnified as above.)

Female.—Not known.

Described from a single male captured on a window at Proserpine, Queensland, November 4th, 1912.

Habitat.—Australia: Proserpine, Queensland.

Type.—No. *Hy 1274*, Queensland Museum, Brisbane; the above specimen in xylol-balsam (mounted with a specimen of *Anagrus armatus*).

4. FIFTEENTH SPECIES OF GONATOCERUS FROM AUSTRALIA.

GENUS GONATOCERUS, Nees.

Gonatocerus ayrensis, n. sp. (normal position).

Female.—Length, 1.15 mm. Slender. Golden yellow, the head dusky black, the tip of abdomen and a narrow transverse band before it, black; funicle and club black, the pedicel suffused somewhat with dusky; middles of posterior femora and tibiae black. Antennæ characteristic—all funicle joints long, except the first and last; the first is only two-thirds the length of the second, which is slender and subequal to the pedicel; the distal funicle joint is only half the length of the joint preceding it, which is somewhat the longest joint of the funicle, subequal to funicle joint 5 and half the length of the long club; the distal joint is oval. Scape long.

Agrees with *baconi*, and may be the female of that species, but the cephalic two pairs of legs are lighter in *ayrensis*, there is no noticeable black on the thorax, and the proximal tarsal joints are longer. Also in *ayrensis* the scape is much longer than in *baconi*, but in some species of the genus this is a secondary sexual character.

(From one specimen, magnified as above.)

Male.—Not known.

Described from one female captured from a shop window in the town of Ayr, Queensland, November 6th, 1912.

Habitat.—Australia: Ayr, Queensland.

Type.—No. *Hy 1275*, Queensland Museum, Brisbane; the forenoted specimen on a slide (mounted with an *Aphelinoidea*).

5. SOME NEW HABITATS OF TRICHOGRAMMATIDÆ.

Tumidielava ciliata, Girault, Proserpine, Queensland, November 4th, 1912, by sweeping grass in a narrow strip of jungle bordering a canal-like stream. *Abbella xanthogaster*, Girault, Proserpine, Queensland, November 3rd, 1912, a female by sweeping in the dry bed of Proserpine River; another female same place, same date, from window of a workshop in the town; three females, November 6th, 1912, at Ayr, Queensland, from the windows of a blacksmith's shop. *Abbella subflava*, Girault, Nelson (Cairns), North Queensland, October 29th, 1912, on windows. *Trichogramma australicum*, Girault, from window,

Nelson, North Queensland, October 9th, 1912; and a female at Proserpine, Queensland, November 4th, 1912. *Oligosita pulehra*, Girault, sweeping grass near Cromarty (near Ayr), Queensland, November 8th, 1912; also at Ayr, November 6th, 1912, from the window of a smith's shop, a female. *Oligosita sacra*, Girault, from a window, Nelson, North Queensland, October 10th, 1912. *Aphelinoidea howardii*, Girault, a female, November 6th, 1912, from a window in a smithy, Ayr, Queensland.

6. A SECOND NEW SPECIES OF ABELLA FROM AUSTRALIA.

Genus ABELLA, Girault.

Abella mira, n. sp. (normal position).

Female.—Length, 0.75 mm. Rather slender. Bright lemon-yellow, marked with velvety black as follows:—The face beneath the eyes, the pronotum, at least three large spots in a longitudinal line on each side of the distal half of the abdomen, under low magnification appearing like three transverse black stripes across the abdomen (sometimes a fourth spot near base), and a large suberescentric substigmatal spot reaching half-way to the caudal wing margin and actually continued to that margin more obscurely after an interruption. Otherwise as in *subflava*.

Differs from *subflava* in the larger substigmatal spot and nearly complete banding of the wing, in bearing shorter marginal cilia around the fore wing, and in bearing a short oblique line of large discal cilia (4–5 cilia) from the stigmatal vein partly hidden by the substigmatal spot. The fore wings bear about twenty lines of discal ciliation around the apex, but only a few of the lines are very long.

(From four specimens, magnified as in the preceding descriptions.)

Male.—Not known.

Described from four female specimens captured July 11th, 1912, at Townsville by sweeping grass; November 6th and 7th, 1912, from windows of a smith's shop, Ayr; and on November 8th, 1912, by sweeping from the Ayr-Townsville train between Cromarty and Stewart's Creek. The specimen of *subflava* formerly recorded from Townsville is the foregoing female.

Habitat.—Australia: Townsville, Ayr, and Stewart's Creek, North Queensland.

Type.—No. Hy 1272, Queensland Museum, Brisbane; one female on a slide (Ayr, November 6th), mounted with two specimens of *A. xanthogaster*.

7. SIXTEENTH AUSTRALIAN SPECIES OF GONATOCERUS.

Genus GONATOCERUS, Nees.

Gonatocerus nox, n. sp.

Female.—Length, 0.75 mm. Slender.

Similar to *Gonatocerus cingulatus* of Perkins, but the whole body uniformly sooty brownish, nearly black, coloured like most species of *Anaphoidea* or *Anaphes*; also in the antennæ, the fourth funicle joint

is distinctly longer than the third, the two not subequal, as is frequent with *cingulatus*. Thus, a very dark brownish species with narrow fore wings.

(From one specimen, similarly magnified.)

Male.—Not known.

Described from a female taken from windows in a blacksmith's shop in the town of Ayr, Queensland, November 7th, 1912.

Habitat.—Australia: Ayr, Queensland.

Type.—No. *Hy 1276*, Queensland Museum, Brisbane; the above specimen in xylol-balsam (mounted with the type of *Gonatocerus fulgor*, described below, and two other specimens).

8. SEVENTEENTH SPECIES OF GONATOCERUS FROM AUSTRALIA.

GENUS GONATOCERUS, Nees.

Gonatocerus fulgor, n. sp.

Male.—Length, 0.90 mm.

Like *brunoi*, Girault, but the fore wings differ in that they are somewhat broader and shaped differently; thus they are not so regularly rounded at apex, flatter there; the discal ciliation is noticeably denser (finer and shorter), and there are about thirty-three lines; also the marginal cilia of both wings are somewhat shorter. The antennæ are different from those of *brunoi* in that the funicle joints are shorter, thus the proximal ones are barely twice longer than wide and the distal ones not more than two and a half times longer than wide. The pedicel is black, and the legs darker than those of *brunoi*, more especially the posterior tibiæ. Discal ciliation near apex of posterior wing moderately dense.

(From one specimen, similarly magnified.)

Female.—Not known.

Described from one male taken from a window in a smithy at Ayr, Queensland, November 7th, 1912. The fore wings of this species approach in shape those of the broader-winged and (usually) brown members of the genus.

Habitat.—Australia: Ayr, Queensland.

Type.—No. *Hy 1277*, Queensland Museum, Brisbane; the foregoing specimen (mounted in balsam with the type of *Gonatocerus nox* and two other specimens).

For the full treatment of the two families, see 'Memoirs Queensland Museum, Brisbane,' i. 1912, pp. 66-175.

ON THE ICHNEUMONIDÆ OF THE DUBLIN MUSEUM.

BY CLAUDE MORLEY, F.Z.S.

SOME slight account of the Ichneumonidæ contained in the Dublin Museum, so little visited by specialists, may be of use to future students of this family, more especially in respect of the Haliday types therein contained; the types of the species

described by Haliday from South America in 1836 have already been referred to by me (Entom. 1911, p. 212) and are in the Natural History Museum, London. The specimens at Dublin may be divided into ten collections of varying size and importance, thus:—(1) a general museum collection, nearly entirely of Irish origin, many with no data, extending to Ichneumoninae 186 specimens, plus Cryptinae 345, plus Ophioninae 446, plus Tryphoninae 626, to which the Pimplinae bring a total of 869 specimens. (2) a small British collection made by Mr. Brown of quite small Hymenoptera, of which 76 are Ichneumonidæ. (3) 181 German specimens, named by and acquired from Dr. Sigismund Brauns, of Mecklenburg. (4) a small collection of 91 exotic specimens, many of much interest as belonging to species not or but meagrely represented in Britain, with but some half-dozen of them given by Francis Walker to Haliday. (5) Haliday's Japanese (?) collection of sixteen specimens, set in a similar manner to that referred to by me at Entom. 1913, p. 131. (6) Haliday's Sicilian collection of sixty Mediterranean specimens, so little represented in Britain. (7) Haliday's Norwegian collection, a small one of a hundred or two specimens, evidently not taken by himself, for the mounting is extremely careless and much too bad to admit of determination; with ten specimens from Britain and, probably, West Africa. (8) Haliday's English collection, mounted and more or less correctly named by Francis Walker: 321 specimens. (9) 173 specimens captured and localized by Walker from Broadstairs, Southampton, Lizard, Isle of Wight, Land's End, Lyme Regis, and North Wales. (10) Haliday's personal British (mainly Irish) collection, consisting of Ichneumoninae 127 specimens, plus Cryptinae 769, plus Pimplinae 1011, plus Tryphoninae 1684, plus Ophioninae with total 1936 specimens, mainly in excellent condition, though few with definite locality, the Irish often marked by green sealing-wax on the pin-head, and the English sometimes similarly indicated by red. The total number in the Dublin Museum is about 3713 specimens.

In this last collection were, as has several times been supposed in my 'British Ichneumons,' the types of Haliday's species, described in his "New British Insects Indicated in Mr. Curtis's Guide" (Ann. Nat. Hist. ii. 1839, pp. 112-121), and though none were labelled as such and many misplaced by Cane, Westwood and others, I was enabled to fix the great majority. They are as follows:—

Ichneumon phaleratus (*Platylabus phaleratus*, Hal.) = *P. leucogrammus*, Wesm. (1853).—A solitary female.

Tryphon hæmosternus.—Type not found; it was placed in the genus *Polyblastus* in 1872, by Rev. T. A. Marshall, I know not upon what grounds.

T. (Cteniscus) curtisii.—A solitary, unlabelled specimen.

Dr. A. Roman tells me (*in lit.* 2, ii. 1912) that this species also occurs in Sweden.

T. (Cteniscus) aurifluus = *Excenterus geniculosus*, Schiöd. Mag. Zool. ix. 1839, p. 11 *nota*; Holmgren et Brischke. Several females, including the type; apparently not uncommon in Ireland. Sweden (Roman).

T. (Cteniscus) phæorrhæus.—A solitary male. The apical half of the abdomen is discally brick-red, with apices of the fifth and sixth segments bright flavous; all the legs are testaceous, with only the hind coxæ nigrescent; the clypeus, cheeks and face are flavous with a central black line down the last. In my table (Ichn. Brit. iv. 203) it should come next after *Excenterus mitigosus*, Grav., from which it differs in its subovate abdomen, inconspicuous petiolar spiracles, &c.; my record (*loc. cit.*) from the New Forest is an error. Sweden (Roman).

Exochus antiquus.—No Exochid in Haliday's collection has alar areolet combined with pale frontal orbits (one fragment—head, front legs, antenna, and part of thorax—is labelled "N. S.," but its frontal orbits are not pale); nor can it be an *Orthocentrus*, which genus he knew well, for he named *fulvipes*, *spurius*, *ridibundus*, and *flavipes*, Grav., and possessed some one hundred and fifty specimens in all.

E. licitor = *E. decoratus*, Holmgr. (1873).—A solitary female, with red-marked pin.

E. pectoralis = *E. decoratus*, Holmgr. (1873).—A solitary male, marked "N. S.," of which the whole face and frontal orbits—not "faciæ orbita" only—are pale.

E. talpa (Chorinæus talpa).—Type selected by me from eight specimens.

[N.B.—A couple of female *Microleptes splendidulus*—exactly as figured in Ichn. Brit. iv. 22—and a similar one labelled "*splendidulus*" by Haliday, and a male—extremely like Stephens's figure of it—placed along with them, are in the collection. Roman synonymises *Miomermis glabriventris*, Thoms. O. E. xii. 1317, with this species.]

Periope auscultator.—The typical and solitary female was misplaced.

Cryptus Mesochorus (Astiphrommus) atricilla.—Type neither indicated nor selectable.

C. (Mesochorus) fulgurans.—Type labelled "fulgurans" in pencil on green paper.

C. (Mesochorus) olerum.—Type labelled as the last; a *nomen nudum*.

C. (Mesochorus) sylvaram.—Type as above; the variety not indicated.

C. (Mesochorus) complanatus and *arenarius*.—Types not indicated nor selectable.

C. (Helictes) fulvicornis.—Almost certainly *Megastylus erythro-*

stomus, Grav. There are four of the latter in the collection, but I hesitated to select a type.

C. (Helictes) cruentatus = *Megastylus cruentator*, Schiöd.—Type selected by me from a series of nine Irish specimens; not indicated by Haliday.

C. (Helictes) varius.—Type not indicated nor selectable; the description leaves little room for doubt that it is closely allied to *Helictes coxalis*, Förster.

Clepticus.—Respecting this genus, I was able to determine nothing.

Plectiscus, Pimpla (Ephialtes) senator.—Type not indicated.

Pimpla (Polysphincta) phænicea.—Owned by Haliday to be a form of *P. percontatoria*, Müll.

Acrodactyla madida.—Type (a dissected female) selected by me from nine examples of both sexes; not indicated by Haliday.

A. degener.—Type similarly selected from seven examples of both sexes.

Bassus serricornis, Euceros serricornis = *E. egregius*, Holmgr. = *Bassus peronatus*, Marsh. A single pair, of which the female is the type, simply labelled "serricornis."

B. (Orthocentrus) laricis.—Correctly synonymised with *Stenomacrus fortipes*, Thoms. in Ichn. Brit. Type not indicated.

Porizon linguarius.—Type neither indicated nor selectable; *P. moderator* and *P. dissimilis* are the only species of the genus named by Haliday.

Atractodes, Grav.—Of this difficult genus are nearly two hundred specimens in the collection.

A. incessor = *Exolytus levigatus*.—Type labelled "incessor."

A. dioneus.—Type not indicated; probably a form of the last.

A. scrutator = *E. levigatus*.—Type labelled "scrutator."

A. vestalis.—A very long series; type labelled "vestalis." The species is now known as *tenebricosus*, Grav.

A. albo-vinctus.—This species is not now contained in the collection at all.

A. arator.—Type specifically labelled.

A. salius.—Type not named, and cannot now be fixed.

A. exilis.—Type not named nor selectable with certainty; sexes appear transposed.

A. croceicornis.—Type labelled with the MS. name "simulans."

A. piceicornis.—Type not named, and cannot be fixed.

A. fumatus.—Type labelled specifically.

A. cultellator = *forcolatus*, Grav., which latter Haliday misunderstood. A solitary female, carded, unlabelled.

A. citator.—Type not to be fixed.

A. properator = *Callidiotes (Mesatractodes, Morl.) luridator*, Grav. = *coxator*, Grav.

Lampronota fracticornis. — Doubtless = *L. melancholica*, though a type cannot be fixed among the nine examples in the collection.

L. crenicornis = *L. caligata*. — Type (a dissected male) selected by me from twelve English and Irish males and females.

L. denticornis = *L. accusator*, Fab., as I anticipated in 1908; female type selected by me from a single pair.

Unfortunately I had no time to examine the remainder of the Parasitic Hymenoptera with any care; there are far more Braconidæ than Ichneumonidæ, with no types yet excavated from the general chaos. Among the Chalcididæ I discovered a little group of specimens, named in Walker's caligraphy, which I believe to be part of the types of his Mon. Chalcid.; and further investigation should yield much of interest in both these families and the Proctotrypidæ, of which Haliday also wrote between 1833 and 1839.

LIFE-HISTORY OF *HESPERIA LINEA* (= *THAUMAS*).

BY F. W. FROHAWK, M.B.O.U., F.E.S.

(Continued from vol. xlv. p. 256.)

THE young larvæ which hatched from the eggs and spun themselves up for hibernation during the first week of August, 1912, commenced emerging from their hibernacula on April 16th, 1913, by eating their way out of the cocoons, and shortly after fed on the tender blades of grass. One was separated from the rest and kept isolated for the purpose of observation, to which the following descriptions refer.

After each meal it rested lying along the centre of the blade; after feeding two or three times it spun two cords of silk from edge to edge of the blade, drawing them partly together, in which it lived. On the seventh day six cords were spun across the blade.

The first moult took place on May 6th, twenty days after hibernation.

After first moult, the ground colour is very pale greenish-ochreous, greenest over the middle segments. Head ochreous, clypeus darker, eye-spots dark; surface granular, sparsely sprinkled with little black knobbed processes; the body has a granulated surface resembling lizard skin, and is beset with tiny black stud-like knobs. A medio-dorsal green line extends from the head to the eleventh segment, which is uniformly pale ochreous without any markings, and beset laterally with sharply-pointed simple white hairs; the medio-dorsal line is edged with light ochreous; a fine subdorsal whitish line edged with green;

the spiracles are outlined with dark brown; legs and claspers ochreous. There is no dorsal collar on the first segment as in the previous stage.

Second moult, May 19th, the second stage occupying thirteen days.

After second moult it measures 7 mm. long; ground colour bright green; a medio-dorsal darker green stripe bordered by a pale yellowish line; a fine subdorsal whitish line bordered on each side by a darker green line, and a whitish lateral line. The head is light greenish-ochreous, clypeus and medio-frontal line darker and continuous with the body stripe, eye-spots black; the surface is finely granular and sprinkled with minute black points. The body is likewise granular, and is beset with minute stud-like processes; the anal segment is fringed with whitish hairs. The ventral surface is flattened. If disturbed when out of its dwelling it falls to the ground and rolls in a complete ring, remaining so for a short time.

Third moult, May 27th.

After third moult measuring 14 mm. long. Head very pale whitish-ochreous-green, with a slightly darker central band continuous with the medio-dorsal stripe, clypeus very indistinct, otherwise it is similar to previous stage; the pale spiracles are placed on a very fine pale line.

Fourth moult, June 6th.

After the fourth and last moult, fully grown, the larva measures 21 mm. long. The head is globular, the surface reticulated and sprinkled with minute white bristles, eyes dark; the colour is ochreous-green with a slightly darker green band down the centre, but very faint. The body is swollen in the middle, tapering at the ends, the first segment is small and narrow, the anal segment terminating in a projecting flap, the segments subdivided into six divisions, the first one being much the widest; the ground-colour is grass-green with a rather darker green longitudinal medio-dorsal band intersected by a central paler line, and bordered on either side by a pale yellowish line, and a similar subdorsal line; the small yellow spiracles are situated on a fine pale line followed by a conspicuous yellowish-white lateral stripe, the ventral surface is darker green, on each clasper is a whitish crescentic mark. The first and last segments are wholly green. The legs fleshy-ochreous. Between the ninth to tenth and tenth to eleventh segments is a ventral patch of white waxy substance.

The larva became fully grown and spun up for pupation on June 15th, and pupated June 17th. The larval state occupying 311 days.

The pupa varies in length from 16 mm. to 19 mm. long. It is slender and tapering.

Dorsal view: The head bears a short frontal conical point,

from the base of which the head slopes off to the rather prominent eyes; across the neck it is slightly contracted; base of wings rather swollen, and very slightly narrowed across the middle; the abdomen gradually tapering to the long cremastral horn, which is furnished with a cluster of projecting amber-coloured hooks.

Lateral view: Head rounded with a central conical point; thorax rounded, which is the greatest diameter of the pupa; slightly sunken at the metathorax, the abdomen gradually tapering to anal segment, which terminates in a long flattened cremaster with a cluster of hooks only at the extremity; the ventral surface forms almost a straight line. The long tongue-case, which is free from the apex of wings, reaches to the anal segment.

The whole surface is granular and covered thickly with white powdery bloom of a waxy nature. On the head-horn are a few fine whitish bristles.

Colouring: Immediately after pupation the head, thorax, and basal half of wings are pure rich brilliant green; the apical half of wings paler; the abdomen yellow-green; the terminal detached portion of tongue-case is deep ochreous; the cremaster and head-point flesh-colour. It is striped longitudinally like the larva. By slow degrees the colouring matures and loses the brilliancy; the abdomen becomes whiter, and the wings and thorax duller.

When seven days old the head is green, spread with a pinkish bloom, the frontal point deeper lilac-pink; thorax grass-green; wings greyer green; abdomen whitish-yellow-green with a medio-dorsal longitudinal grass-green stripe, the last two segments fading into pale lilac; cremaster darker.

Just before emergence the pupa assumes a dull smoky-black, segmental divisions pale greenish, and wings dark copper-red.

It is attached to the grass-blades by a cincture round the middle and by the cremastral hooks to a pad of silk spun on the surface of the blades; usually three or four blades are spun together forming a tubular shelter in which the pupa is more or less concealed.

The pupal period extends from twelve to seventeen days, according to temperature.

The individual described, which pupated on June 17th, produced a male imago on July 4th, remaining seventeen days in the pupa. One that pupated July 3rd, 1912, emerged July 16th (a female), remained thirteen days in pupa. Another which pupated on July 10th, emerged on July 22nd, also a female, was twelve days in the pupal state.

BY THE WAY.

“WHAT is the ox-warble fly?” The question raised quite a flutter of excitement in the Mother of Parliaments this afternoon [July 10th, 1913]. Mr. Chas. Bathurst, who is a great authority on all matters agricultural, in the course of a question to the Vice-President of the Irish Board of Agriculture, suggested that this quaintly-named creature caused great devastation to hives. That propensity did not arouse the languid interest of the Irish, although it appeared to have the support of the Chief Secretary for Ireland, who answered the question. Mr. Bathurst was not only anxious about what the ox-warble fly does, but he was gravely concerned because the English and Irish Boards of Agriculture gave entirely different accounts of its life history. The House pricked up its ears at this suggestion of division in Ministerial circles, and awaited with some interest Mr. Birrell's answer to the supplementary question. Mr. Birrell was equal to the occasion. “This sort of thing often happens in biography,” said the right hon. gentleman, resuming his seat amid much laughter, and a determination on the part of many members to “read up” at an early opportunity all about “the ox-warble fly.” . . .

Many Londoners will be cheered to-day by the grateful intelligence that Boxhill, one of the beauty spots of outer London, has been saved from the jerry-builder. The announcement was made this afternoon by Sir Robt. Hunter at a meeting of the National Trust. It would appear that a public benefactor in the person of a gentleman who modestly desires to remain anonymous has made an offer to purchase a part of the magnificent estate upon which Boxhill stands and to present it to the Trust for the use of the public. For generations now Boxhill has been one of the most appreciated pleasure haunts of Londoners. It lies within a short distance of Dorking, and the public have for generations been allowed to roam over its heights and enjoy its delightful vistas of Surrey, Hampshire, and Sussex.—(Daily Paper.)

C. M.

NOTES AND OBSERVATIONS.

NOTE ON PARASITES OF *HYGROCHROA SYRINGARIA*.—In the August number of the ‘Entomologist’ (vol. xlvi. p. 245) I notice that a letter written by Dr. E. R. Buckle to Mr. Claude Morley has been appended to my description of a new species of *Meteorus* (Braconidae), *M. niger*. As this letter appears in one or two respects to be at variance with the description, perhaps I may be allowed a few words of explanation. Dr. Buckle mentions that the larvæ of *Hygrochroa*

syringaria which he had under observation hung themselves from the food-plant or roof of the breeding-cage by a thread, and that next day a larva so suspended was found to have a pupa-case of an ichneumon suspended from it. The letter reads as if this occurred with all the thirty larvæ mentioned by the writer. Although I have known a similar instance myself, it must not be taken that such is usually the case. In the ordinary way the parasitic larva emerges from the host when the latter is resting on a branch or leaf of the food-plant, attaching itself to the pabulum before quite severing connection with the host. When confined in a breeding-cage, the slightest jar causes the larvæ of *H. syringaria* to drop, as described by Dr. Buckle, and it is easy to see that when weakened by the presence of a parasite they may be unable to climb back, and that consequently the parasitic larva is obliged to emerge when the host is in this unusual position. In a state of nature such a thing must be of rare occurrence. To quote from the letter: "The fly emerged by cutting off a circular cap from the lower end of the pupa-case, or, in a few cases, by eating a rather irregular hole through the side of the case." Now, with *M. niger*, as with all other Meteoridæ with which I am acquainted, the fly invariably removes a circular cap, the irregular holes that Dr. Buckle describes were no doubt made by hyperparasites, probably a species of *Hemiteles* or *Mesochorus*. Again, to quote: "The darkest specimens, the males, all came out first; and then the rather softer-bodied females, which had a yellowish patch in the center of the dorsal surface of the abdomen." In *M. niger* the female is quite as dark as her mate, not one of the hundred or so specimens I have examined showing any sign of such a yellowish patch as mentioned. In some species of *Mesochorus*, however, which I have bred hyperparasitically through Meteoridæ, such markings are usual, so that I think if Dr. Buckle will re-examine his specimens, he will find that he has confused the parasite with the hyperparasite. *Mesochorus* is, of course, widely removed from *Meteorus*, though in size the parasite and hyperparasite agree. In the study of the Parasitica, the snares and pitfalls set for the experienced student are very numerous; for the novice or unwarly observer their name is legion.—G. T. LYLE; Brookenhurst, August 8th, 1913.

ARASCHNIA LEVANA AT CARDIFF.—Your correspondent Mr. T. Butt Ekins would be well advised to compare the insect which he assumes to be *A. levana* with the Continental spring form of this butterfly. Possibly, misled by the description in the text-book quoted, he has mistaken *Ilamearis (Nemeobius) lucina* for *levana*, which, by the way, is not a "fritillary" at all. It has, I believe, never been reported British, even in the imaginative days of the "Kentish Cabinet"; but it is difficult to understand why this species, which is not uncommon on the opposite side of the Channel, in the north-east departments of France, should not be indigenous or have established itself in our southern woods. It does not occur in the north-west of France, or Brittany, for example; but in the Nord is reported from the Forest of Mormal (Le Roi); and my correspondent M. Postel, of Fonequevillers, Pas-de-Calais, informs me that it is

common in the department of the Somme at Aveluy, occurring also at Mailley-Maillet, and Coigneux. If Mr. Butt Ekins has not already determined the species of his capture and cares to send it to me for inspection I shall be happy to identify the same; or I will send him, with pleasure, a specimen of the French *levana*, first brood.—H. ROWLAND-BROWN; Oxhey Grove, Harrow-Weald, August 18th, 1913.

GEOMETRA VERNARIA IN SCOTLAND.—While collecting at dusk I netted a specimen of *Geometra vernaria*, and was surprised to find on referring to 'Moths of the British Isles' that this species is practically unknown up here. I shall be glad to know if there is any other instance of one of this species having been captured in Argyllshire or as far north as this.—JAMES N. SLOON; Blairbeg, Blainmore, Argyllshire.

LITHOSIA LUTARELLA PYGMÆOLA IN NORFOLK.—While collecting recently on the sandhills at Winterton, Norfolk, I took four specimens of *Lithosia lutarella* var. *pygmæola*, one at sugar on a bunch of marram heads, the others at rest on the marram grass. Two were taken on August 11th and two on August 14th. The weather at the time was unfavourable for collecting, the wind blowing steadily from the north-east, so that I had no opportunity of judging how plentiful *pygmæola* really is in what I imagine to be a hitherto unknown locality.—FRANCIS H. LYON; 89, Clarence Gate Gardens, London, N.W.

CYANIRIS ARGIOLUS OVA ON PORTUGAL LAUREL.—On May 27th I noticed *Cyaniris argiolus* ovipositing on Portugal Laurel. I found two ova at the base of the terminal buds of two flowering sprays. Larvæ from these hatched out on June 5th, and are feeding up well. There is plenty of holly in the garden.—(Rev.) C. A. SLADEN; Alton Barnes Rectory, Pewsey, Wilts, June 24th, 1913.

CÆNOCALPE VITTATA (PHIBALAPTERYX LIGNATA).—On June 16th and 17th I caught a few specimens of *P. lignata* locally, from which I obtained a small batch of ova. I placed the ova on *Galium verum* and the larvæ commenced to emerge on June 28th. The first opportunity I had of counting the larvæ I found thirty-seven about half-grown; they fed up very well, showing a preference for the buds and flowers of the bedstraw. The first of the larvæ pupated on July 18th, and the remainder during the next five or six days; they spun up amongst the food plant mainly, while a few made slight cocoons on the surface of the sand. The moths—nineteen males and eighteen females—emerged upon the following dates: July 31st, eight; August 1st, eleven; August 2nd, ten; August 3rd, four; August 4th, four = nineteen males, eighteen females; all fine specimens except two (slightly crippled). I have a good lot of ova from a pairing and hope to carry on a further brood. Perhaps I should add in conclusion, these have been reared in my greenhouse.—W. A. TYERMAN; Chesterfield Road, Ainsdale, Southport, August 5th, 1913.

COLIAS EDUSA IN ISLE OF WIGHT.—On August 14th I captured two male specimens of *C. edusa* at Whitecliffe Bay, near St. Helens, Isle of Wight. Is this part of a summer brood or a summer immi-

gration?—A. CAPEL MORRIS; Brookfield, Binstead Road, Ryde, I.W., August 15th, 1913.

COLIAS EDUSA IN ESSEX.—Mr. A. Luvoni informs us that at Westeliff, Essex, he captured seventeen specimens of *Colias edusa* during the second and third weeks in August of this year. Both sexes were represented in about equal proportion.

COLIAS EDUSA IN HANTS, WEST SUSSEX, AND NOTTS.—*C. edusa* is about this year. I have seen a dozen or so, and caught a beautiful example of var. *helice*.—(Major) R. B. ROBERTSON; Hillingbury Cottage, Chandler's Ford, Hants, August 23rd, 1913.

On August 5th last I saw here a specimen of *C. edusa*. It was in good condition.—W. M. CHRISTY; Watergate, Emsworth.

I captured a male specimen of *C. edusa* in the Blidworth district, Notts, on August 20th.—JOHN RANDLE; Annesley Road, Hucknall, Notts.

COLIAS EDUSA AND DASYPODA HIRTIPES IN SUSSEX.—I took a female specimen of *Colias edusa* near Shoreham, Sussex, on August 7th. A few days later the species was quite common; at one time I noticed three sporting together. In a sandy spot near the sea I noticed a colony of the Hairy Bee (*Dasyпода hirtipes*), which were burrowing holes in the sand to a considerable depth.—W. PASKELL; 85, Second Avenue, Manor Park, E., August 19th, 1913.

HELIOTHIS PELTIGERA AND ACIDALIA FUMATA IN HAMPSHIRE.—I have to record the capture by myself of *Acidalia fumata* and *Heliothis peltigera* on Hayling Island, June 25th and 27th respectively. Both moths were females, and each deposited a number of fertile ova.—A. T. POSTANS; 55, Raglan Street, Southsea, Hants, July 21st, 1913.

GELECHIA VELOCELLA AT WANSTEAD.—Until Wednesday last I had never met with more than five or six specimens of this local moth, but on this occasion, when crossing a dry piece of meadow land, I noticed the second brood in abundance amongst the dried-up stems of its food-plant (*Rumex acetosella*). I managed, after many attempts, to box a couple for verification. This is the most active member of the genus with which I am acquainted. Duponchel certainly gave it a most appropriate name!—A. THURNALL; August 1st, 1913.

SELIDOSEMA ERICETARIA (PLUMARIA) IN SCOTLAND.—As I notice that so recent an authority as Barrett states that *Selidosema plumaria* has not been observed in Scotland, it may be of interest to record that I found it early this month in several localities at the west end of Loch Shiel in Argyllshire. It occurred usually at a moderate elevation, and rested on the rocks in company with *Anaitis plagiata* and *Dasydia obfuscaria*, from the latter of which it was difficult to distinguish on the wing.—C. N. HUGHES; 3, Wyndham Place, Bryanston Square, W., August 16th, 1913.

CRYMODES EXULIS ASSIMILIS AT BRAEMAR.—I have much pleasure in recording the capture of a specimen of *Crymodes exulis* var. *assimilis* at Braemar in July last. With the exception of a piece

out of the inner angle of the left front wing it is in very fair condition. Although it seemed an ideal night for sugaring, there was only one other insect (an *Hadæna adusta*) on the whole of my patch. Mr. Arthur Horne, of Aberdeen, kindly identified it for me, and his decision was confirmed by Mr. J. P. Mutch, of Hornsey Road.—ROLAND G. BENTON; Muswell Hill, N.

DEIOPEIA PULCHELLA IN DERBYSHIRE.—May I bring to your notice the capture of a female *Deiopeia pulchella*. The moth was taken on June 14th by a member of the Trent College Nat. Hist. Soc., and was beaten out of laurel bushes in the college grounds. It is not a good specimen, probably owing to the buffetings received on its long journey. I believe there are very few, if any, records of the capture of *Deiopeia pulchella* in a locality so far from the sea as Trent, and, so far as I know, it is some years since it was taken at all in England.—H. H. WALLIS; Trent College, Derbyshire, July 24th, 1913.

RECENT LITERATURE.

The Remarkable Life-history of a new Family (Micromalthidæ) of Beetles. By HERBERT S. BARBER, Bureau of Entomology, Washington, D.C.

IN this paper, which has just appeared in the 'Proceedings' of the Biological Society of Washington (vol. xxvi. pp. 159-190, August 8th, 1913), Mr. Barber has given a further account* of his very interesting observations on the life-history of a little North American beetle, *Micromalthus debilis*, Lec. Although some of the most important stages in the life-history have not yet been observed, the facts already brought to light are more than sufficient to justify the claim that the life-history of this beetle is "the most remarkable in the Coleoptera, if not one of the most remarkable in the whole class Insecta." *Micromalthus* "combines in its life cycle—eggs by two methods of reproduction, seven or eight forms of larvæ, adults through two distinct lines of larvæ, oviparous pædogenesis and viviparous pædogenesis." The larvæ live in rotten wood, and amongst them one form was observed which was more robust than the others, and appeared to be almost free from segmentation; this gave birth to a number of living young—minute white larvæ, distinguished by having long slender legs of the Caraboid type: that is, with a distinct tarsal segment provided with two claws at the end. These larvæ constitute a sort of migratory stage. They crawl away and wander for a time, then start burrowing in the wood, feed a little, and after a week or so moult into the second form, which is legless and much resembles a Cerambycid larva. After one or two more moults the Cerambycoid larva either rarely pupates, or usually moults, disclosing the pædogenetic form. After a period of about two weeks the young, numbering from three or four to thirty or forty, but usually about ten, are born, tail first, and begin the new generation. Certain individuals of the pædogenetic form, however, do not develop

* A preliminary account appeared earlier this year (Proc. Ent. Soc. Washington, xv. No. 1).

embryos, and of these many die apparently barren, but others void, through the vulva, instead of several migratory or "caraboid" young, a single, large, soft, oval egg, which adheres to the side of the mother, and hatches in eight or ten days into a first stage larva utterly unlike the previous forms, and which much resembles a weevil larva in appearance. This larva feeds on the contents of the mother's body, and when full-fed changes into another form of larva having short, stumpy, three-jointed legs, and later pupates. It appears that from the pupæ thus derived only male beetles are developed, whereas from the pupæ derived directly from the Cerambycoid form of larvæ only female beetles emerge. If subsequent observation confirm these results, we shall be faced with some extremely interesting facts indeed. Mr. Barber has not yet succeeded in getting the male and female beetles to pair, and has therefore not been able to observe the stages following upon the ordinary sexual mode of reproduction. He hopes to give a complete account of the extraordinary life-history of this beetle at a later date. We shall await it with the keenest interest.

C. J. G.

The Life-history of Panorpa klugi, McLach. (Journal of Coll. of Agric. Univ. of Tokyo, vol. iv. No. 2). By T. MIYAKE. Pp. 117-139, and 2 plates shewing larva and pupa, and structural details. Tokyo, 1912.

In 1863 Brauer gave a life-history of *Panorpa* based on observation of several European species. In 1895 Felt gave the result of his observations of the larval stage of the American insect, *Panorpa rufescens*. In the present paper Miyake is able to give the complete life-history of a Japanese species, *Panorpa klugi*. Enderlin places this and other Japanese species in a new genus, *Aulops*, but Miyake, after his work on this insect, does not consider the separation justified.

Our author gives a description of his breeding-cages, and especially the method employed for keeping the interior damp without excess of moisture. He fed his larvæ on wounded or dead insects, since meat was not found to be satisfactory. The eggs were first put in Petri dishes, and great care was necessary to preserve both eggs and larvæ from vegetable and animal parasites and other foes.

Although cases have been mentioned of *Panorpa* preying on living insects, Miyake considers, and no doubt correctly, that such an occurrence is very exceptional, and that the food consists of dead or injured or even partially decayed insects. They sometimes feed on vegetable matter, e.g. petals of *Silene armeria*.

After describing copulation, egg-laying, and eggs, Miyake gives a full description of the larva. The egg stage lasts about a week, and he concludes that the larva undergoes seven moults in ten to fifteen days, but the last stage lasts over a month. There are changes in the spiracles, also seven in number. The full account of larval habits is interesting reading. The pupa is free in its burrow, and this stage lasts six or seven days for the first brood. In his cages Miyake found that the females often lived more than a month, but the total length of life may be longer in natural conditions. Eggs

are laid in May or June, and again in August or September. Consequently there are two broods a year, and this seems to be the case with *P. germanica* in Britain—sometimes, at any rate. The winter is passed by the larva, in its last larval stage, in the burrow.

Two excellent plates illustrate the earlier stages of the insect. Miyake concludes his paper with the description of a subspecies, *nigra*, of which apparently *P. nipponensis* and *P. brachypennis* are only other forms.

W. J. LUCAS.

The North American Dragonflies of the Genus Æshna (University of Toronto Studies, Biological Series). By E. M. WALKER, B.A., M.B. Pp. 213. Toronto, 1912.

THERE has for a long time been a difference of opinion as to the spelling of the name of this genus. *Æschna* is generally used in Europe, and will probably continue to be used, especially as the change to *Æshna* would introduce a difficulty in connection with compounds such as *Amphieschna*. This matter is, however, unimportant in face of the excellent monograph of the North American members of the genus which Mr. Walker has produced.

Throughout the work it is very obvious that our author is an experienced field naturalist, and we are therefore not surprised to find some fifty-six pages devoted to the biology and bionomics of the American *Æschnas*. The entomologist, therefore, who takes a comprehensive view of his science (although he may not study dragonflies in particular) will wish to inspect this monograph. Following these introductory pages are full, elaborate keys for the identification of both males and females, and in addition such nymphs as are known to science. Each species is then most fully treated, and the distribution, habits, relationships, and so on, are not forgotten.

Of North American *Æschnas*, there are sixteen species, according to Walker, with four forms to *Æ. interrupta*, and two to *Æ. umbrosa*. In Europe there are nine, while in Britain we have six. Of these one species, *Æ. juncea*, is common to Europe and North America, this being a British species also.

After a list of works cited, we come to the plates, twenty-eight in number, six illustrating the abdomens of the imagines being coloured. All are excellent. Though we possess but six *Æschnas* to the North American sixteen, yet it is evident from the plates alone that there is much less diversity among the American species than amongst our own. Across the Atlantic there are none that resemble our *Æ. grandis* and *Æ. isosceles*.

Mr. Walker mentions an interesting observation of *Æ. constricta* ovipositing in the stem of a sweet-flag (*Acorus calamus*) some two and a half feet above the water. He thinks the eggs fall out as the plant withers. On one occasion I saw a *Platynemis pennipes* to all appearance ovipositing in the stem of a yellow water-lily flower some inches above the surface. If eggs were laid, they would later have been brought below the surface, when, after flowering, the fruit came down to water-level, as is the custom with this plant. Is it not necessary for the eggs to remain moist?

W. J. LUCAS.

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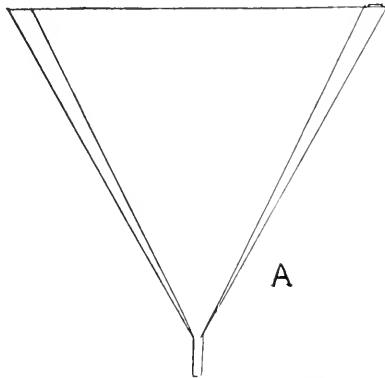
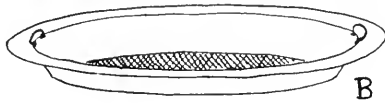
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BERLESE INSECT COLLECTING FUNNEL.

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[No. 605

THE BERLESE FUNNEL.

By C. B. WILLIAMS, B.A., F.E.S.

(PLATE XI.)

It is remarkable that so little use has been made in this country of the interesting piece of apparatus invented by Berlese, in Italy, for collecting minute insects from soil, moss, or other similar materials. Although initially a little expensive, it is so simple to use and so efficient in collecting that it should appeal to all who take any interest in the smaller insects, Acarids, and other Arthropods.

The apparatus (Plate xi.) consists essentially of a double walled metal funnel (fig. A), with a fine mesh sieve across the top and a tube leading to a small bottle at the bottom. The space between the two walls of the funnel is filled nearly to the top with water, which is kept warm by means of a small ring burner.* The material to be examined is broken up, if necessary, and spread out on the sieve, when the numerous small animals which it contains, moving downwards towards the warmth and away from the light, pass through the holes in the sieve, slip down the sides of the funnel and fall into the bottle at the bottom.

The dimensions of the apparatus shown on the plate are as follows:—Total height on stout iron tripod stand, 3 ft. 4 in.; outside diameter of funnel, 24 in.; depth of funnel, 20 in.; space between the two walls at the top, 2 in.; the tray sieve which rests in the top of the funnel is 3 in. deep and has a projecting lip (fig. B) to prevent any rubbish getting down between it and the funnel. The tube at the bottom, leading out

* In the plate the burner is shown attached to a retort stand. This, of course, is unnecessary, as it could easily be fixed to one of the legs of the stand.

of the funnel, is 1 in. in diameter.* The sieve itself consists of perforated zinc with holes 1 mm. ($\frac{1}{25}$ in.) in diameter.

The total cost in stout sheet zinc with an iron stand was a little over £2; copper would be more lasting, but correspondingly expensive.

The measurements could, of course, be altered to suit circumstances, and for general purposes one rather smaller than the above, about 18 in. in diameter, would be most convenient, while one even smaller than this would be quite useful.

The water in the funnel should be kept at a temperature of about 105–110° F., when the greater part of the catch will come through in the first twenty-four hours. If the raw material is plentiful, it is best to put in a fresh supply at this point, but if there is only a little of it to hand, or if it is for any reason required to examine more thoroughly any one lot, it may be left in several days.

For ordinary purposes 70 % alcohol is the most convenient material to put in the bottle, but any fixing fluid may be used, while, if plain water be used many of the insects will remain alive until examined. For this it is most convenient to turn it out into a watchglass or shallow dish, and by examining under a dissecting microscope, any desired specimen can be removed with a fine pipette.

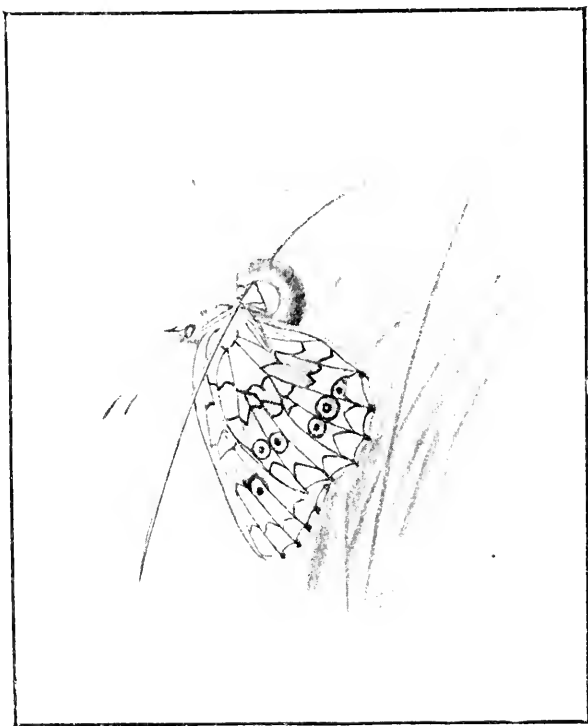
A certain amount of rubbish or small particles of soil always comes through the sieve, especially from such materials as soil and peat, moss on the contrary giving practically none. Almost anything that will go into the sieve may be examined: soil, moss, garden rubbish, dead leaves, decaying wood, peat, grass, seaweed, birds' nests, &c., while to give an idea of the variety of material obtained, I may mention the following:— Small worms; shells; woodlice; spiders; chelifers; Acarids (in profusion, especially Orobatiidæ); Miriapoda (Chilognatha, Diplopoda, Symphyla, Pauropoda); Protura; Thysanura (especially Campodeidæ); Collembola (in profusion); Aphaniptera (from birds' nests); Thysanoptera; Psocidæ; Aphids; Psyllids; Hymenoptera (ants, winged and wingless Chalcids, Prototripids, &c.); small caterpillars; Coleoptera (Staphylinidæ, small Carabidæ, Trichopterygidæ, &c., and numbers of larvæ); Diptera (of all sorts, including wingless forms and numbers of larvæ). In fact, there is scarcely any group of insects of which representatives are not at some time found.

The John Innes Horticultural Institution,
Merton, Surrey.

* Care should be taken that in the making there is no projecting inside at the joint of the funnel and the tube, which would prevent things slipping past into the bottom.

COMPLETION OF THE LIFE-HISTORY OF *MELANARGIA*
JAPYGLA SUBSP. *SUWAROVIVS*.

By F. W. FROHAWK, M.B.O.U., F.E.S., and the Hon.
N. CHARLES ROTHSCHILD, M.A., F.L.S.



M. suwarovius depositing.

In a previous article* we gave an account of the habits of *Melanargia japygia* subsp. *suwarovius*, and described the egg, the larva before its first moult, the adult larva, and the pupa.

In the present paper some further details are recorded concerning the habits of this insect, and descriptions of the remaining stages are given.

On June 19th at 11 a.m. a female was observed depositing at Puszta Peszér. The butterfly flew from a thistle bloom in one of the flat open spaces to a "buczka" (sandhill), and alighted on a blade of *Festuca glauca* var. *scabrifolia*, very rapidly sliding over to the position shown in the drawing, the weight of the

* Entomologist, vol. xlv. No. 592, pp. 1-5. 1912.

insect causing the grass to bend over. The butterfly held on to the grass by the hind legs only, the middle pair being folded across the thorax. By this device the abdomen is brought as close as possible to the grass blade. The insect then curved its abdomen almost in a circle and deposited two eggs, touching each other on the grass parallel to the longer axis of the grass blades. As the butterfly flew up the grass went back with a jerk.

Again, on June 23rd about noon, six females of this butterfly were observed depositing. They all assumed the attitude already described. Two of the females deposited respectively a single egg and two eggs on the inflorescence of *Koeleria gracilis*. A third deposited two eggs on the inflorescence of *Poa pratensis*. A fourth, four eggs on a blade of *Stipa* (probably *capillata*), laid in a row touching each other, and parallel to the longer axis of the blade. A fifth, a single egg on a flower stalk of *Asperula cynanchica*. The sixth female deposited five eggs on a plant of wild asparagus (*A. officinalis*), again laid in a row, and all touching each other. In our previous article we recorded the fact that a female had been observed by Miss Wertheimstein to deposit on *Festuca sulcata*, and that the larva had been found feeding on this plant.

On August 23rd, 1912, the various plants of different grasses containing the eggs deposited between June 10th and July 5th were carefully examined, and to our surprise we found several larvæ had been feeding, and were considerably grown and green in colour, the grass selected by the larvæ being *Poa annua*, although they were supplied with different kinds of *Festuca* and other grasses. They had eaten large pieces out of the edges of the *P. annua* blades.

All the young larvæ in our possession hitherto had immediately entered into hibernation upon emergence from the egg. The larvæ were in various stages, several had apparently only just started feeding; a large number were perfectly quiet, resting close to the egg shells, and had neither eaten nor moved since hatching. Also many were resting on the dead *Festuca* blades, which they closely resemble in colour.

Upon placing a number of larvæ on fresh plants potted up, some pots containing mixed plants of *Festuca* and *P. annua*, we noticed some of the larger larvæ almost immediately started feeding on the *P. annua*.

On August 29th one larva had fixed for moulting, and moulted the first time on September 1st, 1912.

Shortly before first moult it measures 4.75 mm. long. The ground colour is a clear light green, with fine medio-dorsal, sub-dorsal, spiracular and lateral olive-brown lines, and a broad super-spiracular stripe of the same colour. Head and legs pale ochreous-greenish, claspers green.

After first moult (forty-five days after) it is 6.35 mm. long. The head is green, roughly granular, and studded with whitish hairs, each with a translucent bulbous base. The body is glaucous-green, with olive-brown longitudinal lines; the medio-dorsal line is clearly defined and bordered by a fine whitish-green line; the super-spiracular stripe is broad and suffused, darkest along the upper edge and bordered below by a whitish lateral line; immediately above the black spiracles is a fine pale green line intersecting the suffused band; there is also a fine sub-dorsal brown line; above the claspers is a fine brown line. The anal points are whitish. The body is rather densely sprinkled with slightly curved simple brownish hairs with black bases above the spiracles, while those covering the sub-spiracular and ventral surface are whitish with pale bases. The legs and claspers are green.

Several of those which fed during the autumn survived hibernation and started feeding at the beginning of March, 1913. After feeding occasionally for a few days, the first one fixed itself for the second moult on March 9th, and moulted March 15th. This individual on March 31st (after second moult) measured 8.47 mm. long and somewhat stout in proportion, and very similar in all details to the previous stage. The head pale green, deeply pitted with darker green, which gives to the naked eye a rather ochreous-green appearance. It rests in a straight attitude, and feeds both by day and night.

Other examples moulted a second time during latter part of March. The same specimen moulted the third time on April 21st, being thirty-seven days in the third stage. After third moult (seven days after) it measures 15 mm. long. Excepting having paler coloured spiracles, greenish legs, and less prominent points on the head, it is exactly similar in all details to its subsequent stage—*i. e.* after the fourth and last moult, previously described in this Journal.

The fourth moult occurred on May 16th, the fourth stage lasting twenty-five days. It became fully grown at the end of May, and pupated during the first week of June. The larval existence extended between ten and eleven months.

The imago, a fine male, emerged July 4th, the pupal stage occupying a month. In Hungary the normal time of appearance is about the middle of June. The climate of England is entirely different from that of Hungary, the summer being moist and cool instead of very dry and very hot, and the winter moist and warm rather than dry and very cold. Our observations, carried out in this country in 1912 and 1913 on the larvæ of *sucarovius*, show that the majority of the young larvæ hibernate without feeding directly after emergence from the egg, but a few of them after remaining motionless for four or five weeks commenced to feed, moult, and hibernate after the first moult.

So far only those larvæ (*i. e.* those which fed before hibernation) have survived in England, all the rest dying during hibernation or just after. In Hungary it is possible that the larvæ have similar habits. The fact that the eggs are deposited on many plants, some of which cannot possibly be food-plants of the larvæ, seems to indicate that the larvæ hibernate without feeding, resting during the late summer and autumn on the plants where the eggs were deposited, until they are ultimately beaten down by the snow. It is, however, by no means certain that the young larvæ may not *after a time* leave the spot where the egg was deposited, and commence feeding before hibernation.

Finally, it may be possible that Nature has devised a plan to avoid the dangers in the summer of a drought, and that some of the larvæ hibernate without feeding at all, and some commence to feed before hibernation, if the grasses are not already too much dried up.

A BRIEF VISIT TO MALACCA.

By J. C. MOULTON, B.Sc., F.R.G.S., Curator of the Sarawak Museum.

I SUPPOSE everyone who has pretensions to the title of entomologist has read Wallace's 'Malay Archipelago,' and while some may probably regard the chapter on Celebes as their favourite, others will read with renewed interest and delight the chapters on the Orang-utan of Borneo or on the Birds of Paradise of New Guinea; a few others, more fortunate, may have been to Malaya and seen some of the very places visited by the famous naturalist now nearly sixty years ago.

Having had occasion to pay a brief visit to Malacca lately, I thought perhaps a few notes might be of interest to readers of the 'Entomologist,' who would like to be reminded of Wallace's collecting days there in 1854.

From Singapore it takes about twelve hours by sea or rail to reach Malacca; the former route is perhaps preferable, though one is apt to arrive off the town at 2 a.m., at which hour a three miles row ashore does not appeal to the sleepy traveller any more than does the next stage in the proceedings, which is to bang on the doors of the rest-house until one of the sleeping inmates is moved to admit the disturber. Owing to the shallow water no steamers can approach the shore, although a long pier juts out invitingly, but closer inspection shows that this is now no longer in use, and, in fact, is dangerous to walk upon. To this lack of encouragement to passing ships to stop and enliven the place, Malacca, no doubt, owes its long continued air of peace and quiet, disturbed though it is on occasions by week-end invasions of motor-cars from neighbouring rubber estates.

Wallace's description, written over fifty years ago, still holds good to-day, and I quote it in the footnote below.*

But this peaceful "left behind" existence is by no means characteristic of the old Malacca, the fortified Malacca of the Portuguese, the trading centre of the Dutch or the Malacca in the early days of the British occupation. Briefly its history is this:—

After about a century of prosperous growth the Malay city of Singapore was invaded and sacked by a Javanese prince; a certain number of survivors however escaped and fled up the west coast of the Malay Peninsula, and founded the city of Malacca about 1250 A.D. Here they flourished under their Malay chiefs until the advent of the Portuguese under Albuquerque in 1511. The large roofless church of St. Paul on the hill overlooking the coast, where the celebrated missionary St. Francis Xavier † was buried before being transferred to Goa, was built by them, also a large series of fortifications, now, alas! no more, thanks to the misplaced energies of an English governor a hundred years ago. The whole of the Portuguese Eastern trade radiated from Malacca, which thus flourished as the most important trade centre in the East for nearly a hundred years. The Portuguese were succeeded by the Dutch, who have left some substantial buildings, chief of which is the old Stadt House, still used as Government offices, and the large church at the foot of the hill near the landing-place. After nearly two hundred years of constant rivalry for the trade of the East, Malacca was taken by the English in 1795, and the Dutch were turned out. Sixteen years later a large expedition under Lord Minto was despatched from Malacca to Java, resulting in the occupation of that country by the English, with Stamford Raffles as Governor, only to give place again to the Dutch five years later in 1816. But Malacca remained ours, and round it neighbouring states have gradually come under British influence year by year, so that the Straits Settlements, the Federated Malay States, and the Protected States in the Malay Peninsula, now form one large tract of country prospering day by day under British control and advice.

From an entomological point of view Malacca has sadly

* 'The Malay Archipelago,' by A. R. Wallace, 1902 edition, p. 19:—
 "The old and picturesque town of Malacca is crowded along the banks of the small river, and consists of narrow streets of shops and dwelling-houses, occupied by the descendants of the Portuguese, and by Chinamen. In the suburbs are the houses of the English officials and of a few Portuguese merchants, embedded in groves of palms and fruit trees, whose varied and beautiful foliage furnishes a pleasing relief to the eye, as well as most varied grateful shade. The old fort, the large Government House, and the ruins of a cathedral, attest the former wealth and importance of this place, which was once as much the centre of Eastern trade as Singapore is now."

† He died in December, 1552.

deteriorated since Wallace's day, jungle giving place to rubber everywhere; it is interesting to note that Ayer Panas, a place not far from Malacca, where Wallace spent some time collecting, is now the home of a flourishing rubber company which bears that name. It was at Ayer Panas that Wallace caught the first specimen of the handsome Nymphalid, *Prothoe calydonia*, described by Hewitson. He tells us that it was twelve years before the second specimen (from Borneo) was taken. In Sarawak it is regarded as a great rarity, some half a dozen specimens only having been taken in the last twenty years; it is evidently an "unclean" feeder, as Wallace records its capture "on the dung of some carnivorous animal," and the late Mr. Shelford noted that Sarawak specimens were taken in traps baited with rotten fruit.*

During my stay in Malacca I wandered out to Saint John's Hill, which lies a short distance to the east of the town; a little jungle path leads up to the top, crowned by an old ruined fort, probably built by the Portuguese some four hundred years ago. Not having a net with me, I made use of the next best thing with me, *viz.* a notebook and pencil, and amused myself for an hour noting the insect life of this sun-lit spot.

I reached the hill about 9.30 on a Sunday morning, and slowly followed the path gently sloping upwards. Almost the first butterfly to be seen was the conspicuous Danaid *D. melanippus hegesippus*, with fore wings reddish and black-veined, hind wings white with black veins. The little Lycenids *Nacaduba* sp. (probably *ardates*, Moore), and *Everes argiades*, Pallas, appeared common on the sunny path; I noticed two of the former united *in cop.* A conspicuous black and white barred *Neptis* (*N. leucothor*) fluttered boldly ahead of me and alighted on a bush by the side of the path, facing outwards; I notice they invariably do this—*i.e.* fly up to a bush and turn face about before settling, so that they cannot be surprised in the rear. I slowly approached one which stayed on the leaf, actually allowing me to touch its outstretched antennæ before lazily taking flight again, apparently in no way flustered by my attentions. These *Neptis* occasionally rest with wings erect over their head, but more often with wings outspread in the sun. They never seem to exhibit signs of injuries suggesting bird or lizard bites, and their slow, fearless flight seems to imply unpalatable qualities.

The common Eastern Pierine *Terias hecabe* put in an appearance; then the large *Catopsilia pyranthe*, hurrying along as if late for an appointment. *Papilio agamemnon* whirled over head at a tremendous rate, hovered at a flower for a moment,

* 'A List of the Butterflies of Borneo, with Descriptions of New Species,' by R. Shelford, Journ. Str. Br. Roy. Asiat. Soc., No. 45, 1906, p. 131.

and then off again and out of sight down the hillside; I don't know why he (or she?) was in such a hurry; usually, I think, they are not remarkably fast fliers.

A pretty little purple Lyeænid (*Arhopala apidanus*, Cr.) caught my attention in a bush close by, working its hind wings up and down in a manner characteristic of so many tailed Lyeænids here. The genus *Arhopala* is confined to Indo-Malaya, where some two hundred different species are recognized; they usually frequent shady jungle, but occasionally catch the eye as they flit across a sunlit patch. Borneo appears to be their headquarters, as no fewer than sixty species are found in that island.

The common *Junonia atlites* was noticed flying over the bushes on the hillside; then a large carpenter-bee (*Xylocopa latipes*) hummed over head, settling clumsily on a flower for a moment. On the top of the hill in the old ruined fort a snake slid stealthily away through the coarse grass. A magnificent view lay before me to the east over long flat paddy fields and jungle to Mount Ophir, some thirty odd miles in the distance. By some this is supposed to be the Mount Ophir of Biblical fame, the source of gold in King Solomon's time; but actual proof is unfortunately wanting, though I understand gold has been worked there on a small scale in recent times. To the west I could see the Malacca hill crowned with the ruined church of St. Paul; while on neighbouring hills or undulating ground to the north one remarked Chinese graveyards, which, as is usual in the East, occupy the best building sites in or near most of the big towns. The inevitable rubber was of course in evidence, small patches being planted at the foot of this hill.

Descending again slowly I noticed a worn female *Catopsilia pyranthe*, chased for a short time by a large *Delias*, apparently *D. hyparete*, who might well be excused for mistaking the worn *Catopsilia* for its own kind. The common brown dragonfly *Neurothemis fluctuans* was in evidence, also a large hornet with brown-banded abdomen, probably *Vespa cincta*, Fab.

A pretty little Lampides (*L. celeno*, Cr.) fluttered into the shelter of the trees as I passed; further on the large Papilio *P. polytes* (a male) flaunted gaily ahead of me, and then one of those pretty dark Euthalias with light blue marginal border to the hind wings. A gorgeous moth, with blue and white markings above and bright yellow abdomen, fluttered slowly out of reach into the dark bushes by the side of the path.

As one returns to Malacca along the well-kept road at the foot of the hill, bordering neat and picturesque Malay houses nestling among cocoanut plantations; and, leaving that, as one comes to the outskirts of the town, heralded by Chinese noises and Chinese smells, all implying peaceful prosperity, it is hard to remember the very different scenes that these same shores have witnessed in the years gone by.

One would like to cherish the consoling thought that, though mere man and his works must ever change for better or for worse, Nature—and as entomologists we should like to say insect life in particular—endures indefinitely; one would like to think that the insects Wallace saw in 1854 were there in Dutch times, were there in the days of the Portuguese, and, in all likelihood, were there before the foundation of Malacca more than five hundred years ago; and with that thought one would like to look forward to further long periods, secure in the knowledge that the insects noted in 1913 will be noted again next year, ten or a hundred years hence.

But, unfortunately, man the vandal and man the lover of Nature cannot exist together in the same place; the former destroyed the old Portuguese fortifications at Malacca in the beginning of the nineteenth century; a hundred years later his successors planted Wallace's collecting ground at Ayer Panas with rubber, and so it goes on, year by year, these historic places become less recognizable, and Nature gives way before the march of our boasted civilization.

It is well that a Society for the encouragement of Nature reserves has been instituted in England; it is by no means too soon to start the same in the East. *Why* should we sit idle, exclaiming piously "Sic transit gloria mundi"?

"YELLOW IMAGINES OF *PIERIS BRASSICÆ*."

BY F. W. FROHAWK, M.B.O.U., F.E.S.

IN the 22nd number of the 'Internationale Entomologische Zeitschrift,' published at Guben on August 30th, 1913, there is an interesting note under the above heading on p. 151 by Mr. Franz Bandermann, of Halle a/ Saale, which I fancy may be of interest to English entomologists, and of which I append a translation:—

"Many discoveries have been made through chance, and in this way I secured in quite a remarkable way yellow imagines of *Pieris brassicæ* in May of this year. I was examining my boxes of duplicates in which several species were stored. In one of these boxes I had placed six examples of this Pierid which I had taken four days previously from the setting boards. As I noticed some mites moving in the box I killed them with benzine, without, however, touching any of the specimens with the liquid. After a week I wanted to put some more specimens in this box, and when I opened the lid I was much surprised to see some yellow *brassicæ*. At first I could not find my explanation for this change of colour, but soon came to the conclusion that only the yellow paper, which had been used for pasting together

the box, could be the cause of this change. I made an experiment with other imagines, but unfortunately the same result did not follow. All the same I am of the opinion that the vapour of the benzine dissolved the yellow pigment of the paper, and deposited it again on the fresh (*i. e.* recently caught) imagines. Experiments with older examples failed, and they remained white. The yellow examples are in my collection, and were exhibited by me at a meeting of our Entomological Society.

“FRANZ BANDERMANN,

“Halle a/ Saale.”

It is, perhaps, possible that freshly emerged examples of Pieridæ may be tinted yellow by exposing them to the vapour of benzine, the wing membranes containing certain fluids which are not affected by this chemical when they have become hardened.

LEPIDOPTERA AT ALBARRACIN IN MAY AND JUNE, 1913.

BY W. G. SHELDON, F.E.S.

(PLATE XII.)*

ALBARRACIN and its sierra are fairly well known to British lepidopterists, several of whom have visited them during the past twenty years; but these visits have been made exclusively in the months of July and August, when certain very local and interesting butterflies are to be found in abundance, and so far as I am aware no one has ever observed the spring and early summer species occurring in this district.

It was this fact that chiefly induced me to undertake an expedition to this most picturesque of Spanish towns last spring. A companion during a somewhat prolonged excursion of this description is a very desirable adjunct, and I was fortunate in persuading my friend Mr. A. H. Jones to accompany me, and all who know the genial Treasurer of the Entomological Society will realize the charm of his companionship and the value of his assistance.

Albarracin is totally unknown to the foreign tourist. Baedeker does not mention it, and except during the months of August and September, when the inhabitants of Valencia and Saragossa visit the sierra in some numbers, attracted by its comparative coolness and by the curing mineral springs which are found in certain parts, the district is left to those who dwell there permanently.

There are nowadays numbers of books written in English on

* Plate xii. will appear with the November instalment.

various parts of Spain, but I think the bookmaker has rarely if ever visited Albarracin, for the only mention I can find of it in literature is, that the well known writer A. F. Calvert, in one of his books on Spanish cities, writes of Segovia as being, for picturesque and romantic situation, only equalled by Albarracin.

Perhaps it is not very much out of place, even in an entomological article, to outline briefly the story of a town so famous entomologically and historically.

The reason for its foundation was no doubt its possibilities for defence. The River Guadalavivier, rising some considerable distance higher in the sierra, has formed one of the finest gorges I have seen in one particular part of its course; for two miles or so the walls of this cañon rise sheer many hundreds of feet, just affording room for the river to flow between them, and for a modern road to be cut alongside. At the lower end of this cañon the river suddenly makes a great bend, the shape of half of the letter S, almost enclosing a rugged ridge which rises some 150 to 200 ft. above the river; this ridge has in its centre a crag, elevated perhaps 40 ft. above it. On this crag was built the first stronghold, no doubt before historic times. Later the sides of the ridge, and the narrow neck connecting it with the surrounding hills, were fortified with walls, which still in great part remain, and the crag became the citadel. These walls, with their frequent towers, which enclose a spring of excellent water, have the appearance of being erected in Moorish times, say about the year A.D. 1000, and no doubt they constituted in the Middle Ages a very formidable defence. Nothing is known historically of the town before the year A.D. 1020, but it is strongly suspected to have been in pre-Roman times known as Segobriga, and, as such, prominently associated with the Spaniard Viriathus, who about 150 B.C. held the Romans at bay for many years, inflicting repeated defeats upon them. Be this as it may, in the year A.D. 1020 a Moorish chief, Aben Razen, who was lord of the town and district, threw off the yoke of the Central Government at Cordova, and asserted his independence. This chief and his immediate successors seem to have waged war with the neighbouring Emirs of Sagunto, or Murviedro as it was then called, and Denia, and with the Spanish national hero, El Cid Campeador, who at one time was in possession of the town and kingdom of Valencia. El Cid in the height of his prosperity exacted an annual tribute of ten thousand pieces of gold from the Lord of Albarracin, which fact will afford an idea of the considerable extent and value of the possessions of the latter. Towards the end of the twelfth century the Moorish King of Valencia, Mahommed Aben Lahar, in return for assistance rendered to him in war by a Navarrese knight, Pedro Ruiz de Azagra, granted to him the town and territory of Albarracin. The Moorish commander, however, refused to give

up possession, and consequently Azagra was compelled to conquer it.

Upon obtaining possession the new lord declared his independence of the ruling Spanish powers of that period, the Kings of Castile and of Arragon, and he and his successors succeeded in keeping it for several generations. In the thirteenth century the town was besieged by Jaime I., of Arragon, "the Conqueror." The siege lasted for four months, and the assailants were eventually beaten off. Six years later a Mussulman force laid siege to the town without success.

In 1284 it was for the third time besieged, and this time taken by its assailant, Pedro III., of Arragon.

After various vicissitudes Albarracin and its territory was finally, in 1363, peaceably incorporated in the kingdom of Arragon, retaining great privileges, which remain in part even to the present day, for it has jurisdiction over an extent of country 97 kilometres by 61 kilometres; and the community owns a great part of the surrounding forests and mountains.

We were fortunate in making the acquaintance of the cultured Secretary of the Corporation of Albarracin, Don Mariano Rabinad, from whom we experienced great kindness, and who gave us valuable assistance and information in many ways, showing to us, amongst other things, the Municipal records, which are very perfect and voluminous. Those kept at Albarracin date back to 1340. The earlier ones are at Barcelona.

We made enquiries as to the collections of the famous Spanish lepidopterist, Bernardo Zapater, who died at Albarracin a few years ago, and were informed they had been deposited in the museum of the Catholic College.

An examination disclosed that there only remained three small boxes of all orders of insects, which by this time, in consequence of neglect, had resolved themselves almost entirely into dust.

The following is a list of all the articles on the lepidoptera of the district of Albarracin, which I have been able to find in the English magazines:—

"The Butterflies of Arragon," by Mrs. Mary de la B. Nichol, F.E.S.; 'Transactions' of the London Entomological Society for 1897, p. 127.

"A Few Weeks Entomologising in Spain," by T. A. Chapman, M.D., F.Z.S., F.E.S.; 'Entomologists' Record,' xiv. p. 70.

"The Lepidoptera of Central Spanish Sierras," by the present writer; 'Entomologists' Record,' xviii. p. 57.

"*Melitaea desfontainii* and *M. aurinia* var. *iberica* in Central Aragon" by Miss M. E. Fountaine, F.E.S.; 'Entomologist,' xxxix. p. 42.

"A Few Notes on Spanish Butterflies," by A. F. Rosa, M.D.; 'Entomologist,' xli. p. 4.

“In Sunny Spain,” by Mrs. Rosa E. Page, B.A.; ‘Entomologists’ Record,’ xxv. p. 33.

On Thursday, May 8th, we left London, and travelling *via* Barcelona and Valencia arrived at Albarracin on the following Tuesday. At Barcelona we stayed two nights, and spent a day on the hill of Tibidabo, where, in 1908, I had found the larvæ of the very fine *Melitæa aurinia* var. *iberica* in great abundance; the imago should have been flying at the time of our visit, but a careful search did not reveal it, and with the exception of a specimen of *Carcharodus baeticus* and some not over good examples of *Melanargia syllius*, we did not see anything worthy of note.

Beyond Barcelona the journey is a very interesting one; the Mediterranean is skirted all the way to Valencia, and the last fifty miles or so the railway passes entirely between orange orchards. Just at the time of our visit many of the trees were laden with golden fruit, and all of them were white with blossom, the perfume from which filled the entire country and was almost overpowering.

A few miles before Valencia is reached the famous old city of Sagunto is passed, the siege of which by Hannibal was the cause of the Second Punic War. At Sagunto the railway branches inland to Tervel, the nearest railhead to Albarracin, passing some very beautiful country and interesting old historical towns. It does not seem, however, very likely ground for butterflies, very few of which were seen *en route*.

At Tervel we stayed one night at the station, where there is now an excellent restaurant and good sleeping accommodation; the next morning we travelled by *diligence*, which takes six hours or so to reach Albarracin, a distance of about twenty-four miles.

On our arrival on May 13th the weather was not settled, and the next morning we awoke to find the ground covered with snow; this, however, melted during the day, and it was the only touch of winter we experienced.

I cannot say that we saw great quantities of lepidoptera; I question whether such are ever seen at Albarracin, which has an altitude of about 4000 ft., so early in the year; but it must be borne in mind that last year was an unfavourable season over wide regions in Europe, and I cannot help thinking that this reason was accountable for, at any rate, some of the scarcity of specimens. Whether it was so or not, it is certain that, with the exception of a very few species, butterflies were scarce throughout the whole of our stay. We gathered from certain residents that the season was quite a fortnight later than the average, and this of course would account for a certain proportion of the scarcity. In any case it prevented us making excursions to the higher parts of the sierra, such as Bronchales, Griegos, Guadalavivier, &c., for if species were not out at 4000 ft., they obviously

would not be at 5000 ft. or upwards. As a matter of fact, reports from Bronchales as late as the middle of June spoke of the ground being covered with snow. Under these circumstances the dates on which we found the different species must be qualified for reference by the late season.

The weather generally was, as it usually is in Sunny Spain, magnificent; bright sun from morning until evening on many days, tempered by a most delicious cooling breeze, and there were only one or two days on which our quarry did not fly. There were, however, days during which the temperature in our sitting-room did not reach more than 53° Fahr., and even on June 2nd it did not exceed 55°. A fortnight later there was a week of broken weather, with heavy thunderstorms accompanied by hail, each day.

Arriving on May 13th I had to leave on June 21st. My friend, however, was able to remain at Albarracin until June 30th, and I am indebted to him for kindly allowing me to add to my observations the result of his own, both during my stay and after it had come to an end.

I had expected to see many interesting birds at Albarracin, but in this respect the excursion was somewhat disappointing; it is true the smaller species, such as warblers, chats, buntings, &c., were abundant in the Guadalavie valley; but the Raptores, which from the nature of the country and the sparseness of the population one would expect to be abundant, were remarkably scarce. There was certainly a magnificent red kite which treated us to its peerless aerial evolutions almost daily, a mile or so below the town, doubtless its eyrie was near by; and one day near the village of Moscardon two Egyptian vultures were seen.

Enquiries from Señor Rabinad elicited the fact that the lümmergeyer is still occasionally seen in the neighbourhood. Wolves are common in the wilder parts of the sierra, causing great depredations amongst the flocks and herds; and we learned that several cubs were killed during our visit a few miles from Albarracin, near a place we collected over pretty frequently.

The prevailing surface rock at Albarracin is calcareous; this is almost universal in the district, except that on the right bank of the River Guadalavie, immediately below the town and extending some miles back into the hills, there is an outcrop of a silurian formation, surmounted by a very deep red sandstone. On this latter formation at Puerta de la Losilla there is a large pine forest, beneath which is, amongst other plants, an extensive growth of a species of *Vaccinium*, which I think is *V. vitis-idaea*.

The prevailing tree in the calcareous country seemed to me to be a species of *Cupressus*, but Dr. Chapman thinks it is the Savin tree; there are also *Juniperus sabina*, in places, considerable quantities of *Ilex*, and down the Guadalavie

gorge there are here and there a number of ash trees. The undergrowth consists of several species of *Rhamnus*, the curious *Ephedra nebrodensis*, *Pistachia terebinthus*, *Artemisia fructicosa*, and a great number of species of spiny leguminous plants and shrubs; the most singular of these was a shrub entirely without visible stem, and consisting of a bundle of stout spines one or two inches long, between each of which protruded a most lovely mauve, papilionaceous blossom. The whole shrub, which was found chiefly on the summits of the hills, was a mass of brilliant colour. One of the most abundant plants was the common Mediterranean asphodel, which threw up spikes of bloom 3 or 4 ft. high, and which was a very picturesque object. A plant which carpeted the ground in places with its delicate pink blossoms was a small species of *Malva*, beloved of many species of butterflies.

Another brilliant plant which grew in patches here and there was a species of *Linum*, with vivid blue flowers quite an inch in diameter. The flora is strikingly African in character. Springs of water are very infrequent, and except where irrigated the whole region is very dry and sterile.

Our collecting was principally in the Guadalavivier valley or gorge below the town. The first two miles or so of this consist of a wide valley known locally as Valdovecar; the road runs down the centre, and has on the right the river and much fertile irrigated ground. On the left of the road are unenclosed cornfields, which extend up the hillsides at intervals. These cornfields are the haunts of *Zegris eupheme* var. *meridionalis*, *Euchloë euphenoides*, *Anthocharis belia*, &c. Two kilometres below the town, between the road and the river, was a series of sainfoin fields, which during the earlier period of our visit was a gathering place of almost all the lepidoptera we could find in the district; amongst these were *Zegris* var. *meridionalis*, *Euchloë euphenoides*, *Agriades thersites*, *Cupido sebrus*, *Lampides boeticus*, *L. telicanus*, and *Nomiades cyllarus*. Below these fields the valley narrows and becomes a gorge, with only just room for the river and the road. In the first two kilometres of this gorge very little is to be found, but after this, at a place called Santa Croche, just where an old castle is seen perched upon a crag on the left, matters improve; and from here onwards for several miles the lower slopes of the gorge and the cross ravines constitute probably the best ground for butterflies in the whole district, and are certainly the headquarters of such local species as *Melitaea desfontainii*, *Rusticus zephyrus* var. *hesperica*, and later in the season *Satyrus priouri*. There is a wide valley leading out of the main valley, the first one on the left below Albarracin, which is known locally as the Vega. In early summer, and later on also, this is good ground; here we first found *Melanargia inc*s in some numbers.

We of course made several visits to the hill district on the

right bank of the river, well known to previous visitors, and called Puerta de la Losilla; and one day we took a mule-cart to Moscardon, a village some dozen miles above Albarracin, which is said in Zapater's Catalogue to produce *Erebia evias*; the day was, however, not favourable, with but little sun, and the only species not seen elsewhere was *Anthrocera rhadamanthus* var. *cingulata*, of which we captured a few examples.

Nowadays there are so many species of lepidoptera which are only recognizable with certainty by an examination of their genitalia, that I felt it necessary to submit specimens of all the species of which there could be any doubt to my friend Mr. A. L. Rayward, who most kindly undertook to make preparations of those organs, and to whom I am greatly indebted for so doing.

(To be continued.)

NOTES AND OBSERVATIONS.

NOTE ON THE EGG-LAYING OF *HESPERIA SYLVANUS*.—It is stated in 'Butterflies of the British Isles' by South, p. 193, and also in Tutt's 'British Butterflies,' vol. i. p. 136, on the authority of the late Mr. Ullyett, of Folkestone, that the female of this butterfly deposits its eggs within the sheath of a grass-stem. I recently had the opportunity, in Hungary, of watching several examples of this butterfly deposit, and in all cases the egg was laid in exactly the same manner. The butterfly alighted on a blade of grass almost parallel to its longer axis. It then curved its abdomen round beneath the blade and deposited an egg almost in the centre of the blade. Most of the eggs were laid on the lower surface of the grass blade, but a few were placed on the upper surface when the lower surface was the more exposed of the two. Mr. Ullyett's assertion, unquestionably incorrect, is the more remarkable, as he was an extremely accurate observer; and the explanation probably lies in the fact that he mistook a female of *Hesperia thauumas* (*linea*) for this species, as *thauumas* adopts that method of laying its eggs which he describes.—N. CHARLES ROTHSCHILD; Arundel House, Kensington Palace Gardens, W.

PARNASSIUS APOLLO IN GERMANY.—"In Deutschland verboten" is a legend not unfamiliar to the tourist surveying the bookstalls of Lucerne and Vienna. But it has now achieved an extended significance, and collectors of palaearctic butterflies will be interested to hear that the capture of *Parnassius apollo* has been forbidden throughout the German Empire by an order of the Government. The order—for information of which I am indebted to M. Charles Oberthür—has not come a day too soon, for the extermination of *Apollo*, already complete in the mountains of Silesia, is threatened elsewhere, despite the independent action of the Bavarian Government to put an end to over-collection of the species in the Bavarian highlands. A close season of a few years for a special butterfly is

an agreeable novelty. It is to be hoped that the German authorities will be more successful in enforcing it than has been the case elsewhere, where attempts have been made by State or Municipality to protect rare flowers and birds.—H. ROWLAND-BROWN; Harrow Weald, September 14th, 1913.

COLIAS EDUSA IN BUCKS.—While collecting on August 15th on the Chiltern Hills, near Princes Risborough, I took a male *Colias edusa*. The day was dull, and there was not a ray of sunshine to induce the flight of butterflies, though a few *Agriades corydon* males were on the wing. Happening to beat a small dwarf conifer, however, I put up this, the only "Clouded Yellow" I had seen in England for five years, with the exception of the female notified by me from Great Missenden last year. Unfortunately, though otherwise perfect with the freshness of a newly-emerged specimen, a large piece had been torn, apparently by a bird, from the right hind wing. I visited the same locality on several occasions during the month, but saw no more of the species. At another spot on the 9th I captured a perfect example of *A. corydon* var. *tithonus*, Meig. (var. *syngrapha*, Kef.), the first I have ever encountered on the Chilterns in some twenty years' collecting hereabouts. *Pamphila comma*, usually very abundant, was conspicuous only by its absence. I saw but one very dark female: possibly the flight was over. I should mention, also, the marked tendency of the "blues" this season, especially of *Polyommatus icarus*, to develop blue forms of the female.—H. ROWLAND-BROWN; Harrow Weald, September 13th, 1913.

COLIAS EDUSA AT EALING.—As I was walking near Ealing Broadway station about mid-day yesterday (August 28th) a specimen of *C. edusa* swooped down over the houses within a few yards of me, and careered away across Haven Green.—W. R. TAYLOR (B.A.).

COLIAS EDUSA IN HAMPSHIRE.—A male specimen of *C. edusa* in fair condition was taken on September 17th in the Public Gardens at Bournemouth.—A. S. CORBET; Bournemouth.

COLIAS EDUSA IN KENT.—Two friends of mine kindly collecting for me on a holiday at Romney, Kent, reported that *C. edusa* was very abundant during the second week in August; among a fine series brought back were two beautiful specimens of var. *helice*. Large numbers of the commoner species were captured, among which I was glad to find one *A. occulta*: is this not a rare insect so far south?—J. B. MANLY; Park View, Henley-in-Arden, Warwickshire, September 14th, 1913.

COLIAS EDUSA AT SOUTH NORWOOD.—Whilst sitting in my back garden on Sunday last, the 24th inst., I observed a fine specimen of *C. edusa* (male) flitting over the flowers.—W. D. COMSDALE; "Sunny Bank," South Norwood, S.E., August 30th, 1913.

COLIAS EDUSA IN SUSSEX.—*C. edusa* has been plentiful in clover fields at Selsey this week, and I have caught some very fine specimens, the females being especially good and in perfect condition. I have also seen one *C. hyale* but failed to net it.—MISS A. D. EDWARDS; Iron Latch Cottage, Selsey, Chichester, August 29th, 1913.

COLIAS EDUSA, &c., IN ISLE OF WIGHT.—On Monday, August 25th, at Brooke, near Freshwater, in the Isle of Wight, I captured three *Pyrameis cardui* as well as seeing two others. Numerous male *Colias edusa* were flying as well, and I also netted a good female on the slopes round Carisbrooke.—A. CAPEL MORRIS; Leafield, Gibsons Hill, Norwood, S.E., August 30th, 1913.

COLIAS EDUSA, &c., IN ISLE OF WIGHT.—I was staying at Bembridge, Isle of Wight, from August 27th till September 10th, and during the whole of that time I found *C. edusa* quite common in the clover fields, between Bembridge Harbour and Whitecliff Bay. Males were far more numerous than females, but I took one beautiful specimen of the female form *helice*. Many were rather worn, but quite half of those I saw were beautifully fresh, and there is no doubt at all that they were bred on the spot and not immigrants. Very few other butterflies were seen, except *Pyrameis atalanta*, and an occasional *P. cardui* or *Vanessa urtica*.—F. A. OLDAKER; The Red House, Haslemere, September 16th, 1913.

COLIAS EDUSA IN WILTSHIRE.—I saw several specimens of *C. edusa* at Pewsey at the end of August. Others were noted throughout September up to date.—(Rev.) C. A. SLADEN; Alton Barnes Rectory, Pewsey, Wilts, September 23th, 1913.

COLIAS EDUSA IN YORKSHIRE.—I took *C. edusa* in good condition at Bridlington, September 7th, 1913.—H. DOUGLAS SMART; Shelley, Huddersfield, September 14th, 1913.

LARVÆ OF *TORTRIX PRONUBANA* ON GERANIUM.—I have just read Mr. Claxton's (p. 196) record of *Tortrix pronubana* found feeding on geranium in his greenhouse. It is interesting to hear that this little species has reached Romford. If reference is made to the Entom. Record, vol. 20, p. 213, it will be seen, however, that geranium is not a new food-plant for this omnivorous insect. Perhaps if Mr. Claxton could trace the origin of any geranium cuttings he may have had from the south—or through a florist—he might be able to account for the presence of *T. pronubana* in his greenhouse. The larvæ are particularly fond of making their abode in that end of the stem which is left after the cutting is trimmed for striking. They often feed in considerable numbers in my boxes of geranium cuttings.—FRANK E. LOWE; Guernsey, August 21st, 1913.

TORTRIX PRONUBANA AT HARROW.—At dusk on September 16th I took a specimen of this moth on my open window here.—F. W. EDWARDS, Kingswear, Cornwall Road, Harrow.

ARASCHNIA LEVANA IN BRITAIN.—I was interested in Mr. H. Rowland-Brown's remarks in the September issue (p. 267) of the 'Entomologist,' and am communicating with him direct, but in case any other reader is interested in this capture I would point out that there is no doubt as to its being *A. levana*, the species being clearly described by W. F. Kirby, F.E.S., in text, and he also gives splendid coloured figures of same, including var. *porina* and *prorsa* (see 'Butterflies and Moths of Europe,' Cassell & Co). This butterfly is also described and figured in 'Beetles, Butterflies, Moths and other Insects,' by A. W. Keppell, F.E.S., and W. Egmont Kirby, but is

here named *Vanessa levana* (the Least Tortoiseshell). I have made careful enquiries around the district where I got this specimen (Forest of Dean) but cannot trace anyone breeding foreign butterflies, so apparently it is the first British caught specimen.—T. BUTT EKINS; Loxbere House, Windsor Terrace, Penarth, September 22nd, 1913.

BIRDS EATING BUTTERFLIES.—During the last two years I have noticed only two instances of birds catching butterflies, though I have kept a sharp look-out for them. In my small garden, of perhaps three-quarters of an acre, I have notes on no fewer than thirty-five species of birds, either in the garden or flying over, such as swifts and swallows. No doubt this large number is due to the fact that my grounds are the most sheltered on the Curragh ridge, and give the birds some protection from the violent winds which blow from the south-west for the greater part of the year. Eight species have nested in the garden, and tasting experiments should, one would think, be fairly in evidence, but I have witnessed none. Of the two instances I am able to give, one was a chaffinch and the other a young robin, both the victims were "whites," *P. brassie* and *P. rapæ* respectively. The chaffinch was driven off, but returned and finished its meal. It is noteworthy that on both occasions it was raining heavily, and both butterflies had been disturbed and were unable to do more than flutter, owing to the downpour. This supports the view held by myself and others that attacks on butterflies are comparatively rare, owing to their being more difficult to capture than other prey. No doubt there are other reasons, one being, as Colonel Yerbury has expressed it, a maximum of wings and a minimum of body. The birds that have nested in the garden comprise the following: Mistle Thrush, Long Thrush, Blackbird, Chaffinch, Robin, Gold Crested Wren, Hedge Accentor, Sparrow.—N. MANDERS (Lt.-Col.); Curragh Camp.

THE BUTTERFLIES OF THE CURRAGH DISTRICT.—The butterflies of the Curragh district are necessarily few in number, but though I was prepared for a paucity of species I was surprised to find that the exertions of two seasons' collecting only produced nineteen, and of these two, *G. rhammi* and *A. paphia*, are represented by single specimens. Butterflies in Ireland are near the western limit of their distribution; but the chief impediment to their greater numbers, both in species and individuals, is, doubtless, to be found in adverse climatic conditions. Ireland is notoriously a wet district, but so far as my experience goes, and it is almost confined to the Curragh, it is not so much the rainfall as the extraordinary number of dull, cloudy days, often without rain, which follow each other with the most distressing regularity. While England was enjoying uninterrupted sunshine in June and July, Ireland, or at any rate this part of it, was lying under a dense atmosphere of persistent cloud, which lasted week after week with, consequently, an almost total absence of butterfly and other insect life, and it was not until July was well advanced and in August that we had real summer weather. Last year was a contrast to this; then we had a fine spring and no summer; this year we have had a very wet spring and a late warm summer, and the effect on the emergence of the spring butterflies

was remarkable, as the following dates indicate. *P. rapæ*, April 10th, 1912; May 17th, 1913. *P. egeria*, April 16th 1912; May 15th, 1913. But the emergence of the summer butterflies was not delayed, as for instance, *C. typhon*, July 1st, 1912; July 1st, 1913. *A. aglaia*, July 14th, 1912; July 12th, 1913. I have regarded as the Curragh district the country for about five miles round the barracks, which I may say are built on an exposed ridge, running due east and west, and surrounded on all sides by an undulating grassy plain, which is used by the troops. With the exception of a few small isolated hills, the country for several miles round is perfectly flat and, no doubt, at one time was an extensive morass; a great number of the bogs have been drained, but there is a good deal of bog still remaining in the near neighbourhood. About two miles east of the Curragh is a small stretch of broken, hilly country covered with furze and bracken, and on the top is a venerable earth-work, known as Knockaulin, covering some acres, and a relic of the far-off days when the native Irish were defending themselves from the incursions of the Danes. This is the best locality, and it was here that I found *M. aurinia* particularly abundant. This, with *C. typhon* and *P. icarus*, is the most interesting butterfly I met with, and from a batch of larvæ found on Knockaulin I bred a series which comprised all the described Irish forms, and not a few of the English. Of *C. typhon* I only caught two last year and a dozen this, all I saw on the one favourable day and in the same acre of bog. They are likewise an interesting lot, as they seem to me to represent not only the Irish but also all the British forms, which is curious in such a small number. To one brought up in the Darwinian tradition it is puzzling how they were ever considered to be anything more than one variable species. The females of *P. icarus* vary greatly, and the cause of it is difficult to trace. Last year was extremely wet, and they nearly all approximated to the usual form found in England, by the restriction of the blue scaling to the base of the wings; this year, which has been fine and decidedly warmer, the blue has largely predominated, and in many all four wings are entirely blue, with the exception of a brown edge to the forewings and red lunules to the hind wings. These are particularly handsome. The following is a complete list of the butterflies seen or captured: *P. brassicæ*, common; *P. rapæ*, abundant this year; *P. napi*, abundant, the summer brood is remarkably fine; *E. cardamines*, abundant; *L. sinapis*, locally common in many places; *G. rhamni*, one only; *V. urticæ*, common this year; *V. io*, three only seen; *A. paphia*, one only; *A. aglaia*, locally common; *M. aurinia*, locally abundant; *L. egeria*, very common everywhere; *L. Megæra*, common; *H. inaria*, abundant; *H. hyperanthus*, very common; *C. typhon*, scarce; *C. pamphilus*, common; *C. phlæas*, not common; *P. icarus*, common where found.—N. MANDERS (Lt.-Col.); Curragh, Co. Kildare.

NOTE ON APLECTA ADVENA.—There seems to be a considerable difference of opinion amongst the authorities regarding the life-history of this moth. Edward Newman says the larva is "full-fed at the beginning of September." Meyrick gives the life of the larva August to April. Another book in my possession corroborates Meyrick. South says the larva feeds "from July to September," and adds that

“in confinement the moth sometimes emerges in the autumn.” L. W. Newman, in the useful work he has just published, gives *advena* as a larva in August and September, and as a pupa from October to May. As this moth comes fairly freely to sugar in my own garden, I have tried breeding it several times. When about two-thirds grown I have always found the larvæ show a strong desire to hibernate, and on one occasion I placed a number of larvæ in the open, caged on turf in which dandelion, plantain, &c., were growing. They disappeared during the winter, but they showed themselves again about March, seemed quite lively and vigorous, and nibbled grass and the young dandelion shoots; but though I tried them with a variety of other food, I apparently did not strike the right one for their spring consumption, and they all died off one by one. This goes to prove that Meyrick is right, and that *advena* does the same as its near relatives, *tincta* and *nebulosa*, and hibernates as a larva under natural conditions. It would be interesting to have the experiences of other observers. While on the subject of the *Aplectas*, I may perhaps record a rather curious point in connection with *tincta*. Once I happened to be near a favourite haunt of the species on a very warm evening very early in the year, and, to see if *tincta* larvæ moved so early, I examined the birch bushes, where I found plenty of the larvæ in their last skins but one. I took some, but though they ate the food I gave them and changed their last skins, they did no good at all, and were easily passed by some larvæ I took some three or four weeks later at the same spot, which fed up and pupated as easily as possible, as I have found they always do when taken in their last skins. The question is, What was the special food or condition the larvæ required in their last instar but one? Also, was it the same want that killed the *advena* larvæ I hibernated?—C. RIPPON; Springfield House, Abingdon-on-Thames.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*June 26th.*—Mr. A. E. Tonge, President, in the chair.—Mr. Main exhibited pupa and living larva of *Parnassius apollo* and the larva of the tiger-beetle, *Cicindela sylvatica*, from near Meiringen, Switzerland.—Mr. Coxhead, galls on leaves of beech, and coloured drawings of the same. They were of the Cecidomyid, *Mikiola fagi*.—Mr. A. E. Gibbs, a series of *Euchloë cardamines*, from near Messina, Sicily, and pointed out that they were small compared with average British specimens, and were known as *turritis*, in which the apical blotch is not extended beyond the discal spot. Mr. Main said that *Phyllotoma aceris*, the jumping sawfly, was now common in many places in the larval state.—Messrs. Sich, Adkin, Edwards, Barrett, and Dr. Chapman made remarks on the season.

July 10th.—Mr. A. E. Tonge, President, in the chair.—Mr. Main, a species of tick from a tortoise of Moroccan origin; the males were small and blackish in colour, while the female was many times larger, and of a delicate pale slate-colour; and cases of the Psychid,

Acanthopsyche opacella.—Mr. Adkin, series of *Celastrina argiolus*, (a) reared in July and August, 1912 and (b) reared in April and May, 1913, from the same lot of larvæ from Bynsford; (c) reared from Eastbourne larvæ in April and May, 1913. The two spring series were much alike, and the females had much less of the heavy bordering of the summer emergence.—Mr. Edwards, several species of *Papilio* of the *ageus* group from the Australian region, including the rare *P. gambrius*.—Mr. Blair, a nest of the wasp *Polistes gallica*, from Meiringen, with the living female.—Mr. Turner, for Mr. Carr, a bred *Cerostoma scabrella*.—Mr. Barrett and others remarked on the comparative sizes of the captures of other seasons with the present. Some members considered that imagines were smaller this year, while others thought that they were quite up to the average size.

July 24th.—Mr. A. E. Tonge, F.E.S., President, in the chair.—Mr. Edwards exhibited a pair of the Erycinid *Staluctis evelina*, from the Lower Amazons.—Mr. Adkin, *Borkausenia pseudospretella*, bred from hare's hair.—Mr. West, a series of the Coleopteron *Anobium paucicum*, found destroying tobacco leaves, by Mr. Adkin.—Mr. Curwen, some fifteen examples of *Polyommatus icarus*, from near Dorking, showing much variation in the spotting and coalescence of the spots on the under surface.—Mr. Hugh Main, parasites of the larva of *Orygia antiqua* and the larva of the large water-beetle *Hydrophilus piceus*.—Mr. Ashdown, the larva of *Hyles euphorbiæ*, from Switzerland.—Mr. Barrett read a note on the migration of the butterflies *Aporia crategi* and *Pieris brassicæ* in Sicily.—Mr. Sicih exhibited the cocoon of *Nepticula viminetella*.

August 14th.—Mr. A. E. Tonge, F.E.S., President, in the chair.—Mr. Adkin, a series of *Spilosoma urticæ*, reared from larvæ taken at Eastbourne in the autumn of 1912.—Mr. Edwards, varied examples of the African *Hamanumida dædalus*, pointing out the extreme response of the under side markings to the environment; the fungi *Polyporus hispidus* on an apple-tree, and *Polystictus abietinus* from a fence; and the pupa of *Tipula oleracea*, the common "daddy-longlegs."—Mr. Barrett, Sicilian and Swiss *Satyrus hermione*, the former the larger; *Raywardia telicanus* and *Lampides beticus*, from Sicily; and the pupæ of *Nonayria sparganii* and *N. typhæ* in situ, head upwards in the former, downward in the latter.—Mr. Dennis, a gall on plantain, caused by *Tortrix icterana*.—Mr. Curwen said that *Colias edusa* was common at Mickleham on August 10th, and also specimens of *Nisoniades tages* were obtained on the same date.

August 28th.—Mr. B. H. Smith, B.A., F.E.S., Vice-President, in the chair.—Mr. Main exhibited the living imago of an ant-lion, which he had bred from a larva obtained in Switzerland in June last. It was a female, and while held would feed on flies presented to it.—Mr. West, the Orthoptera *Thamnotrizon cinereus* and *Forficula auricularia* var. *forcipata*, from Dartford, and on behalf of Mr. Carr, the rare Coleopteron *Trichius fasciatus*, from Mid-Wales.—Mr. Adkin, a specimen of *Agrotis exclamationis*, from Lewisham, in which the reniform and orbicular stigmata were united.—Mr. Dunster, *Colias edusa*, from Lyme Regis, *P. atalanta*, *P. cardui*, and *V. io*, from Crewkerne, with *Epione apiciaria*, *Mesoleuca ocellata*, &c., from the same locality.—Mr. Curwen, series of *Polyommatus escheri*

and *Lycæna sephyrus* var. *lycidas*, from Switzerland.—Mr. Carr, ova of *Boarmia gemmaria*, deposited in a box among ova of one of the "thorns."—Mr. Turner, specimens of the Coleopteron *Cetonia aurata*, from Cortina; bred *Cassida viridis* (?) from larvæ on a *Salvia* near König See, Bavaria; and a nest of a wasp, taken from a wall on the road leading from Cortina to Pieve di Cadore.—Mr. Sich reported the occurrence of a Tineid, *Tineola biselliella*, in some numbers, in the Indian rat-snake's den at the Zoological Gardens.—Mr. Step read a communication, describing how wasps (*Vespa germanica*) deliberately cut holes through tennis netting which had impeded the direct road to their nest in his garden.—H. J. TURNER, *Hon. Rep. Secretary*.

OBITUARY.

ODO MORANNAL REUTER.

THERE died, on September 2nd last, in Finland, Professor Odo Morannal Reuter, of the Finnish University of Helsingfors, who, among many other distinctions as an entomologist of the first rank, was one of the twelve Honorary Fellows of the Entomological Society of London, to which he was elected in 1906. Born at Abo sixty-three years ago, it was there that he passed the last years of his life and eventually died. But, though blind for the past five years, he never ceased to work at his favourite science, and the writer of this note well remembers the courageous and hopeful letter he addressed to his colleagues when he recognized that blindness was inevitable. As Emeritus Professor of Zoology at Helsingfors, and a linguist proficient in all the tongues of Northern Europe, including English, hardly a year passed between 1870 and 1910 without some contribution from his laboratory to our knowledge of the less studied groups of insects. Articles upon Hemiptera-Heteroptera, Thysanoptera, and Collembola, filling as *separata* five pages of the Catalogue of the Entomological Society's Library, testify to the fertility of his genius and the diligence of his pen. He was also an accepted authority upon Economic Entomology, and published in Helsingfors, Stockholm, and Berlin many "popular" books devoted to animal psychology which enjoy a wide circulation. The last work of this kind, says a correspondent of the 'Morning Post' (writing from Abo on September 4th), deals with the habits and instincts of solitary insects, and of this German and Finnish editions are in the press, with possibly an English edition to follow. But, though entomology was the dominant inspiration of his activities, Professor Reuter, like the late W. F. Kirby, gave considerable attention to the folk-lore and literature of Finland, using the tongue spoken by him in conversation, which was Swedish. Indeed, a poet himself, it would not be saying too much to describe him as the Fabre of the North, gifted alike with exceptional powers of observation and insight, and with the language of a seer with which to adorn his thoughts and mental speculations.

H. R.-B.

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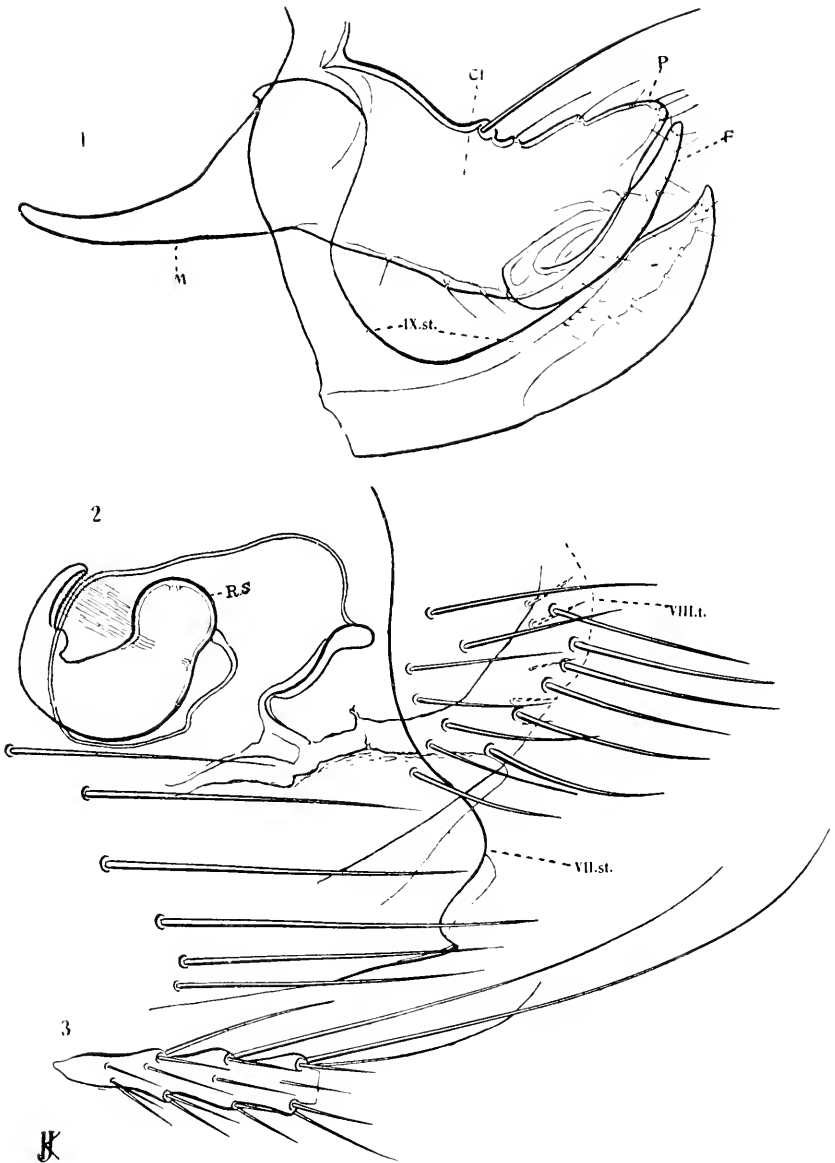
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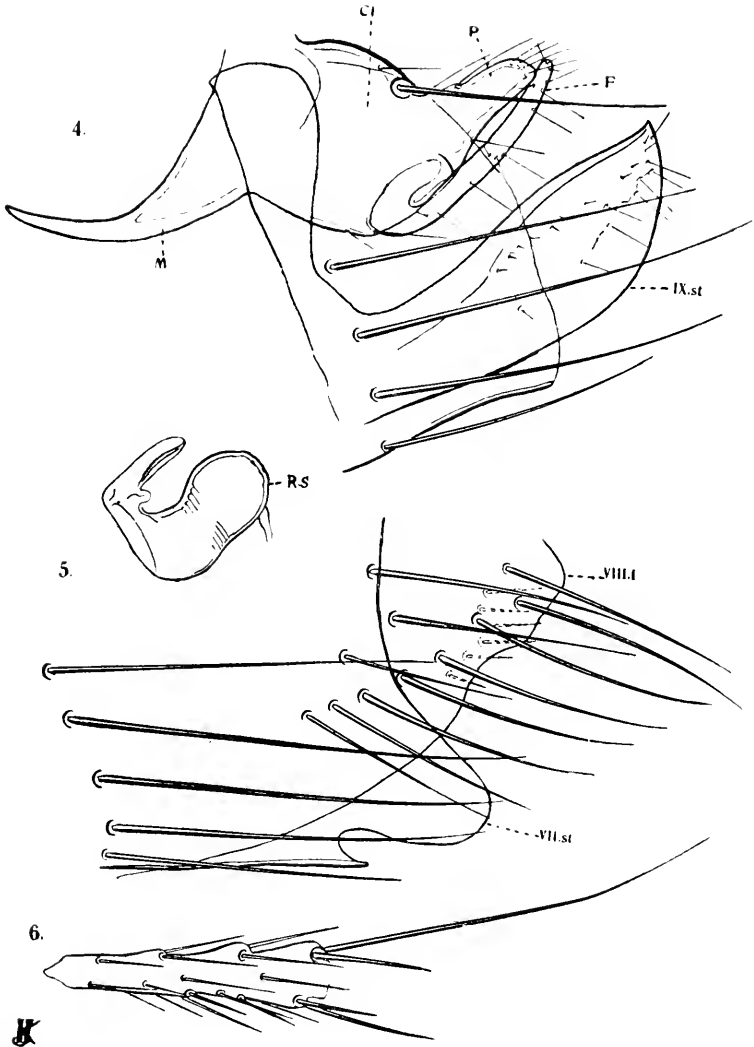
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Entomology Pins, 1s., 1s. 6d., 2s., 2s. 6d., 3s., 3s. 6d., 4s., 4s. 6d., 5s., 5s. 6d., 6s., 6s. 6d., 7s., 7s. 6d., 8s., 8s. 6d., 9s., 9s. 6d., 10s., 10s. 6d., 11s., 11s. 6d., 12s., 12s. 6d., 13s., 13s. 6d., 14s., 14s. 6d., 15s., 15s. 6d., 16s., 16s. 6d., 17s., 17s. 6d., 18s., 18s. 6d., 19s., 19s. 6d., 20s., 20s. 6d., 21s., 21s. 6d., 22s., 22s. 6d., 23s., 23s. 6d., 24s., 24s. 6d., 25s., 25s. 6d., 26s., 26s. 6d., 27s., 27s. 6d., 28s., 28s. 6d., 29s., 29s. 6d., 30s., 30s. 6d., 31s., 31s. 6d., 32s., 32s. 6d., 33s., 33s. 6d., 34s., 34s. 6d., 35s., 35s. 6d., 36s., 36s. 6d., 37s., 37s. 6d., 38s., 38s. 6d., 39s., 39s. 6d., 40s., 40s. 6d., 41s., 41s. 6d., 42s., 42s. 6d., 43s., 43s. 6d., 44s., 44s. 6d., 45s., 45s. 6d., 46s., 46s. 6d., 47s., 47s. 6d., 48s., 48s. 6d., 49s., 49s. 6d., 50s., 50s. 6d., 51s., 51s. 6d., 52s., 52s. 6d., 53s., 53s. 6d., 54s., 54s. 6d., 55s., 55s. 6d., 56s., 56s. 6d., 57s., 57s. 6d., 58s., 58s. 6d., 59s., 59s. 6d., 60s., 60s. 6d., 61s., 61s. 6d., 62s., 62s. 6d., 63s., 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RHADINOPSYLLA BIVIRGIS, n. sp.



RHADINOPSYLLA CEDESTIS, n. sp.

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TWO NEW PALÆARCTIC SPECIES OF *RHADINOPSYLLA*, A GENUS OF SIPHONAPTERA.

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

(PLATES XIII. & XIV.)

IN 'Novitates Zoologicae,' xix. p. 367 (1912), Dr. Jordan and myself proposed the new genus *Rhadinopsylla* for *R. masculana* and allied species, all of which have a genal comb of five spines. Besides *masculana*, *pentacanthus*, and *isacanthus*, mentioned in the place quoted, we now also refer to *Rhadinopsylla* the species described as *Typhlopsylla altaica*, Wagn. (1900), from the Altai Mountains; *Typhlopsylla fraterna*, Baker (1895), from South Dakota (U.S.A.); and the two new species described hereafter.

One of the two new species renders a slight emendation of the original diagnosis of the genus necessary. We described the fifth hind tarsal segment as bearing four pairs of lateral bristles. This is not the case in all the species, the second new species described below having five pairs.

Dr. A. C. Oudemans, in *Entom. Bericht.* p. 340 (1913), says that the labial palpus of *R. pentacanthus* consists of four segments. The statement is erroneous. There are five segments, as mentioned in our description of the genus.

1. *Rhadinopsylla bivirgis*, n. sp. (Pl. xiii., figs. 1, 2, 3.)

♂ ♀. The head agrees closely with that of *R. masculana*, Jord. & Roths. (1912), from Algeria, the frons being strongly angulate a short distance from the palpi in both species. The pronotum of *R. bivirgis* bears a comb of sixteen or seventeen spines and a row of ten bristles (on the two sides together). The metepimerum has five bristles (3, 2), the stigma being placed above the upper bristle of the second row. The abdominal tergites bear a row of ten or eleven bristles, and the sternites of III. to VI. seven or eight bristles on the two sides together. The antepygidial bristles of the female are much shorter, but somewhat thicker, than the lower bristle of the row on the seventh tergite. The bristles of the legs present some characters absent from all the other known species. The longest apical bristle of the hind tibia does not extend to the tip of the first tarsal segment. The first hind tarsal segment has on the hinder side two or three deep

notches, each bearing a pair of bristles, and these pairs are of about the same length, and either equal the longest apical hind tarsal bristle, or, if the latter bristle is much prolonged, are shorter than it. The second hind tarsal segment (fig. 3, male) has on the hinder side one pair of bristles besides the apical pair. The longer bristle of both pairs is prolonged, the long subapical bristle reaching in the male almost to the apex of segment five, and in the female not quite to the apex of segment three, and the longer apical bristle of the second segment extending in the male far beyond the claws, and in the female to the base of segment five. This last segment bears in all the tarsi four pairs of lateral bristles.

Modified segments.—♂. The clasping organs very closely resemble those of *R. masculana*, but the clasper (fig. 1, Cl) is much more bent upwards in its distal half, the long bristle placed at its dorsal edge has a much more proximal position; and the distance from the base of the movable process F to the base of the manubrium is longer than the breadth of the clasper. The "finger" F, which is rather strongly curved proximally, does not quite reach to the tip of the clasper and about equals in length its distance from the base of the manubrium. The apex of the inner arm of the ninth sternite (ix. st.) is broad and rounded, with the anterior angle produced into a short beak. The ventral arm (measured along the ventral margin) is distinctly longer than the vertical one. It is canoe-shaped, and bears a number of minute bristles, as shown in fig. 1.

♀. The seventh sternite bears a single row of twelve bristles on the two sides together, and its apical margin has a small rounded subventral sinus, above which there is a short rounded lobe (fig. 2, vii. st.) variable in size. The eighth tergite has three or four long bristles below the stigma, a row of seven near the apical margin, and seven or eight more proximally to this row. On the inner surface the segment bears five short stout bristles. The outline of the apical edge of the segment is rather obscured in the example from which the figure is taken. The head of the receptaculum seminis (r. s.) is quite short and hardly at all separated from the tail, the latter narrowing strongly apically, and bearing on the dorsal side a hump at the beginning of the narrow portion.

One male and two females from Burkhan, near Djarkent, Semitchenskoi, East Turkestan, off white weasel, February 15th and 19th, 1912 (W. Rückbeil).

2. *Rhadinopsylla ecdestis*, n. sp. (Pl. xiv., figs. 4, 5, 6.)

♂ ♀. Although closely resembling *R. bivirgis*, the present species appears to be perfectly distinct, differing essentially in the tarsi and the modified abdominal segments. In contradistinction from all the other known species of *Rhadinopsylla*, the present form has five pairs of lateral bristles on the fifth segment of all the tarsi in both sexes, one mid tarsus in the male having six bristles on one side and five on the other. The longest apical bristle of the hind tibia reaches beyond the apex of the first tarsal segment. The hind tarsal bristles are different in length from those of *R. bivirgis*; on the first segment

only the apical and subapical bristles are prolonged, on the second only the apical one (fig. 6, male), both bristles of the subapical pair being short, the long apical bristle of the male moreover not reaching beyond the claw.

Modified segments.—♂. The body of the clasper (fig. 4, Cl) is much shorter than in *R. bivirgis*, the manubrium (M) much more directed downward, and the process P of the clasper as well as the movable process F are slenderer. Process F is much longer than its distance from the manubrium. The horizontal arm of the ninth sternite (ix. st.) is broader than in *R. bivirgis*.

♀. The antepygial bristles are longer than in *R. bivirgis*, and the apical lobe of the seventh sternite (vii. st.) is much more produced than in that species (fig. 5). The eighth tergite (viii. t.) has four bristles below the stigma, the lower one being very long, and a subapical row of eight. Proximally to this row there are from three to five bristles, the segment also bearing a row of five or six bristles on the inner surface. The stylet, as in the preceding species, is almost perfectly cylindrical. The receptaculum seminis (r. s.) closely resembles that of *R. bivirgis*. The wall on the ventral side of the "tail" has partly collapsed in both our mounted specimens, as drawn.

A series of both sexes from Kysyldorygda, near Djarkent, Semitchenskoi, East Turkestan, off *Meriones tamaricus*, October 5th, 1912 (W. Rückbeil).

SOME COLEOPTERA FROM CENTRAL AMERICA.

BY T. D. A. COCKERELL.

WHEN recently at the U. S. National Museum, I took occasion to work over some Coleoptera from Central America, principally collected by my wife in Guatemala. While doing this I was much indebted to Mr. Herbert S. Barber for his kind assistance. I give here a few notes which may be of interest.

Brachyacantha bistrispustulata (Fabr.). — Bocas del Toro, Panama (E. Bethel). As this did not agree very perfectly with Leng's description (Bull. Amer. Mus. Nat. Hist. xxx. p. 296), I took occasion to compare it with authentic specimens, and found that Leng's description was inadequate in regard to the structure of the legs; so much so, that one might be misled into thinking he had a new species. I made an entirely new description from my specimen, and give it here:—

♀. Length, $3\frac{1}{2}$ mm., broad oval, dorsally shining black, with light orange spots; elytra with small evenly scattered punctures, and between them some excessively minute ones, only visible with a high power of the compound microscope (all this is essentially as in *B. ursina*); thorax similarly sculptured, but the punctures denser in the median field; front of head punctate, and minutely (microscopically) rugulose between the punctures; eyes a fine dark green;

head pale orange, the sides, along the eyes, suffusedly blackened (narrowly above), and the lower margin broadly blackened (especially at sides), except the actual edge, which is reddish; thorax with large oblique subquadrate reddish orange lateral areas, making the broad median black region constricted in the middle; elytra with no humeral spot; the three orange spots on each very large, the subapical one suboval, pointed laterad, narrowly separated from margin; the discal or subdorsal ones nearly circular, their diameter greater than their distance from the thorax, and much more than twice as great as their distance from the suture; the lateral ones more irregular, smaller than the discal, separated by a fine black line from the margin; legs ferruginous, approximately the basal half of the femora black; spine of anterior tibia long and sharp, nearly as long as diameter of tibia at that point, margin beyond broadly arcuate as in *B. decora*, but with a very distinct though small supplementary tooth as in *B. arizonica*, though not so near to the apex of the tibia; the tibial spine is very straight, not curved as in *B. dentipes*; middle tibia with a small subapical spine. The elytra are considerably shorter than in *B. ursina*.

This Coccinellid is probably of considerable economic importance as a destroyer of Coccidæ.

Calomicraspis haroldi, Candèze.—Quirigua, Guatemala (W. P. Cockerell). A very fine species, with the thorax and scutellum green, the elytra red. It is probably quite rare, as it was not represented in the U. S. National Museum.

Enema endymion, Chevrolat.—Quirigua (W. P. Cockerell).

Phileurus didymus (L.).—Quirigua (W. P. Cockerell).

Cœlosis biloba (L.).—Quirigua (W. P. Cockerell).

Hammaticherus mexicanus, Thoms.—Quirigua (W. P. Cockerell). Apparently new to Guatemala.

Neleus interstitialis (Esch.).—Quirigua (W. P. Cockerell). *Neleus*, Kaup, Col. Heft., v. (1869) is preoccupied by *Neleus*, Raf., 1814. The matter has probably been set right by Zang (1905), whose works I do not possess.

Rhodocanthopus punctatostriatus, Percheron.—Quirigua (W. P. Cockerell).

Calopteron bifasciatum, Gorham.—Quirigua (W. P. Cockerell). Closely resembles a Syntomid moth (*Correbia obtusa*, Druce), also found in Guatemala.

Epilachna defecta, Mulsant.—Antigua, Guatemala (W. P. Cockerell).

Photuris trilineata, Say.—Quirigua (W. P. Cockerell).

Ægithus clavicornis, Quirigua (W. P. Cockerell).

Mesomphalia sp.—Several at Puerto Barrios, Guatemala (W. P. Cockerell). A fine dark green species, with two large blood-red spots on each elytron. It probably has been described, but no name could be found for it.

Morio monilicornis, Latr. (det. Schwarz).—Quirigua (W. P. Cockerell).

CICADETTA MONTANA IN THE NEW FOREST.

BY G. T. LYLE, F.E.S.

WHEN writing "Further Notes on the British Cicada," published in the 'Entomologist' vol. xlv. p. 332, I did not anticipate having anything more to say on this subject, but since then my acquaintance with our Cicada has so greatly improved that I am venturing to send a few more notes, which I hope may not be without interest to some readers.

Walking through the Forest on the morning of May 19th, 1912, I passed the spot where in previous years I have found many nymph cases, but as the earliest date on which I had noted the Cicada before was June 6th, I did not expect to see any sign of it. What was my surprise, therefore, to at once discover three nymphs and five empty cases. Two of the nymphs were resting on dead stalks of dry bracken some few inches above the ground, the third was crawling on the grass, but soon assumed a similar position to the other two; this was at 11.30 a.m., a bright sunny morning. All the nymphs and cases were within a space some two yards square, so I sat down to observe.

At 11.42 I noticed that the thorax was splitting in one case; the emergence was somewhat slow at first; however, the imago gradually worked its way out, at times giving a series of jerks, until it was hanging head downwards with only the anal segments within the case. At 11.59 the insect bent its body upwards, evidently using considerable muscular effort in so doing, until able to clasp the head of the nymph case with its legs. After resting a few moments in this position the abdomen was drawn clear at 12.3 p.m. In colour a pale green with a dark patch on either side of the pronotum and the eyes dark, the newly emerged imago was considerably lighter than the nymph, which was a brownish green. The wings were, of course, immature and had a bluish tint; expansion, however, was rapid, for at 12.12 they were fully grown, though still limp, while at 12.26 they were folded over the back.

In the second nymph the thorax split at 12.5 p.m., the imago had emerged by 12.25, and the wings were fully grown at 12.34; the time taken in emerging being thus almost identical with that occupied in the first case.

While making these notes I was sorry to find that I had accidentally placed my hand on a fourth emerging Cicada, unfortunately injuring it so that, although it completed its emergence, the wings were crippled. Of these four Cicadas which I watched emerge, the first was a male, the second a female, and the other two males. Of the five empty cases found four had contained males and one a female.

At 1.20 I was obliged to leave. None of the Cicadas had

then assumed the mature coloration, although they were much darker than on emergence. The two perfect males were pill-boxed, the female and the crippled male being left behind.

On my return at 2.45 the female had disappeared, but the crippled male was still in the position in which I had left it, no doubt through being unable to fly. This male was now quite mature, and the two males in the pill boxes assumed the mature

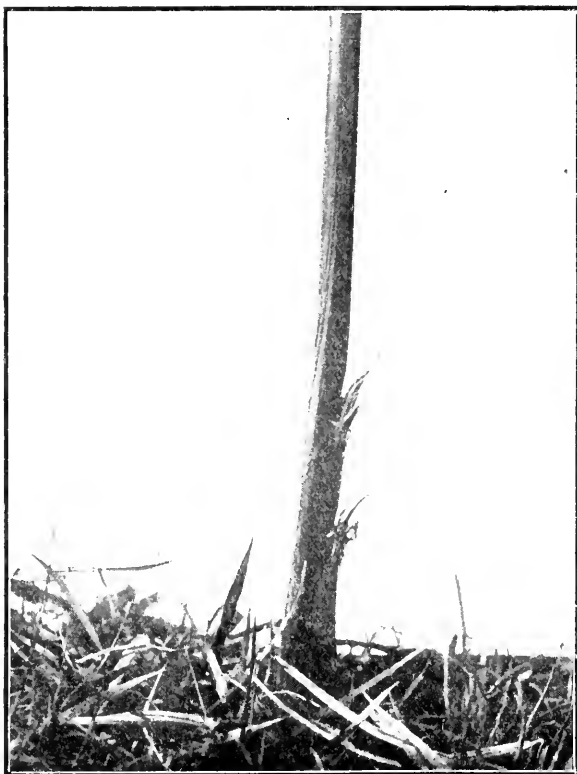


Photo G. T. Lyle.

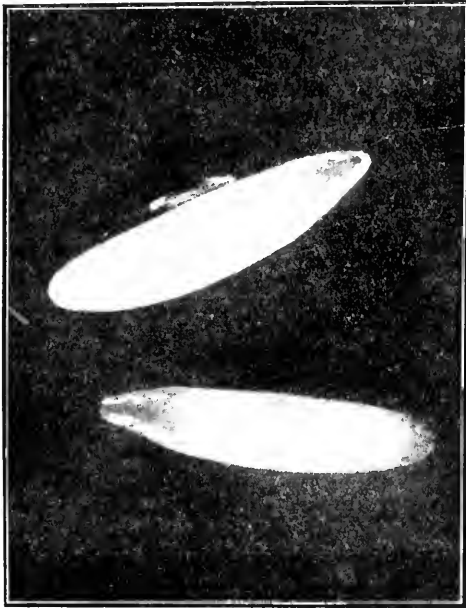
Stalk of bracken (*Pteris aquilina*) containing ova of *Cicadetta montana*.

colours by 2.20. Several Cicadas were "singing" in the neighbouring trees during the whole time I was at the locality. I may mention that the spot where all these Cicadas emerged is within a yard or two of the place where, in 1911, I found so many empty nymph cases.

On May 26th I again visited the Cicada ground and at 11.45 a.m. discovered two females sitting on fronds of bracken;

they were quite mature, and had probably not recently emerged. One of these I disturbed at 12.30, when it flew off with a heavy and somewhat purposeless flight, for after circling round twice it alighted on the turf. Although the insect passed quite close to me, I could not detect the rustling of the wings mentioned by other entomologists. The second was still on the bracken frond at 12.50, but at 1.30 had gone.

About this time I located a male on the branch of a pine tree, being attracted to it by its lusty song. Carefully pulling



Ova of *Cicadetta montana* $\times 22$.

Photo G. T. Lyle.

down the branch until the insect was within a foot of my face I watched operations. The bug was resting longways on a twig, singing loudly, the wings, both upper and lower, being quite still, as were all six legs, the only motion I could detect being a very slight dilation of the abdomen when the song, which was intermittent, commenced, and a corresponding contraction when it ceased; the generative organs being also protruded and withdrawn. After a time the insect walked up the twig, and I particularly noticed that the song continued while the Cicada was in motion.

Like the squeak of a bat, it would appear that the note of the Cicada is not audible to everyone, for a friend who was with

me on this occasion was quite unable to detect the sound, although certainly within two feet of the insect.

While searching for nymphs and nymph cases I have several times noticed stems of bracken which have been punctured in a rather peculiar manner, strips of the cuticle having been partly detached, the cavity within containing numbers of ova. Although I have never been successful in rearing the nymph from the few ova which I have removed, and have not been fortunate enough to see the female in the act of ovipositing, there can be little doubt, judging from the habits of nearly allied species, and also from the spot where I have found these ova, that they are the eggs of *C. montana*. The ovipositor must be a powerful instrument to slice the cuticle of the bracken, the method of which the illustration will help to explain (p. 302). Although in the instance figured we have two punctures at a distance of an inch apart, I have often found cases with only one such puncture, and in 1911 noticed a bracken stem with three punctures. Each of these punctures seems to contain some dozen or twenty ova, although I cannot be sure of the exact number, as I have always endeavoured to disturb them as little as possible.

In length the ova reach 2 mm., the medial diameter being but $\frac{1}{2}$ mm.; they are considerably more pointed at one end than the other, smooth and somewhat shining, and when first laid a pale cream in colour; they rest longways within the bracken stalk, but do not appear to be placed in any particular order. Ova found on June 23rd, 1912, judging from the discoloration of the puncture, had evidently been laid some little time; these ova were still in the same position and unhatched on August 2nd, they then seemed, however, to be slightly darker in colour. Again, on October 6th, I noticed that they were still unhatched, although by this time they had assumed a brownish tint. After this date I was unable to find the nest. Of course, it is possible that these ova were infertile, though they certainly had not that appearance.

There is no doubt that in 1912 *C. montana* was exceptionally plentiful, as, in addition to those already mentioned, I found many other empty nymph cases in the neighbourhood.

In 1913 a careful search on May 18th revealed no trace of the bug, and being away during the following three weeks I could not again visit the locality until June 11th, when at 3.15 p.m. I found a recently emerged female resting just above its nymph case. Although the wings were fully expanded, the mature coloration was not completely assumed until 5.20, when the insect was still in the same position where I left it. Only two other nymph cases were to be found, both of males, and a thorough search a week later did not receive any reward, nor did I on either occasion detect any singing, in spite of the fact that the weather was quite favourable. I may mention, however,

that on June 15th I heard a Cicada singing in a pine tree within a few yards of the spot where, in 1901, I made my first acquaintance with this interesting bug, another proof of how extremely local is the species.

At present the haunt of our Cicada is known to, I believe, only two professional collectors, one woodman, and six or seven entomologists, so that it would seem unnecessary to invoke the assistance of the newly formed "Society for the Promotion of Nature Reserves" for its protection; the time will probably come, however, when it will be found imperative to make some effort to prevent the extermination in the New Forest of this species, as well as the Lepidoptera *Apatura iris* and *Zygæna meliloti*.

Brockenhurst: Sept. 17th, 1913.

SOME DICHRORAMPHAS OBSERVED IN 1913.

BY REV. JOHN W. METCALFE, F.E.S.

BEING in want of several species belonging to this genus for "genitalia" purposes, a careful look-out was kept for them, and the following notes may be of interest. The group to me is a very puzzling one, and it is hard to say exactly how many species we possess. Perhaps Mr. Pierce will be able to tell us when the genitalia have been worked out.

In May *D. saturnana* was flying freely amongst *Tanacetum vulgare* near Ottery St. Mary, indeed it occurs here wherever Tansy is found. The date is perplexing, as Barrett and Meyrick give June and July, Stainton and Wilkinson July and August. The unfolded costa seems clearly to identify the insect and to separate it with *plumbana* from the other *Dichroramphas*. But here, and apparently in the Eastern counties, it flies from the beginning of May and is over by the middle of June, whilst I have seen no sign of a second brood. I have received this insect from friends under the name *tanaceti*, perhaps a guess suggested by the food-plant, the vicinity of which it never leaves. However, it is at least possible that Stainton and Wilkinson were really describing *saturnana* under the name *tanaceti*, and to this the fact that their insect was taken amongst Tansy points. In this case *tanaceti* drops out of our lists. On the other hand, Stainton and Wilkinson, who were, at any rate, dealing with the same insect (*vide* the captor, a Mr. Thompson, near Crewe), may have had *herbosana* before them. In favour of this are the date, the Northern locality, and the fact that they both describe *saturnana* with the unfolded costa elsewhere. In this case we must with Meyrick retain *tanaceti*, St. & Willk., for *herbosana*, Barr.

Of *D. herbosana* I took two specimens at Braemar in early July. This insect I also received from Mr. T. Ashton Lofthouse, taken in the Middlesbrough district in July amongst *Achillea*. The same collector sent me two other insects which, though having a slightly different general appearance, I cannot separate from *herbosana*, and which occur with him amongst *Chrysanthemum* and *Pyrethrum*. Meyrick also gives *Tanacetum* as the food-plant, perhaps on the strength of his identification of this insect with Stainton's *tanacti*.

D. squana and *D. plumbana* occurred in large numbers near Torquay on June 3rd, flying amongst mixed herbage in the waste corners of a field on the cliffs. The latter seems a very variable insect, but again is easily distinguished by the unfolded costa. Near the same spot an odd specimen of *D. politana* was netted, whilst here and there *D. petiverella* flitted about.

Perhaps the most interesting species met with was *D. senec-tana*. It seemed highly probable that it should occur on the cliffs to the east of Sidmouth, and it was a delight, at the second attempt, to turn it up flying freely under the cliff at Weston Bay amongst *Chrysanthemum*. This is a striking insect when set and one easily distinguished.

It remains only to mention one other species, *D. consortana*. This was found in a most romantic spot at the junction of the rivers Garry and Tummel above Pitlochry, N.B. It was flying in great numbers amongst the fading *Chrysanthemum*, but by this date (July 25th) it was unfortunately a little past its prime. The double-brooded *D. acuminatana* has not been noticed here, and the common *D. plumbagana* seems unreasonably scarce, but *D. simpliciana* amongst *Artemisium*, and *D. alpinana* have been taken in other years, leaving only the rare *D. alpestrana* to be met with. However, the above seems a pretty fortunate list of captures in this one genus made during a single summer.

Ottery St. Mary.

BRITISH NEUROPTERA, 1912.

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

NOT many observations in connection with the British Neuroptera have come to hand during the year 1912; but such as they are, they should be put on record, as our knowledge of the distribution of these insects is so meagre.

Snake-flies.

Raphidia xanthostigma, Schum. Tuddenham, Suffolk, June 1st
(C. G. Nurse).

R. maculicollis, Steph. Goathorn Peninsula, Studland, Dorset,
May 25th (J. W. Yerbury).

Brown Lacewings.

- Hemerobius pellucidus*, Walk. A nice insect, which seems to be rarely captured. Studland, May 26th (Yerbury).
- H. micans*, Oliv. Llandrindod, Radnor, August 8th (South); Lelant, Cornwall, August 28th (Yerbury).
- H. lutescens*, Fab. Studland, May 16th (Yerbury); New Forest, August 2nd (G. T. Lyle); Llandrindod, August 11th-19th (South); Lelant, August 28th (Yerbury).
- H. orotypus*, Walleng. Stokenchurch, Oxon, August 4th (Yerbury).
- H. subnebulosus*, Steph. Llandrindod, August 17th (South).
- H. concinnus*, Steph. Tuddenham, June 11th (Nurse).
- Micromus variegatus*, Fab. Seashore salt-marsh, Lelant, August 26th (Yerbury).

Green Lacewings.

- Chrysopa alba*, Linn. Hurst Hill, New Forest, August 5th; neuration less black than usual (W. J. L.); Llandrindod, August (South).
- C. tenella*, Sch. Frinton-on-Sea, Essex, July 8th (Yerbury); Walton-on-the-Naze, Essex, salt-marsh, July 9th (Yerbury); Beaulieu River, New Forest, August 6th (W. J. L.).
- C. vulgaris*, Sch. Frinton-on-Sea, July 22nd (Yerbury); Walton-on-the-Naze, July 23rd (Yerbury); Parkstone, Dorset, at light, September 14th (C. Adams).
- C. prasina*, Ramb. (= *aspersa*, Wesm.). Frinton-on-Sea, July 22nd (Yerbury); Silverstream, New Forest, August 7th (W. J. L.).
- C. ventralis*, Curt. Near Newland's Corner, on North Downs, Surrey, July 19th (W. J. L.).
- C. perla*, Linn. A male and a female taken in Steer Lane, Oxshott, Surrey, June 19th (W. J. L.); eggs laid afterwards in the box in which they were placed.

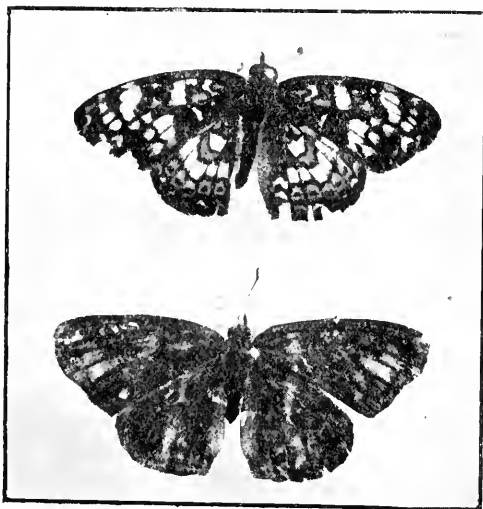
Scorpion-flies.

Panorpa germanica, Linn., was first taken on May 12th (a female) between Oxshott and Claygate (W. J. L.). On June 9th, in the same district, they were common, and on June 19th they appeared to be still common in the same place. On June 30th I took it in the Rhinefield district in the New Forest, and Mr. Lyle took it in the Forest on August 2nd. No doubt all these belonged to the early brood. On August 27th, near Palmer's Water, in the New Forest, I took one male and four females on bracken leaves. These must, I feel certain, have belonged to a second brood. They were remarkably fresh with somewhat glossy wings, and the bright spotting gave them quite a distinct appearance. Mr. Porritt took the species on September 9th at Sutton-on-Sea, Lincolnshire. It might seem that the larger species, *P. communis*, Linn., was not in evidence in 1912.

Kingston-on-Thames: October, 1913.

TWO NEW VARIETIES OF *PHYCIODES*
CAMILLUS, EDWARDS.

By T. D. A. COCKERELL.



Phyciodes camillus is common in the mountains near Boulder, Colorado, and among a number of specimens collected we found two very well marked aberrations:—

Ab. rohveri (fig. 1). The paler markings on the upper side glistening pearly white, slightly creamy. The black and orange-fulvous normal. North Boulder Creek, Boulder County, Colorado, in the Canadian Zone, August, 1907 (S. A. Rohwer).

Ab. tristis (fig. 2). Upper side clouded with black; primaries with a few orange-fulvous marks on basal half, and a large fulvous patch, interrupted by black lines along the veins, on the apical part; secondaries with similar markings. Jim Creek, Boulder County, Colorado, September 7th, 1907 (S. A. Rohwer).

The varietal name must be considered applicable to any similarly melanic form, whether or not it agrees in minute details. An analogous variety of *P. tharos*, Drury, has recently been described by Mrs. W. Reiff as *reaghi*. (Entom. News, xxiv. p. 305.)

Three varieties of *P. camillus* have been previously described as follows:—

Ab. emissa, Edwards, 1871. Colorado (Mead). A variety with the black colour reduced.

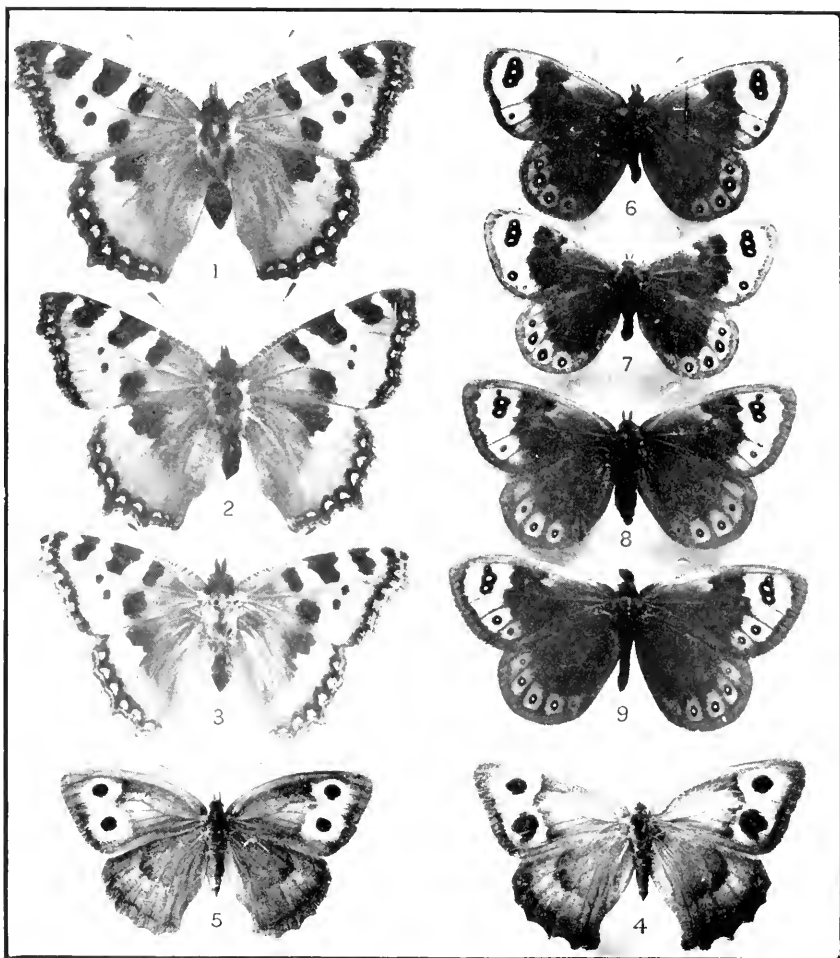


Photo H. Main.

FORMS OF DIURNI FROM ALBARRACIN.

- Figs. 1 and 2.—*Aglais urticae* var. *ternelensis*, Albarracin, June, 1913 (bred specimens.)
 Fig. 3.—*Aglais urticae*, typical specimen, Digne, May, 1903.
 Fig. 4.—*Epinephele lycaon* ab. *boopis*, Albarracin, July, 1905.
 Fig. 5.—*E. lycaon*, typical specimen, Digne, July, 1905.
 Fig. 6.—*Erebia epistygne* var. *virialthus*, male, Albarracin, May 15th, 1913.
 Fig. 7.—*E. epistygne* var. *virialthus*, female, Albarracin, May 16th, 1913.
 Fig. 8.—*E. epistygne*, typical specimen, female, Digne, April, 1903.
 Fig. 9.—*E. epistygne*, typical specimen, male, Digne, April, 1903.

Ab. pallida, Edwards, 1864. Texas and Kansas. Another pallid variety, the black mainly confined to the costal region.

Ab. mata, Reakirt, 1866. Rocky mountains of Colorado. Light markings more extended; marginal row of lunules on anterior wings complete; the two postdiscal bands continuous, broad, and of equal width.

LEPIDOPTERA AT ALBARRACIN IN MAY AND JUNE, 1913.

BY W. G. SHELDON, F.E.S.

(PLATE XII.)

(Continued from p. 289.)

THE number of species of Rhopalocera met with was seventy-three, as follows:—

Papilio podalirius var. *feisthamelii*.—Generally distributed but not common; first seen on May 25th.

P. machaon.—A few specimens only seen in the neighbourhood of Santa Croche.

Thais rumina.—Zapater says "this species is very scarce"; it certainly is not so now, for it was to be seen everywhere on the dry hillsides, especially at and near Santa Croche, where its foodplant *Aristolochia pistalochia* grew abundantly. The specimens are of full size, but are pale and do not show any tendency towards var. *cantaneri*. The front wings are well blotched with red.

Aporia crataegi.—Not uncommon and generally distributed; first seen on May 31st.

Pieris brassicae and *P. rapae*.—Generally common.

Pontia daplidice.—The first brood of this species, var. *bellidice*, was flying at the commencement of our stay, and a second brood was very abundant in the middle of June. These latter were very fine examples of var. *raphani*.

Anthocaris belia.—Was seen flying rapidly over cornfields in May, and an ovum I found on a yellow crucifer produced the summer form var. *ausonia*, after my return to England.

Euchloë cardamines.—Common in May.

E. euphenoides.—Abundant everywhere, it was the first butterfly I saw on arrival at Albarracin, and it continued in good condition until the middle of June; the males have the orange patch with strongly margined black border to the edge nearest the base of the wings, and in some instances the veins in this patch are covered with black scales also. Some of the females have the apical patch light orange as in Riviera specimens, others are the usual Spanish form, with the orange patch thickly covered with dark scales.

Zegris eupheme var. *meridionalis*.—This beautiful species occurred everywhere in cornfields, but was not by any means abundant, or easy to catch, especially the males, which flew very rapidly; consequently our bag was a small one. By working for it one could get three or four specimens in a day, but we usually contented ourselves

by picking up stray ones that came across our path; the specimens do not differ perceptibly from those I have from Granada. We first saw it on May 17th, on which day I captured two males and one female, and from their condition I should say it had then been out several days. It continued in good order until the end of May and I netted one good male on June 13th. The females absolutely refused to part with a single ova, and a search on the yellow crucifers growing in the cornfields for them was not successful.

Colias hyale, not very common, first seen on May 26th.

C. edusa.—Abundant during the whole period of our stay, successive broods continuously appearing. *ab. pallida* was not uncommon.

Rhodocera rhamnii and *R. cleopatra*.—Hibernated specimens of both these species were not uncommon amongst *Rhamnus* in the Guadalaviev gorge.

Thecla spini.—Common on the hilltops around Albarracin, and some larvæ I found at Santa Croche, on *Rhamnus lycoides*, produced this species after my return to England; first seen on June 8th.

Callophrys rubi.—A few specimens of this species of the var. *fervida* form occurred generally, my examples are in addition all *ab. immaculata*.

Chrysophanus alciphron var. *gordius*.—This species according to Zapater is abundant; we, however, did not find it so, and, except for a few examples on the hilltops on June 13th, it was not seen. These examples, which are all males, have a much stronger purple flush than Swiss or French specimens, and come near some *ab. intermedia* from Piedmont, which I have seen.

C. phloceas.—Not common.

Lampides baeticus.—Certainly the most abundant Lycænid we saw at Albarracin, chiefly frequenting sainfoin fields, where it was in great numbers. Some of the examples were of large size—one of mine expands 42 mm. It occurred continuously during the whole of our stay.

L. telicanus.—Frequenting the same localities as the last, but was not common, usually one or two examples were taken each day; first seen on May 25th.

Scolitantides orion.—A rather small race, of which the average expanse is about 28 mm., was not very rare in the Guadalaviev gorge near Santa Croche. These examples are mostly var. *ornata*, one or two are, however, quite black = var. *nigra*. I also took one specimen at Puerta de la Losilla; first seen on May 18th.

S. baton.—Abundant amongst its foodplant *Thymus*, everywhere on the dry hills at the time of our arrival at Albarracin. The form is entirely var. *panoptes*, without the slightest indication of the red band underneath, which is found in the type.

Plebeius argus = *aegon*.—A very interesting and beautiful form occurred in small numbers towards the end of our stay, probably it was not even then fully out. Of the named local races it seems to me to come nearest to the var. *hypochiona* of Rambur. In size the males almost equal var. *bejarensis*, Chapman, expanding 32 mm. and much resemble that form except that the black border on the upper sides

is narrower, the spots on the under side are smaller, and the bases of superiors underneath have more blue scales, the ground colour underneath is equally pure white. My only female is quite without blue on the upper side, the orange lunules are, in this example, continuous on the upper sides of all wings. A most interesting male, taken by Mr. Jones after my departure, has the characteristics of *ab. casalicus*, which, of course, has hitherto only been taken in North-west Spain by Dr. Chapman.

P. zephyrus var. *hesperica*.—This species was one of the chief objects of our search, for it is exceptionally rare in our collections; the only examples I know of in Britain are two males in the British Museum, which are labelled "Andalusia," and so far as I am aware it had never been seen alive by any British lepidopterist. It is described in Zapater's Catalogue as rare and local.

My first capture, a quite fresh male, was taken by the side of the road near Santa Croche on May 27th. From this date we searched carefully and widely each day for further specimens, but fruitlessly, until June 5th, on which day Mr. Jones took another male; unfortunately he did not recognize it at the time of capture, so the clue of its locality was lost. However, on June 6th I at length found a very small spot where it was not uncommon, and here on this day I captured fourteen good examples, and others on succeeding days. This locality was a small plateau, perhaps half a mile from the spot where I captured my first specimen, and amongst the hills skirting the left bank of the Guadalavivier. On this plateau grew isolated examples of the savin trees which are the principal timber clothing these hills; the undergrowth consisted of spiny plants, chiefly leguminous, a species of *Malva*, *Asphodel*, and other southern plants, which included a low growing, very hirsute, leguminous plant, with a somewhat inconspicuous light yellow flower, the rather large head of which is borne on a stem two or three inches long. This plant the authorities at Kew have kindly identified for me, it is the *Astragalus aragonensis* of Freyn. On my first visit to this spot, I noticed flying slowly over it, and evidently depositing ova, a female Lycanid, which after watching for some time I netted, and found to my great delight was this much desired species. I then searched the plant it had been frequenting and found on it several freshly deposited ova. On a subsequent date I found another locality even smaller than the first, in which a few examples could be found most days; here again the *Astragalus*, which is at Albarracin an exceedingly local plant, grew.

In size my specimens are smaller than those in the National Collection, the largest of which expands 40 mm.; my largest male expands 38 mm., and the largest female 35 mm. The average size of my specimens would be about 3 mm. less than these sizes.

P. var. hesperica is excessively local, and only found in the immediate neighbourhood of its food-plant.

P. astrarche.—Zapater says this species is very abundant; we did not find it so, though odd specimens were to be taken each day in widely distributed localities after its first appearance on May 21st. The form is a southern one, with well marked orange lunules on all the wings.

P. icarus.—Fairly common and widely distributed.

Agriades thersites.—Dr. Chapman states in the 'Transactions' of the Entomological Society of London for the year 1912 that he took this rediscovered species at Albarracin, and therefore we kept a sharp look-out for it. As a matter of fact, it was the first Lycaenid we saw, a female being taken on May 18th flying in a sainfoin field in the Guadalavivier valley, and from that date onwards for about a fortnight a few specimens were taken each day; the condition of these got gradually worse, but in early June there seemed to be another emergence; at any rate, fresh specimens again occurred. With the exception of one or two males found sunning themselves on rocks in a gorge, I did not see this species elsewhere than in the sainfoin fields; it flew with *P. icarus* and was certainly as common as that species. I had three females put up for ova, but unfortunately, though carefully tended and fed, they would not oblige me, though they lived for many days and seemed quite at home amongst the flowers of almost every leguminous plant growing in the district, including, of course, sainfoin, which, from the fact that the females were found only amongst it, I cannot help suspecting would be one of the plants the larva feeds upon.

My series of twelve males and four females varies considerably in size, ranging from 29–39 mm. in expanse. My Albarracin *P. icarus* singularly have a maximum and minimum expanse practically the same.

When one knows the distinguishing characteristics of these species, a glance is sufficient to separate them. In addition to the points of difference given by Dr. Chapman, my specimens have the bases of the superiors underneath with distinctly fewer blue scales in *A. thersites*; the under side of the inferiors in the males is more brown and not so grey, and the orange lunules are more distinct than is the case in *P. icarus*.

All the females of *P. icarus* are ab. *caerulea*, and the whole of the *A. thersites* females are equally blue, though the blue is of a brighter tint, not so purple. Dr. Chapman does not mention this form, for which I propose the name of ab. *azagra*, n. ab.

A. escheri.—This species was first seen on June 10th, and was not common at the time of my departure. The specimens do not appear to differ from my French or Swiss examples, except that my solitary female has the orange lunules on the upper side of a brighter and lighter colour.

A. bellargus.—Abundant, a very fine form, my largest male expanding 42 mm. as against the 40 mm. expanse of my largest French and 37 mm. largest British examples.

Amongst my series of males are three of what I think is a very rare European form, *i. e.* with orange spots showing on the upper sides of the inferiors. Tutt named this form ab. *rufolineata*, and states that it is found in Algeria and at Gibraltar. I find that there are specimens in the National Collection labelled "Portugal" and "Algiers." Evidently the form is a dry district one.

A. corydon.—This species was not out at the date of Mr. Jones's departure from Albarracin, and the only remark I have to make respecting it is with regard to its food-plant. I have sometimes

wondered if the varied coloration of the two local races (vars. *hispana* and *aragonensis*) which occur in the Albarracin district is brought about by different larval pabulum, and therefore it may not be without interest to say that in the headquarters at Albarracin of var. *aragonensis*, *Hippocrepis commosa* is an abundant plant. I did not have an opportunity of visiting the habitat of var. *hispana*, but perhaps some future observer who does so will note if this plant occurs there also.

A. hylas var. *nivescens*.—This species was very late in appearing, but Mr. Jones took a very large male expanding 43 mm. at Santa Croche on June 21st, and a second smaller male at Losilla on June 28th.

Celastrina argiolus.—Not common; a few specimens only were seen.

(To be continued.)

NOTES AND OBSERVATIONS.

TORTRIX PRONUBANA.—Referring to Mr. Lowe's remarks (*antea*, p. 291), I have had no geraniums from outside sources for several years. I am of opinion that the larva referred to was an escape from a number of larvæ I collected at Bournemouth the previous August, many of which died while quite small in December. My object in writing was to suggest that a proportion of the August larvæ hibernate, producing a Spring brood, which in turn produces the August brood. What the Autumn *moths* do I cannot tell. I have entirely failed to secure a pairing among them. Neither have I ever succeeded in finding either moth or larva in the Spring, except the solitary specimen recorded, which cannot be regarded as normal. It may be that the habits of this species in Britain are different from what they are on the Continent. It would be interesting to know if any British observer, or Mr. Lowe in Guernsey, has carried the species through the cycle of an entire year.—(REV.) W. CLAXTON; Navestock Vicarage, Romford.

NOTE ON CUCULLIA LYCHNITIS.—On July 22nd, 1911, while collecting on a dull day in Oxfordshire I took a few larvæ of *Cucullia verbasci* nearly full-grown on *Verbascum nigrum*, and gathered a supply of the plant for food. The latter I placed in water on arrival home, and on looking at this on July 25th I found eighteen very small larvæ feeding, which I identified some time later as those of *C. lychnitis*. They grew very rapidly, and some idea of this may be gathered from the fact that all had gone down to pupate on August 22nd. The pupæ were kept in a room in which there was no fire during the winter, and the imagines emerged as follows: June 2nd, one; June 3rd, two; June 4th, one; June 6th, four; June 29th, two; July 26th, two; August 3rd, one = thirteen; June 1st, one; July 3rd, one; July 8th, one = three. It will be noticed that only three of the sixteen pupæ passed the second winter in that stage.—H. L. DOLTON; 27, Brunswick Street, Reading, Berks, October 6th, 1913.

MARGARONIA UNIONALIS AT HYPHE, KENT.—I have much pleasure in recording the capture last night of a very beautiful specimen of *M. unionalis*. It was first noted by my father, at rest on the outside of a window here, at 11.5 p.m. He called me, and I opened the window, when the moth flew into the room and was secured.—PERCY RICHARDS; Seabrook, Hythe, Kent, October 28th, 1913.

CYMATOPHORA FLUCTUOSA IN SCOTLAND.—Among a number of insects captured last year by Mr. L. G. Esson in the Isle of Mull are several examples of this moth. The species has not, I believe, been definitely recorded from Scotland before.—N. CHARLES ROTHCHILD; Arundel House, Kensington Palace Gardens, London, W.

UNUSUAL PAIRING OF NOCTUID MOTHS.—Whilst searching for *Luperina cespitis* in Richmond Park on Saturday evening last I was fortunate enough to take a male *Noctua xanthographa* and female *Charceas graminis* in cop. The latter subsequently laid a number of eggs, the rearing of which I intend to take particular care with. Is this not a remarkable occurrence? I should be glad to hear if a hybrid of these two widely-separated species is at present known.—A. E. HODGE; 14, Astonville Street, Southfields, S.W., August 26th, 1913.

ENDOPISA GEMMIFERANA IN DEVON.—When searching on the cliffs east of Sidmouth for a possible locality for *D. senectana*, I was delighted to capture several specimens of *E. gemmiferana*. On that date, June 21st, the insect was beginning to go over, and was not in the best condition. It was flying amongst masses of *Lathyrus sylvestris*, which is probably its food-plant. Hitherto it has, as far as I know, only been taken in the Isle of Wight. As the food-plant occurs all along the cliffs in this locality, it should be found in some numbers another year.—(Rev.) J. W. METCALFE; Ottery St. Mary.

NOTE ON SCOLIOPTERYX LIBATRIX.—While exploring an attic at Fursdon, Thorverton, Devon, I came across seven fine specimens of *Scoliopteryx libatrix* (five males, two females) hibernating in a row on a beam about 2 ft. in length.—W. R. TAYLOR; Jesus College, Cambridge, October 13th, 1913.

NOTES FROM DERBYSHIRE, &C.—Freshly emerged specimens of *Lycæna astrarche* were taken at Dovedale on July 22nd this year. I understand that this butterfly is not common in the locality. I secured a good series. I saw a fresh female specimen of *C. edusa* on September 6th at Leigh, Staffordshire, and a good male on September 8th at Barrow-on-Trent, Derbyshire. I was out shooting on both occasions, so had no net to effect a capture. I am informed that several specimens of *C. edusa* have been seen this year at Barrow while the corn was being cut. Two specimens of *Acherontia atropos* have been taken in Derby during the past month, both of the male sex, and one is in my possession, the other in the Derby Museum.—WINSTON ST. A. ST. JOHN; Derwent House, Derby, October 9th, 1913.

EMMELESIA TENIATA IN WESTMORLAND.—On July 19th last I netted in a wood near Kendal a fine female of *E. teniata*. Mr.

Louis B. Prout kindly identified the specimen, which is generally darker and has the central band broader than the figure in 'Moths of the British Isles.'—FRANK LITTLEWOOD; 22, Highgate, Kendal.

ADDITIONS TO THE GLOUCESTERSHIRE LIST.—On June 28th, 1913, I boxed a male specimen of the Hippopotamus Tortrix (*Epiblema (Ephippiphora) turbidana*) on the bank of the Stroud Canal at Framilode. On July 17th, 1913, I netted a specimen of *Batrachedra pinicolella* in the Forest of Dean. I am indebted to Mr. E. Meyrick, F.E.S., for identifying the specimens. As far as I can ascertain, neither of these species has been hitherto recorded from this county.—C. GRANVILLE CLUTTERBUCK.

COLIAS EDUSA AND SPHINX CONVULVULI IN GLAMORGANSHIRE.—On August 26th, 1913, I took a freshly emerged male specimen of *Colias edusa* in a clover field at Southerndown, near Bridgend, and on the following day my wife saw another on the cliffs there. On September 1st I found a female specimen of *Sphinx convolvuli* at rest on the wooden pailings outside the Earl of Dunraven's park. It was in good condition except for a piece chipped out of one hind wing.—C. GRANVILLE CLUTTERBUCK, F.E.S.; 23, Heathville Road, Gloucester, October 6th, 1913.

COLIAS EDUSA IN KENT.—During the last half of August this year *Colias edusa* was very common. I could easily have caught about three hundred in the lucerne fields. I secured a fine series; amongst them were twelve fine var. *helice*. One specimen, a giant female, had large markings in the black borders, and the ground colour was bright light yellow.—R. H. RATTRAY (Colonel); Tonbridge.

COLIAS EDUSA IN THE CITY.—Whilst standing outside Fishmongers' Hall on September 8th I noticed a specimen of *C. edusa* coming from the direction of King William Street. It flew over London Bridge about 8 to 10 ft. from the ground along the middle of the roadway.—S. WEBB; Dover.

COLIAS EDUSA IN HANTS.—On August 28th last—a hot and sunny day—I saw a specimen of *Colias edusa* flying in the street at Ryde, Isle of Wight, and on September 3rd, a fine, though chilly day in contrast, another was seen at Gosport.—JOSEPH ANDERSON; Chichester, Sussex.

COLIAS EDUSA IN CAMBRIDGESHIRE.—Yesterday a friend, Mr. F. Hardwick, brought me a living specimen of *C. edusa* (male) which he had captured in the Fleam Dykes, near Cambridge, on October 12th. It was in poor condition, and we subsequently released it. May I add a record of *C. edusa* which I nearly captured at Chippenham this year on June 2nd.—W. R. TAYLOR; Jesus College, Cambridge, October 13th, 1913.

COLIAS EDUSA IN SUSSEX.—*Colias edusa* has been very abundant here (Bexhill) this season. I took the first on August 16th, soon after I came here; they were evidently emerging then in the clover

fields. Later, they were everywhere—gardens, fields, roadsides, &c. Curiously enough the first specimen I caught was more or less var. *helice*—a very pale creamy tint. I subsequently caught a dead-white example, and so did my son. I saw no *C. hyale* here. There has been a fair sprinkling of *P. cardui*, and *P. atalanta* is still numerous.—E. A. C. STOWELL; Laleham, Bexhill-on-Sea, October 10th, 1913.

COLIAS EDUSA var. HELICE IN KENT.—At the end of August, near Dover, my son and I took three *Colias edusa* var. *helice* in good condition, and we saw a fourth.—(Captain) W. E. MANLEY; 62, Albert Hall Mansions, London, S.W., October 13th, 1913.

COLIAS EDUSA AT LEWISHAM AND EASTBOURNE.—On the afternoon of October 4th a specimen of *Colias edusa* flitted across my garden at Lewisham and settled on a *Gaillardia* blossom, where I was able to examine it closely, and it proved to be a worn male. I had not seen the species in this neighbourhood since the great “*edusa*” year of 1877. At Eastbourne the species was common throughout August and September, especially about the middle of the latter month, when, in the sheltered nooks on the downs, it was the commonest of the butterflies met with; it was also frequently seen flying along the parades.—R. ADKIN; Lewisham, October, 1913.

COLIAS EDUSA IN SUFFOLK.—I took four male *Colias edusa* at Felixstowe on a small patch of lucerne near the beach in the second week in August, and later in the month two male and one female here in Stutton. The latter laid about one hundred and fifty eggs in confinement, from which I have now a healthy lot of larvæ of various sizes.—J. F. LORIMER FISON; Stutton Hall, Suffolk, October 15th, 1913.

MUTILLA EUROPEA IN YORKSHIRE.—When staying at Robin Hood's Bay last September Professor A. G. Green, of the University of Leeds, then spending some time at Scarborough, cycled over to pay me a visit, and while resting for lunch on Low Moor observed a strange-looking insect crawling along the path. The creature was captured and brought to me and recognised as a *Mutilla*, although I was then ignorant of the species. It has since been identified by Professor Poulton as *M. europæa*, and its capture seems worthy of record, because in the prospectus of a book on ‘The Moorlands of North-Eastern Yorkshire,’ by F. Elgee, about to be published at Middlesbrough, a figure of this insect is inserted as the second Yorkshire specimen. If that is really the case, the third Yorkshire example is now in the Hope Museum at Oxford.—R. MELDOLA; 6, Brunswick Square, W.C., October 23rd, 1913.

SETTLING HABIT OF PYRAMEIS CARDUI.—The first *Pyrameis cardui* that I noticed here was on June 4th. It was flying round elms in a meadow about six o'clock in the evening. It would often fly down and settle on the ground; but each time that it did so selected a bare, dry patch, and, closing the wings over the body, was almost indistinguishable from the soil on which it rested. I have often observed this habit.—JOSEPH ANDERSON; Chichester.

CYANIRIS ARGIOLOUS, A PARTIAL THIRD BROOD.—Between September 29th and October 18th thirteen specimens of *Cyaniris argiolus*, four males and nine females, have emerged from pupæ resulting from some forty larvæ collected from the flower buds of ivy at Eastbourne on September 5th last. Although a third emergence of *C. argiolus* may not be altogether unknown, it is at least very infrequent, and the interesting point in this instance is that, although the majority of females follow the spring emergence in that they have comparatively narrow borders to the fore-wings, some of them resemble the summer emergence in having the wings broadly black bordered.—R. ADKIN; Lewisham, October, 1913.

EUCHLOË CARDAMINES EMERGING IN OCTOBER.—I have the pleasure of bringing to your notice a very late emergence of *E. cardamines*. I found a very small male in the breeding cage on the morning of October 2nd. All the other imagines from the same brood of larvæ had emerged between April 24th and June 9th.—B. W. NEAVE; Lyndhurst, 95, Queen's Road, Brownswood Park, N., October 20th, 1913.

NOTES ON GONEPTERYX RHAMNI, &C.—During the last week in September I was watching some *P. atalanta* on a clump of Michaelmas Daisies, when I observed a female *G. rhamni*, which was also on the flowers, suddenly flutter up to a creeper on the house wall (a yellow summer-flowering Jasmine), and settle on the under side of a leaf. This was about 3 p.m. on a sunny day. The butterfly never stirred for a fortnight, though we had some even warmer days when the sun actually shone upon it. It had evidently gone into hibernation. I watched it every day, for it was clearly in sight at a height of about 10 ft. from the ground, though it required two or three minutes' search to locate it, as its pale whitey-green colouring seemed to disappear among the pale jasmine leaves. I had hoped to watch it through the winter, but unfortunately a squally evening and tempestuous night on October 8th apparently dislodged it from its exposed perch, and I have not found it again as yet. The interesting feature to me was the apparently casual and unpremeditated way in which it took up its winter quarters; there was no search or selection of a site. Yet it would not move again, though the sun actually shone upon it. Three *Vanessa urtica* evidently retired for the winter about the same time, though one was tempted out once more on a very fine day. But *P. atalanta* have obviously no inclination that way, as my batch were all out to-day (October 10th) battling with a very chill east wind.—E. A. C. STOWELL; Laleham, Bexhill-on-Sea.

NOTES ON THE PAST SEASON.—I spent the months of May and June at Margate, and kept a sharp look-out for the arrival of immigrant species. On June 2nd I found that *Colias edusa*, *Pyrameis cardui*, *P. atalanta* and *Plusia gamma* appeared simultaneously in a locality, where, for some days previously I had been taking *Acontia luctuosa* and *Aspilates citraria*. Butterflies were very scarce! Expeditions to Blean Woods, near Herne Bay, and Sturry Woods, near Canterbury, only resulted in the taking of *Argynnis euphrosyne*, *Callophrys (Thecla) rubi* and *Cyaniris (Lycæna) argiolus*.

At Sturry I caught several *Lithosia aureola*, with the usual common wood-frequenting Geometræ. At the Margate lamps *Neuriasaponaria*, *Melanippe galiata*, *Hemorphila abruptaria* and other species occurred, and I noticed that my son had caught specimens of *Ennomos autumnaria* and *E. fuscantaria* in the same positions in the preceding autumn. A visit to my old collecting grounds at Chinnor at the very end of June found insects still scarce. However, I took *Lycæna minima*, *Parasemia plantaginis* and *Ino geryon*, but their flight was apparently nearly over. Later, my son paid two visits there and found *Hesperia comma* in its old haunts at Chinnor, and *Lycæna corydon* in abundance at Princes Risborough. On arriving at our home in Cornwall I began to look up *Lycæna ægon*, which is the most interesting West Cornwall butterfly. The varieties of the females are almost protean, very dusty black, resembling *L. minima*, and many blue mottled forms, in some the blue colouring extending over almost the whole of the upper wings. A very fine male specimen of *Chrysophanus phlæas* var. *radiata* was secured, as well as three good bleached forms of *Epinephele ianira*, and one *Pararge megera* with one hind wing mostly white, owing to absence of pigment. Larvæ of *Eupithecia pulchellata* in foxgloves and *Dianthæcia nana* and *D. capsicola* in *Silene* were common. At the end of September *Agrotis suffusa* and *A. sauciâ*, *Epunda nigra* and *E. lichenæa*, were plentiful at sugar, as well as a specimen each of *Percnoptilota fluviala* and *Xylina petrificata*.—A. P. SPILLER; Chinnor, Oxon, October 20th, 1913.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*Wednesday, May 7th, 1913.*—Mr. G. T. Bethune-Baker, F.L.S., President, in the chair.—Mr. Charles C. Best-Gardner, of Rookwood, Neath, Glamorgan, was elected a Fellow of the Society.—The President announced the death of Mr. Herbert Druce, F.L.S.—Commander J. J. Walker exhibited a series of *Acalyptus carpini*, Fr., var. *rufipennis*, Gyll., a rare weevil, taken on and about a willow-bush at Weston-on-the-Green, Oxon, in April, 1913.—The Hon. N. Charles Rothschild, an example of *Taniocampa gracilis* captured in April this year at Wood Walton Fen, Hunts. The specimen in question is white all over, without any markings whatever.—Mr. Donisthorpe, a form of *Lasius affinis*, Schenck, an ant new to Britain, of which he had found a colony at Tenby, in South Wales, on the sandhills, on April 24th this year.—Mr. H. Eltringham, a number of the scales composing the anal tuft of *Cnethocampa pityocampa*, Schiff., remarkable as being the largest scales known in any Lepidopterous insect.—Prof. Poulton, four males and six females of *Papilio polytes*, L., captured March 10th–October 10th, 1912, by Capt. R. A. Craig, on Stonecutters' Island, in Hong Kong harbour, about one mile from the mainland. All the females were of the male-like form *cyrus*, Hübn. (= *pammon*, L.).—Prof. Poulton read extracts from letters received from Dr. G. D. H. Carpenter, telling of his success in obtaining, for the first time,

fertile ova from a *planemoides* female of *P. dardanus*. Three *planemoides* and seven *hippocoon* females had been bred from the eggs laid by the Bugalla parent.—Mr. J. C. F. Fryer exhibited a large series of the wings of Danaine and Euploine butterflies from Ceylon, remains of these insects which had been observed by him to be eaten by birds, mainly by the so-called "Wood-Swallow," *Artamus fuscus*; also a few specimens of the same butterflies which had been killed by Asilids, these being distinguished by the fact that the bodies were nearly or quite intact.—The following papers were read:—"On the British Mycetophilidae," by F. W. Edwards, F.E.S. "Culicidæ from Papua," by Frank H. Taylor, F.E.S., Government Entomologist to the Australian Institute of Tropical Medicine. "Pupal Coloration in *Papilio polytes*," and "The larval Habits of the Tineid moth *Melasina enerya*, Meyr.," by J. C. F. Fryer, M.A., F.E.S.

Wednesday, June 4th, 1913.—Mr. G. T. Bethune-Baker, F.L.S., F.Z.S., President, in the chair. The President announced that His Majesty the King had been graciously pleased to become Patron of the Society.—The death was announced of Lord Avebury, the oldest Fellow of the Society, and of Mr. Philip de la Garde.—Capt. F. Sitwell, Wooler, Northumberland, was elected a Fellow of the Society.—Mr. C. O. Waterhouse exhibited a blue variety of the female of *Rhynchites æneovirens* recently taken at Burnham Beeches.—Dr. F. A. Dixey, a male and female specimen of *Tatochila immaculata*, Röber, with a pair of *T. stigmadiæ*, Stögr., for comparison.—Mr. Donisthorpe, a fine series of *Claviger longicornis*, Mull. (including live specimens), with its proper host *Lasius umbratus mixtus*, with which he had taken it at Box Hill on May 16 and 23.—Mr. W. C. Crawley, male, virgin female, fully developed fecund queen, and a partly-developed queen of *Anergates atratulus*, Seh., taken for the first time in Britain, July, 1912, New Forest.—Prof. Poulton called attention to the striking resemblance between the parts of the under-side exposed during rest of many species of *Melitæa* and certain *Hesperidæ*—especially the large species *H. antonia*, Spey., *H. sida*, Esp., and to a less extent *H. carthami*, Hübn. He also exhibited a female of the Asilid fly *Helignoneura brunnipes*, F. (*Asilus castanipes*, Meigen), together with the Oncoclid (Cyrtid) fly *Physegaster maculatus*, Macq., both from Batna, Algeria. Also on behalf of Dr. Adalbert Seitz, F.E.S., the Fossorial model *Pepsis sapphirus*, Pal. de Beauv., and two of its mimics—the Reduviid bug *Spiniger ater*, Lep. et Serv., and the Locustid (Phasgoneurid) *Scaphura nigra*, Thunb., var. *vigorsii*, Kirb. All three had been captured together with a third mimic, a Syntomid moth of the genus *Macrocneme*, by Dr. Seitz, along not more than two hundred paces of a sunny road through the high forest between Santos and the little village of Sao Vicente.—Mr. J. C. F. Fryer, a light specimen of *Tentocampa gracilis* for comparison with that exhibited at the last meeting by the Hon. N. C. Rothschild.—Comm. J. J. Walker, on behalf of Dr. R. C. L. Perkins, a specimen of *Thalpochares ostrina*, Hübn., var. *carthami*, H.S., apparently freshly emerged from pupa, taken by Dr. Perkins at Paighton on June 1st, 1913.—The President, thirty-three specimens of *Celastrina argiolus* bred from one batch of eggs, sixteen of which emerged last autumn, and seventeen in May

of this year.—Dr. G. D. H. Carpenter gave an account of a brood of *Papilio dardanus* raised by him from eggs laid by a female of the *planemoides* form, consisting of twenty-two specimens—seven *hippocoon*, three *planemoides*, the rest males.—Dr. K. Jordan showed a Swallow-tail (*Papilio thoas thoantiades*), a Hawk-moth (*Protoparce diffissa diffissa*), and a Honey-bee (*Apis mellifica*), which were found dead at Buenos Ayres on *Araujia albens*, being caught by the proboscis in the flowers of that plant. Also, on behalf of Prof. Seitz, the cocoon and chrysalis of a Noctuid from China. The pupa bears dorsally at the base of the last segment a patch of sharp longitudinal ridges, and there are corresponding ridges on the inside of the cocoon. This stridulating apparatus enables the pupa to produce a loud chirping continued sound.—Dr. Longstaff exhibited a small bee (*Andrena*, sp.) with a coleopterous larva, apparently a Meloid, partly on, partly in its abdomen. Captured near Seville, Spain, April 15th, 1913.—The following papers were read:—"On the Relationship between certain West African Insects, especially Ants, Lepidoptera, and Homoptera," by W. A. Lamborn, M.R.C.S., L.R.C.P., F.E.S., Entomologist to the Agricultural Department of Southern Nigeria. With an Appendix containing descriptions of New Species by G. T. Bethune-Baker, Pres. Ent. Soc., W. L. Distant, J. Hartley Durrant, and Prof. R. Newstead, F.R.S. "Supplementary Notes on new or little-known Forms of *Acræa*," by H. Eltringham, M.A., F.Z.S. With description of a new form of *Acræa encedon* by Prof. E. B. Poulton, D.Sc., F.R.S.—GEORGE WHEELER, M.A., *Hon. Secretary*.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*September 11th*, 1913.—Mr. A. E. Tonge, F.E.S., President, in the chair.—Mr. Ashdown exhibited the imago of *Hyles euphorbiæ* bred from a larva taken at Aigle, Switzerland.—Mr. Turner, a larva of *Mamestra pisi* from New Cross, feeding on Michaelmas Daisy.—Mr. Sheldon, a collection of Heterocera taken in the Arctic areas of Norway and Sweden in 1911-12. Of the eighteen species shown, ten are to be found in the British Fauna. Species like *Plusia hohenwarthii*, *Anthrocera exulans* var. *vanadis*, *Psodas coracina* (*trepidaria*), &c., found in the high Alps, occurred there near sea level.—Mr. West (Greenwich), examples of the wasps *Vespa germanica*, *V. sylvestris* and *V. vulgaris*, to show the specific characters.—Mr. Curwen, a series of *Lowcia alciphron* var. *gordius* from Iselle, showing much variation in intensity of ground colour, and a short series of *L. amphidamas* from Caux, near Montreux.—Mr. Step, specimens of *V. germanica* and *V. vulgaris*, to show the difference in the appearance of the face.—Mr. Carr, the large spider *Epeira quadrata* from Crockham Hill, on heather, and reported *Asphalia diluta* common at sugar, *Noctua glareosa* common, and *Agrotis agathina* fairly common.—Mr. Sich reported *Carpocapsa pomonella* as abundant.—Mr. Tonge reported larvæ of *Nonagria typhæ* at Deal to be extensively parasitized this season.—Mr. Smith reported *Phryxus livornica* as occurring for the third year in succession at the Lizard, and also specimens of *Leucania vitellina*. *Agrotis lunigera* were in some numbers in the same locality.—HY. J. TURNER, *Hon. Report. Sec.*

Correction, August 28th, *C. viridis* = *C. equestris*.

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NOTES ON THE LIFE-HISTORY OF *LYCÆNA ARION*.

By F. W. FROHAWK, F.E.S., M.B.O.U.

In previous numbers of this Journal* the author has dealt with the different stages of *Lycæna arion*. Since the latest of these contributions (vol. xxxix. pp. 145-47) further attempts have been made to elucidate the doubtful points in the life-history of this insect, but it has to be confessed that a considerable gap still remains in our knowledge of the matter. It is the purpose of this note to give a brief account of the most recent observations of the author in the hope that suggestions tending to further progress may be elicited from others who may be interested in the subject.

In the papers alluded to, the author recorded that the butterfly prefers to deposit its eggs on plants of wild thyme growing on or near anthills (the nests of *Lasius flavus*),† only a few eggs being deposited on each nest or group of plants. The young larvæ emerge in about nine days if temperature conditions are normal. The earliest food of the young larvæ consists of the buds (flower) and blossoms of the thyme,‡ but they also readily devour one another.† Thyme continues to be the food of the larva until it has moulted three times. At this stage—about twenty days after emergence—it drops from the thyme plants,‡ and it is from this point that our knowledge of the life-history begins to be uncertain. We do not know what are the habitat or the food of the larva in its fourth stage.

We are aware that the insect hibernates as a larva,§ and it may be assumed that it feeds for some time before doing so. We are, however, ignorant as to the periods when it enters on and leaves hibernation, and as to its behaviour during that episode. The larva is full-grown in the first half of June, so that its last stage extends over nine months.

In captivity, at the termination of their third moult, the larvæ refuse to remain longer on the thyme, and jerk themselves from

* 'Entomologist,' xxxii. pp. 104-106; xxxvi. pp. 57-60; xxxviii. pp. 193-94; xxxix. pp. 145-47.

† *Ibid.* xxxvi. pp. 57-60.

‡ *Ibid.* xxxii. pp. 104-106.

§ *Ibid.* xxxix. pp. 145-47.

it on to the earth.* There they proceed to hide themselves behind any suitable pieces of vegetation that they can find, their object being apparently to avoid the light. In the absence of hiding places they simply wander about aimlessly. In the night it is presumed the larvæ search for food; but it is established that at this point they have lost their cannibal habits.† The principal object of the experiments which are about to be described was to discover the natural food of the larvæ after they drop off the thyme plants, and here two clues leading in apparently opposite directions present themselves.

In the first place, the fact that the adult female deposits its eggs on plants growing on or near ants' nests, coupled with the well-known fact that ants are in the habit of milking the larvæ of many Lycenidæ, suggested that the larvæ of *arion* might be fed by ants or find food in their nests.‡ This theory is supported by the discovery in Cornwall barely below the surface of the soil on the top of an ants' nest of three full-fed larvæ † accompanied by one of smaller size—a discovery which definitely established the fact that the insect hibernates as a larva—but, as no more could be found in a large number of nests which were examined, the discovery in question may have been due to an accidental coincidence. There seems to be no reason to doubt that the larvæ referred to had entered the soil for the purpose of pupation, the discovery of two pupæ§ in close proximity to one another by Mr. A. L. Rayward and the author having made it clear that more than one larva may select the same spot for this purpose.

The other theory is suggested by the fact that the larvæ after the third moult eat honey and bore into green peas,† on which food they can subsist for several weeks.

Much discussion has taken place since the publication of the author's previous articles in connection with the two theories which have been briefly mentioned, there being a sharp division of opinion among entomologists. Dr. Chapman (whose knowledge of the earlier stages of European Lepidoptera is probably unrivalled) and those with him are convinced that the larva of *arion* lives within the nests of the ants after its third moult. In opposition to this view it is urged that the eggs may be deposited on the ants' nests only in order that the larvæ may be protected from their natural enemies by the presence of the ants, which milk them; and also that, if the larvæ were ever really in the nests, they must have been found in the course of many thorough searches by the author and others. As to these searches it must of course be admitted that, as only a few eggs are deposited on each nest and the larvæ are so small and in colour resemble the soil so closely in September when some of the searches were

* 'Entomologist,' xxxii. pp. 104-106.

† *Ibid.* xxxvi. pp. 57-60.

‡ *Ibid.* xxxix. pp. 145-47.

§ *Ibid.* xxxviii. pp. 193-94.

made, it is quite conceivable that some might have been overlooked. If further, as seems probable on the analogy of *Cupido minima*, which it much resembles in the larval state, the larva of *arion* should feed up in the autumn and hibernate as a fully fed larva, it would possibly be absent from the nest in the spring when careful searches were also made. While the negative result of these searches is thus explicable on Dr. Chapman's hypothesis, it must necessarily, as was first pointed out by the Hon. N. Charles Rothschild,* militate against it, and it must also be noted that this hypothesis fails to account in any way for the avidity of the larva for green peas.

For the purpose of testing the rival hypothesis the author was able to secure, through the kindness of Mr. H. St. J. Donisthorpe, a number of living colonies of the yellow ant (*L. flavus*) in observation nests. These observation nests are ingenious contrivances by which one is able to study in close detail colonies of ants living under circumstances closely resembling their natural condition. Incidentally, it may be mentioned here that the individuals composing a colony of *L. flavus* hibernate during the winter. They do not feed at all, nor is any food stored in the nest at this season. When a larva which had completed its third moult was placed in an observation nest containing *L. flavus*, it wandered from partition to partition as if in search of something. It was occasionally milked by the ants, but otherwise they took no notice of it, and it ate nothing except a little honey which had been placed in the nest for the ants. On the other hand, if a fresh green pea or a scarlet runner bean was offered to the larva it at once bored into it and commenced to feed. This experiment, which was repeated a number of times without any material variation in the results, seems to the author to prove conclusively that the larva of *arion* does not feed on the ova, larvæ, pupæ or imagines of the ants, nor on their ejecta or excreta. It also proves that the ants do not feed it, though they might of course procure food for it.

In another experiment, a portion of an ants' nest was placed in a glass cylinder with a little vegetation on the top. The colony inside was small, but appeared to be otherwise in a normally flourishing condition. A larva of *arion* which had just completed its third moult was then placed on the surface of the nest and carefully observed. The larva gave no indication of a desire to burrow into the nest or to approach the ants. It roamed about for a while, then rested beneath a small fragment of a grass root and finally succumbed. This experiment also appears to furnish convincing evidence that the larva does not normally live within ants' nests.

It occurred to the author as an alternative explanation that

* Ent. Rec. xxiii. p. 40.

the larva might conceivably subsist on the aphides which frequent roots on the surface of the soil, or on swellings produced by these aphides on the plants on which they feed, or on the excreta of these minute creatures, if any be deposited on the surface of the soil; but it must be admitted that any such explanation is unlikely to prove correct. On the other hand, the structure and characteristics of the larva of *arion* so closely resemble those typical of larvæ of other Lycænida that possess burrowing habits and subsist on succulent vegetable substances that, even if we were ignorant of the known fact that it feeds on fresh peas and beans, it would be difficult to avoid drawing the obvious inference.

A FEW COMPARATIVE NOTES ON SOME DIURNI IN THE SEASONS 1912 AND 1913.

BY R. M. PRIDEAUX.

WHERE not otherwise stated, the following observations relate to the sandy wooded uplands in the neighbourhood of Brasted Chart, extending from Sevenoaks to Crockham Hill; with a few notes from the parallel range of chalk hills (the North Downs) from Otford to Oxted.

The season of 1912 began favourably, as was to be anticipated after the exceptional summer of 1911, and butterflies appeared early and in abundance.

The wet and cold summer that ensued, however, was so prohibitive of insect activities that 1913, in my experience, has been one of the worst seasons (especially the opening months) of which I have any records. The later appearances and second broods produced, it is true, specimens in more normal abundance.

Pieris brassicae.—1912. From May 10th fairly common; second brood scarce.—1913. First brood scarce; single specimens from May 5th; second brood common from July 11th (in S. Devon) and July 28th here.

P. napi.—1912. The first brood abundant from April 24th, but somewhat undersized specimens; second brood scarce.—1913. First brood scarce from May 21st; second brood in abundance.

P. rapæ.—1912. From late April common; later scarcer.—1913. First brood scarce, not seen before May 11th; second brood in normal numbers.

Euchloë cardamines.—1912. First appearance (a female, curiously enough), April 21st; subsequently very common; ova found May 6th. Three males were seen fluttering round a pair *in cop.* for several minutes, May 10th. In the Boscastle district (N. Cornwall), where a fortnight was spent at the end of June and beginning of July, males of this species were recorded as late as June 24th.—1913.

Scarce and late, like nearly all the spring-emerging species; not recorded till May 13th.

Colias edusa.—1912. This species was evidently not rare at the end of June near Boscastle, but the cold and wet weather prevailing at the time precluded many chances of observation. A female, captured on the 23rd, lived for several days, but subsequently died without laying.—1913. The prevalence of "Clouded Yellows" this year has been a bright feature in an otherwise cheerless season. On June 3rd a female flew past me, near Westerham; on the same day my friend, Mr. F. Gillett, captured one on the N. Downs near his house, from whose ova he was successful in rearing some specimens, and on the 15th a chance meeting with a collector at Crockham Hill revealed another female, just taken by him. As our records show, these early specimens were the precursors of an abundant later emergence. From August 16th to the 25th (and doubtless later) the species was common on the slopes of the N. Downs, males greatly preponderating. The absence of any record of the species in the first fortnight of July, which was spent near Salcombe, S. Devon, is noteworthy, as it is usually to be found in those parts; presumably, the period was just "between the broods," which will also account for the absence of *Pierids* during this visit, with the exception of one *P. brassicæ*, on July 11th.

Gonepteryx rhamni.—1912. This species is usually seen fairly commonly throughout these wooded hills, on which *Rhamnus frangula* grows plentifully; and in the spring of 1912 they were in rather unusual abundance from March 11th onwards. Eggs were found towards the end of April, and on the 28th seventeen were counted, all laid close together, on one shoot of buckthorn—an occurrence the more remarkable in that on several adjacent bushes no ova could be found. Larvæ that hatched on May 5th pupated on June 7th, and produced butterflies early in July. Scores of these butterflies were released in my garden, but scarcely any specimens were subsequently seen at large there or in the adjacent woods, only five examples being recorded—four of these on September 8th and 21st, and one only during the miserably wet and cold August.—1913. For the first time during nearly thirty years of recorded observations have I failed this spring to see hibernated specimens of this butterfly, nor could I discover that they had been seen by others in this immediate district. Mr. Gillett noted a few on the N. Downs, and I saw one male at Mereworth on June 14th. It is therefore scarcely surprising that the species in its summer emergence has been far to seek, only one being seen here, on September 28th. On the other hand, on the chalk hills opposite they have been fairly common this August. Although more eggs appear to be laid on the exposed and shrubby buckthorn bushes hereabouts, yet the larvæ would seem to survive their enemies more successfully on the spreading tree-like growths of *R. frangula*, which grow under the deep shade of beech and other trees. Here I have found them full-grown frequently, but have searched for the pupæ in vain, except on one occasion, when one was found attached to a stem of heather some yards from the food-plant.

Vanessa urticae.—1912. After hibernation, April 17th. Not

very common in the summer. Full-grown larvæ were found here as late as September 27th, producing butterflies (in captivity) at the end of October until November 6th, all undersized specimens.—1913. Not very common at any part of the season in my experience.

V. io.—1912. A few hibernated specimens (the species is never abundant up here) from April 18th, on which date a specimen was seen feeding at sloe-blossom. Near Boscastle, at the end of June, the larvæ of this species and of other *Vanessids* were remarkably plentiful, and on one large nettle patch near Camelford, on July 1st, larvæ of *V. Io*, *V. urticae*, *Pyrameis cardui*, and *P. atalanta* were all found feeding together. I do not record a single specimen of the fresh emergence here for 1912.—1913. I have not seen this species at all here this year. Larvæ were full-fed near Salcombe on July 1st, one imago seen near Dorking, August 30.

Pyrameis cardui.—1912. This was *the* butterfly of the season in my own experience, the early migrants especially appearing in very unusual numbers. The condition of these specimens varied largely, from (apparently) freshly emerged ones to such tattered, bleached survivals as, but for their flight, would have been hardly recognizable. The first was seen here on May 14th, feeding at the blossoms of the white beam; and from this date till near the end of June (when I left home for a fortnight) they were everywhere—throughout the woodland, by roadsides, in gardens, &c. Bugle flowers were often an attraction, but more commonly they preferred settling on bare ground exposed to the sun. Ova were laid readily on field thistle in captivity on May 19th, but after reaching a half-grown condition the subsequent larvæ (which hatched in eleven days) mostly died off from no apparent cause, as did many others that were captured at large. This high mortality, which is quite contrary to my experience of the species, was a feature of the season, Mr. Newman tells me, in regard to this and other larvæ, and was apparently due to climatic conditions. The butterflies were still in abundance near Boscastle in early July (still in “hibernated” condition mostly), where larvæ were also found on thistle and nettle; and larvæ were common hereabouts at the sides of cornfields, &c., during the remainder of July. On July 16th I had the supreme good fortune to find a pupa near Sevenoaks spun up in thistle, which the very next morning produced a superb aberration of the butterfly, closely resembling that figured in Newman’s ‘Butterflies’ (p. 64). The first freshly emerged specimen was seen on July 24th, and throughout the following month, whenever the wretched weather permitted their appearance, specimens were to be seen, but in nothing like the abundance that the profusion of their progenitors would have led one to expect.—1913. Only one “early” specimen was seen here, a very fresh one, on May 30th, but specimens were not rare near Salcombe early in July. I only record one newly-emerged one here, on August 28th, and one larva, on July 18th, which soon died.

P. atalanta.—1912. After *cardui* this species was most noteworthy hereabouts. First seen, May 12th, at holly blossom, and common during the remainder of the month. At the end of June and early July specimens of variable freshness were frequent near Boscastle. I witnessed the laying of an egg on July 4th, hatched

on the 12th, pupated August 16th, and emerged September 12th. Larvæ were more abundant than I have ever known them, first in N. Cornwall and subsequently hereabouts. Specimens were bred from larvæ (or pupæ), found at large, from July 19th until Nov. 21st, with scarcely a week intervening without an emergence. Unlike the experience with *cardui*, there was practically no mortality amongst the larvæ, either from parasites or from any other cause. The later appearance of the butterflies in nature was, of course, largely interfered with by the wet and cold season.—1913. Two "hybernated" specimens, on June 3rd, here, and one on July 2nd, in S. Devon, are the only earlier records for the species I have for this year. Fresh specimens were observed, singly, from August 28th until October 18th; not a sign of the larva—so common the preceding year—have I seen.

Argynnis euphrosyne.—1912. These extensive woodlands, disappointing as they are in regard to butterfly life in general, are specially so where the *Argynnids* are concerned. *A. euphrosyne* is the only species to be relied upon, and that is far from abundant. In May, 1912, from the 10th onwards, it was much commoner than usual.—1913. Scarcer this season, like most species; also later, from May 24th until June 11th. Always more abundant in Mere-worth Wood, some miles east of Sevenoaks, but this is outside the radius under discussion.

Epinephele janira.—1912. First seen June 14th.—1913. First seen June 13th—an early date, considering the delayed appearance of most species. I saw the last specimen on October 9th on the N. Downs, and it could doubtless have been recorded there even later in this warm and sunny autumn by residents on those more favoured and flowery hillsides.

Zephyrus betule.—1912. A few full-grown larvæ near Boscastle, beaten on June 22nd, all subsequently found to be ichneumonid.

Thecla rubi.—1912. On the N. Downs on April 27th. A few single specimens on these hills (where it is never common) in May; still out on the N. Downs on July 13th. Seen *in cop.* in N. Cornwall, July 4th, and on the same day a specimen was seen to oviposit on gorse, the egg being laid near the tip of a shoot in the axil of a spine.—1913. One, May 24th, near Sevenoaks; the species still abundant on the S. Devon coast, in the first week of July.

Chrysophanus phleas.—1912. From May 13th, common; abundant near Oxted, May 23rd, the later appearances pretty common. Last record October 4th.—1913. Very scarce in the early part of the summer; first seen June 2nd. Not one specimen was recorded in S. Devon during the first fortnight of July, though butterflies in general were there fairly plentiful. The late summer specimens were pretty common on the N. Downs, and one was seen in Kew Gardens on August 20th.

Lycæna alsus.—1913. This butterfly has been very scarce in its localities near Otford this season, where it is usually to be found in profusion.

L. icarus.—1912. First appearance, May 21st, on these hills; abundant on May 23rd on the N. Downs, where a male specimen was found drying its wings at about 2 p.m. Second brood pretty

common on the chalk, but scarce here.—1913. Remarkably scarce and late; not seen at all by me until June 13th at Oxted, and then by no means common; and Mr. Gillett tells me he only observed the species a few days earlier near his house on the N. Downs, a few miles further east. The second brood has, however, been abundant on the N. Downs, but by no means common hereabouts.

L. corydon.—1912. Two males, July 13th, near Otford; females egg-laying near Oxted, September 7th.—1913. Both sexes, only moderately common, near Oxted, August 14th.

Cyaniris argioides.—1912. Some six or eight years ago this butterfly was by no means common hereabouts, in spite of the abundance of holly throughout the woods. Latterly, however, it has appeared in profusion, and even the adverse season of 1912, so detrimental to many species, seems to have affected this one less than most. From April 18th, when I record the first, a male, *argioides* was abundant everywhere about these hills; rather less so on the chalk. There, where holly is rare or absent, probably *Cornus sanguinea* is one of the principal food-plants of the early brood of larvæ. On May 9th I saw a female lay one egg on an immature flower umbel of this shrub just beneath a bud, and larvæ subsequently fed on the petals and unripe berries, rejecting calyx or leaves. It may be of interest to note that near Boscastle, late in June, being unable to find dogwood thereabouts, immature berries of privet and elder were offered the larvæ but rejected, they having to be fed up finally on holly. The above-mentioned egg hatched in nine days and produced a butterfly on July 16th. Another egg was observed to be laid at the base of the ovary of a holly-blossom on May 11th. The last specimen I record of this brood was on June 9th, at rest upon a fence. The second brood began to appear on July 13th, specimens of which were less abundant than those of the earlier brood, but still common. A larva was found on ivy-bloom as late as September 17th, producing a butterfly on April 17th of this year.—1913. Although not nearly so abundant as last year, butterflies of both broods have been far from rare. First appearance of first brood, April 20th; of the second, July 29th. A specimen in Kew Gardens, August 20th. Larvæ of the second brood have been unusually common on ivy in September last.

Hesperia alveolus.—1912. First appearance, April 27th.—1913. First appearance, May 21st. A perfectly fresh specimen was taken at Mereworth as late as June 14th.

Brasted Chart, Kent, November 1st, 1913.

LEPIDOPTERA AT ALBARRACIN IN MAY AND JUNE, 1913.

By W. G. SHELDON, F.E.S.

(Concluded from p. 313.)

Cupido sebrus.—This species first appeared in the sainfoin fields on May 24th, it was not abundant then, but later we found it

common at the bottom of hot dry gorges, in company with *Melitaea desfontainii* and other species.

The specimens perplexed us a good deal, for they varied in expanse from 23 mm.—31 mm. and also in tint on the upper sides and in spotting on the under sides; and bearing in mind that Zapater gives the nearly allied *C. lorquini* as occurring, one could not be certain that some of the specimens were not that species. Mr. Rayward's careful examination of the genitalia, however, proves them to be all *C. sebrus*. Nearly all possess the second spot from costa on hind wing underneath, the absence of which is given by Kane as a distinguishing characteristic for *C. sebrus*.

Cyaniris semiargus.—Only a few specimens seen, the first on June 7th. Zapater speaks of this species as not being common in the district.

Nomiades cyllarus.—A very fine form was abundant in the sainfoin fields in May. Expanding up to 37 mm. both sexes have numerous bold ocelli underneath, and the blue at the base of the wings, upper side, in the females is much brighter than is the case in French specimens.

Polygonia e-album.—One or two specimens were seen by Mr. Jones after I left. Zapater speaks of it as rather scarce.

Eugonia polychloros.—Larvæ were frequent on elm, and the imago was just coming out on June 20th.

Aglais urticae.—Larvæ were common in May, and the imago bred therefrom proved to be a very magnificent race, with an average wing expanse of 60 mm., and no doubt this expanse would be considerably increased in the largest captured examples. The chief characteristic of the race, apart from size, is the richness of the tawny ground colour, which in this respect equals that of the Corsican form var. *ichnusa*, the width of the band on the hind wings in many examples, and the almost total suppression of the pale patches in the tawny bands, especially the one nearest the anal angle of the superiors. On my previous visit to the district I had noticed the rich coloured examples of this species, but they were not common and were strong on the wing, and I was then not able to secure a specimen for comparison. This form appears to be a well marked geographical race, which approaches in size and characteristics the Chinese form var. *chinensis*. I propose the name of var. *teruelensis*, n. var., for it. (See Plate xii., figs. 1, 2.)

Pyrameis cardui.—Abundant.

P. atalanta.—Not common, a few larvæ and imagos.

Melitaea desfontainii.—This fine Spanish species was first seen on May 24th in the Guadalavivier gorge near Santa Croche. Until June 7th we found it very scarce, only capturing one or two examples each day. On this date, however, Mr. Jones, on other species intent, prospected a cross gorge which came down to the main one, and discovered that this species was common in it, and from there we got as many specimens as we required. Afterwards we found it in similar places elsewhere, such as "The Vega," and on June 18th it was abundant at Losilla.

The males frequent the bottom of hot stony gorges, settling upon the rocks, taking short flights, and when not startled returning to

the spot they started from; the flight is characteristically *Melitaea*-like, and the specimens are not by any means easy to net. The females, which we did not find numerous, were occasionally to be found in the gorges, but more frequently in the undulating clearings on the ground above; in these clearings between the savin trees there was usually plenty of the reputed food-plant, a species of *Thymus*, which Zapater calls *T. aestivalis*. The specimens vary a good deal, within certain limits, but are always abundantly distinct from those of any other species. My largest male and female expand respectively 52 mm. and 57 mm.

M. phoebe var. *occitanica*.—Common generally, first seen on June 1st.

M. deione.—Fairly common, but very local, only found in the main gorge at Santa Croche. The specimens are much like those I have taken at Granada, var. *nevadensis*, but the females are not so large or so variegated, my largest Albarracin and Granada females expanding 49 mm. and 54 mm. respectively.

M. athalia.—Zapater speaks of this species as being very rare; he is probably right, for the only example we came across was a male taken by Mr. Jones, in the Guadalavivier Gorge, above Albarracin, on June 23rd; the specimen is undoubtedly this species, and is a fine, strongly marked form.

Erethis hecate var. *aigina*.—This species, which in my previous visit I had taken at Bronchales and Losilla, was very late in appearing; Mr. Jones obtained a few examples at the latter locality on June 23rd; and again on June 28th; they were confined to a very small spot.

Issoria lathonia.—Common everywhere.

Argynnis aglaia.—Common at Losilla on June 23rd.

A. niobe var. *eris*.—Common at Santa Croche at the end of June.

Dryas pandora.—Frequent generally; first seen on June 18th.

Melanargia lachesis.—Common in some meadows near Santa Croche at the end of June.

M. japygia var. *cleante*.—A few specimens were taken by Mr. Jones at Losilla on June 23rd and on June 28th.

M. ines.—I first took a specimen on June 13th, on a hilltop on the way to Losilla; then, on June 16th, about half a dozen others on the hills skirting the Vega. At the end of June I understand it became frequent, generally on the dry hillsides. The Albarracin form is rather smaller than my Malaga specimens. Mr. Jones has one specimen which is without the pair of ocelli on the costal margin of hind wings.

Erebia epistygne.—The mention of this species being found near Albarracin in Zapater's Catalogue was one of the reasons why I felt compelled to time my visit early in May, for it seemed probable that specimens from this locality would prove distinct in some way from Southern French examples; and as British collectors had never met with them, and there were no specimens in the National Collection, I was very curious to see what they were like. We therefore made our first excursion at Albarracin for this species on May 15th. Puerta de la Losilla, the nearest locality given by Zapater, is a good four miles, uphill grind, from the town, and we did not meet with

our first specimen until we had got fully three miles beyond Losilla. Here, on stony, hilly ground, *E. epistygne* was not uncommon, and in two visits we obtained all we wished for. Afterwards we found odd examples amongst the hills in many directions round the town, and on one occasion I netted a male flying in a sainfoin field in the Valdevecar. The form, which is quite distinct in many respects from the French race, I have figured (Plate xii., figs. 6 and 7), and propose the varietal name of var. *virialthus*, n. var., for it. It differs from its French congeners in size, the average wing expanse being about 46 mm., as against 54 mm., which is the average wing expanse of my Provence specimens; also in the narrower dark anal border to superiors—in some cases, as in fig. 7, this border is hardly perceptible—and the lighter anal tip to superiors; the ocelli on all wings are more prominent, and the under sides are more grey, not so brown.

Hipparchia semele.—Males of this species were first found on June 17th.

Pararge maera var. *adrasta*.—A fine and extreme form of this was not uncommon in May.

P. megaera.—Generally common.

Epinephle lycaon.—Mr. Jones captured a few males during the last days of his stay. There is a very fine form of the female, of which I have specimens, both from Albarracin and La Granja, and which is in other collections from Spain. This I have figured (Plate xii., fig. 4), and propose to name ab. *boopis*, n. ab. In this form, as will be seen, the ocelli on the superiors are much enlarged by black shading, especially the one nearest the anal angle.

E. pasiphae.—Common everywhere from June 8th, on which date the first specimens were seen.

Cænonympha dorus.—A few males were met with towards the end of June; later on the species swarms; they do not differ materially from Basses Alpes specimens.

C. iphioides.—This Spanish species was common at Losilla from June 11th onward. The specimens are not so large, nor are the ocelli so prominent as in my La Granja examples.

C. pamphilus.—Frequent, but not common; a small, weak form.

Carcharodus alceae.—Apparently not common; I only saw one example.

C. altheae.—A single specimen taken by Mr. Jones, superficially identical with Swiss examples of this species, Mr. Rayward finds is actually it.

C. baeticus.—Not common, but one picked up odd specimens everywhere. A good proportion of these were netted as they were flying at the blossoms of *Marrubium*.

C. lavaterae.—Not infrequent by the roadside at Santa Croche from June 5th. The form is a small one, my largest example expanding only 34 mm.; the ground colour of the superiors is rather browner than in Swiss specimens.

Pyrgus proto was just coming out at the end of June; later on it is abundant.

P. sao.—Abundant generally. A form with very red under sides to the inferiors.

Hesperia carthami.—Very abundant; a rather small and brightly marked form first seen on June 6th. Mr. Rayward made certain of the identification by the genitalia.

H. cirsii.—Some examples of a species of *Hesperia* taken by me at the end of July, 1905, prove, on an examination of genitalia being made by Mr. Rayward, to be this species; they were abundant at that time in the Vega, and also at Santa Croche.

H. serratulae.—A Hesperid which was first met with on June 18th, and which superficially appeared to be this species, was found on examination of the genitalia to be it. Specimens were taken at Santa Croche and Losilla, but they were not abundant.

H. onopordi.—This species was fairly common. The first examples were taken on May 19th, and it continued in good condition until the end of June. The identification was confirmed by Mr. Rayward's preparation of the genitalia.

H. malvoides.—Zapater speaks of *H. malvae* being not scarce. Undoubtedly by this is meant *H. malvoides*, which we did not find uncommon. A preparation of the genitalia by Mr. Rayward shows it to be this species. First taken on June 10th.

Nisoniades tages.—Not infrequent from May 19th; all that we saw were var. *cervantes*.

Adopaca flava.—A few specimens were captured. It is not mentioned in Zapater's Catalogue, and is the only species of *Rhopalocera* we met with that is not.

The Heterocera were not much worked, but the following species were taken or identified:—

Aglaope infausta, *Anthrocera rhadamanthus* var. *cingulata*, *A. sarpedon*, *Arctia fasciata*, *Pseudopterna coronillaria*, *Gnophos maucidaria*, *Acidalia rubellata*, *A. rubiginata*, *Athroolopha pennigaria*, *Eurranathis plumistaria*, *Rhodostrophia calabraria* var. *tabidaria*, *Heliothis cardui* var. *purpurata*, *Leucania vitellina*, *Calophasia almoranda*, *Metopoceras chalcidja*, *Athetis hispanica*, *Acontia lucida*, *Erastria viridisquama*, *Tarache lucida*, *Pyrausta sanguinalis*, *P. diffusalis*, *Cledeobia mollavica*, *Cledeobia bombycalis*, *Crambus craterellus*, *Evergestis frumentalis*, *E. umbrosalis*, *Heterogynis penella*, *Aneylis unguicella*, *Pleurota bicostella*.

Youlgreave, South Croydon: September 4th. 1913.

NOTES AND OBSERVATIONS.

BISTON HIRTARIA THREE YEARS IN PUPÆ.—On April 9th, 1910, I was fortunate in finding this insect *in cop.* and I successfully reared a good number of the larvæ. The larvæ were a fine healthy lot, and were all down before the end of July. Not one specimen had appeared by April, 1911. The pupæ were alive and healthy, but showed no signs of emerging. They were always kept outside. On March 29th, 1912, three fine *hirtaria* appeared, one male and two females, and moths continued to emerge up to April 10th, though still a number failed to do so. On March 27th, 1913, one female appeared,

and between this time and April 11th twenty-nine fine specimens in all emerged.—ROBERT LAWSON; 4, Moncrieffe Terrace, Craigie, Perth, N.B.

COLEOPTERA OF GLAMORGAN.—The first instalment of an annotated list, by Mr. J. R. le B. Tomlin, of Coleoptera known to occur in the county of Glamorgan, will be found in 'Report and Transactions of the Cardiff Naturalists' Society for 1912,' vol. xlv. pp. 41-58. Nearly three hundred species are entered as follows:—Cicindelidæ, 2; Carabidæ, 175 (4 doubtful); Haliplidæ, 6; Pelobiidæ, 1; Dytiscidæ, 52 (1 doubtful); Gyrinidæ, 5 (1 doubtful); Hydrophilidæ, 58.

LEPIDOPTERA OF HASLEMERE.—Mr. F. A. Oldaker has compiled an excellent list of the Lepidoptera occurring within six miles of Haslemere. This was recently published as 'Science Paper No. 5,' by the Haslemere Natural History Society. Two photographic plates and a map of the district accompany the list.

HADENA OLERACEA DESTRUCTIVE TO TOMATOES.—I believe it has not been brought to the notice of entomologists what havoc *Hadena oleracea* is creating amongst tomato growers. Tomato growers are suffering great losses all over the country (especially during this year) through this pest; and the trouble seems to be on the increase. In September I visited the nursery of a friend of mine who is one of the largest tomato growers in the North of London, and he showed me a bucket nearly full of pupæ which his men had collected to burn. These all came out of one house. The only remedies seem to be to collect the larvæ by hand, which is a slow process, and to take the top layer of soil off when the insects are in the pupal stage and burn it, which also means a great deal of labour. Of course being under glass the insects are protected against birds, and, though I examined a great number of larvæ and pupæ, I failed to find one ichneumonid. Being thus protected against two of their greatest enemies, the insects increase apace and make the nurseryman's fight against them all the harder. If any of your readers can suggest a better and more effective remedy than the two I have mentioned, I should be most grateful to hear from them. I have suggested that when the insect is in the imago state next year fumigation might be tried, but I am rather doubtful as to the efficacy of ordinary fumigants on an insect with so much vitality as *Hadena oleracea*.—B. S. WILLIAMS; 77, Durham Road, East Finchley, N.

ABERRATION OF BARATHA (MAMESTRA) BRASSICÆ.—On July 14th my father brought in to me a fine var. of *M. brassicæ* which he had found on a fence locally. The ground-colour is pale ochreous brown with dark fuscous markings, but the most remarkable point about the insect is the curious formation of the stigmata. The reniform and orbicular are joined by a white line, as in *P. piniperda*, only instead of being joined at the bottom, as in *piniperda*, they are joined at the top, giving the specimen a most extraordinary appearance. I also bred a fine form of this insect this year; the whole of the upper wings being suffused with deep blackish fuscous except the sub-terminal line, which is bright yellowish ochreous and broad, not

whitish and narrow, as is usual with this species.—B. S. WILLIAMS; 77, Durham Road, East Finchley.

COLIAS EDUSA NEAR OXFORD.—During the last week in August, at Stanton Harcourt, about ten miles from Oxford, I saw about a dozen specimens of *C. edusa*, and captured three, only one of which was in really good condition. They were all males, and were seen in one clover-field.—CHAS. F. THORNEWILL; 15, St. Margaret's Road, Oxford, November 3, 1913.

BIRDS EATING BUTTERFLIES.—Referring to Lieut.-Col. Mander's note on this subject (*antea*, p. 292), I may say that when watching lucerne fields at Folkestone last August I frequently saw birds carrying what looked like pieces of paper into the hedges. I carefully stalked them and hid myself near. I then saw a sparrow fly out, pick off a butterfly and fly with it into the hedge. They did it frequently while I watched. None were caught on the wing, but picked off as they settled. Although *Colias edusa* and *Vanessa urticae* were quite common, I never saw one taken, only common "whites," *P. brassicae* and *P. rapae*.—R. H. RATTRAY (Colonel); Tonbridge, Kent.

MANDUCA (ACHERONTIA) ATROPOS IN IRELAND.—On October 12th, 1913, I secured a specimen of *M. atropos* on the road running from Newbridge to the Curragh, about a mile from the town. The moth was at rest in the gutter, and the day was drawing to a close. Although I frequently hear of captures of this species in Ireland, this is only the second I have had the good fortune to meet with in that country.—H. T. STONEHAM; Stoneleigh, Reigate, Surrey, November 5th, 1913.

MANDUCA (ACHERONTIA) ATROPOS AT BRISTOL.—A fine male specimen of *Manduca atropos* was captured on October 19th in the graveyard of Bristol Cathedral, at rest on the wall of the Berkeley Chapel, by Mr. Hayward, Subsacrist.—GEO. C. GRIFFITHS; Penhurst, 3, Leigh Road, Clifton, Bristol, November 10th, 1913.

HIPPOTION (CHEROCAMPA) CELERIO IN SUSSEX.—I have recently received from Mr. W. B. Ellis, of Arundel, a specimen of the above moth. The insect was captured by a lady on a window in Arundel on September 24th, 1913. Except for slight damage to the left lower wing, the specimen is in fine condition.—G. B. CONEY; The Hall, Batcombe, Evercreech.

TORTRIX PRONUBANA.—On October 17th I took a male specimen of this moth on a shop window in Notting Hill Gate, W. I believe that this is the most easterly point at which it has been observed in the London district.—E. G. JOSEPHS; 23 Clanricarde Gardens, Bayswater.

COLIAS EDUSA IN BUCKS.—Referring to my notice of *Colias edusa* (p. 290, *antea*, where for "conifer" read "juniper"), circumstances prevented my visiting the Chilterns hereabouts again until the end of September. The 27th was a very hot, beautiful day, and at 5 p.m. the temperature in the shade stood at 72 deg., despite the fresh

south-east wind blowing. I had marked out in my mind a special spot on the chalk hills where I might expect to meet with our "Clouded Yellow" in a favourable season, nor was I disappointed, for though practically all other butterflies, except *G. rhamni*, and belated females of *A. melon*, had disappeared, I saw at least a dozen *edusa* in all, the males quite fresh, while I also had the pleasure of watching a worn female ovipositing. She chose by preference the most stunted plants of a *Medicago* growing sometimes actually in the gutter of the road, at this point confined between steep chalk banks well covered with *Helianthemum*, *Hippocrepis*, and scabious. My presence in no way disconcerted her movements; and she passed several times up and down the roadside, laying, I should think, quite a score of eggs, one at a time, and never two on the same small spray. Of these I brought a few home with me *in situ*, but when I came to open the air-tight box in which they were carried, a week later, I could find no trace either of larvæ or ova, and I think the young larvæ must have emerged and perished in the curled dry leaves which had been shaken out previous to examination. Cycling home by way of Tring, later in the day, I captured another perfect male on the side of the road just south of Aston-Clinton, and from the window of the train in the morning I had spotted yet another *edusa* on the railway bank between Chorley Wood and Chalfont Road Stations, where I see the late Rev. F. A. Walker met with it on September 13th, 1900 (*Entom.* vol. xxxiii. p. 273). We may conclude, therefore, that the butterfly had been widespread in south and mid Buckinghamshire during the month. But to which brood did these newly emerged males side by side with worn females belong?

My own third-brood imagos were bred from ova deposited by a female taken in the Warren, Folkestone, about August 19th, and sent me by Mr. L. Newman. By the 28th all of the twenty-four were hatched, and they fed exclusively on *Lotus corniculatus*, refusing *Trifolium pratense* when it was introduced. But though there was comparatively little difference in the dates of emergence, individual larvæ developed much quicker than others. For instance, on September 28th, when the first three hung up for pupation, others were no more than an inch long; and I noticed that there is one moult, the third, which was most critical, seven or eight perishing at this stage apparently from exhaustion, as they ceased eating entirely, shrunk, and fell comatose from the food-plant. After remaining three days rigid on the leno, pupation took place with the "forwards" (about thirty-three days from hatching). On October 21st-22nd three full-sized females emerged (that is, about three full weeks after pupation). Meanwhile, the third emergence, apparently, was proceeding in Buckinghamshire under natural conditions, and on October 9th, another magnificent day, I was once more on the Chilterns, and at the same spot where I had watched the female *edusa* ovipositing on September 27th, my companion, Mr. N. C. Rothschild, bagged a single fresh example of the same sex. I see Mr. Newman in his recently published book of 'British Butterflies and Moths' says that "this larva may be forced from August ovum" (p. 18). This year, at all events, no artificial warmth has been required to mature the third brood.—H. ROWLAND-BROWN; Harrow Weald, October 26th, 1913.

ENTOMOLOGICAL CLUB MEETINGS.—July 5th, 1913, at Jesus College, Oxford. Professor E. B. Poulton in the chair. Other Members present were Mr. Horace Donisthorpe and Mr. W. Borrer (Hon. Member).

July 12th, 1913, at the Hand and Spear Hotel, Weybridge. Mr. Porritt in the chair. Other Members present were Mr. R. Adkin, Mr. H. Donisthorpe, Mr. T. W. Hall, and Mr. A. Sich; also Mr. R. South (Hon. Member).

October 24th, 1913, at Stanhope, The Crescent, Croydon. Mr. T. W. Hall in the chair. The other Members present were Mr. R. Adkin, Mr. H. Donisthorpe, Mr. H. Rowland-Brown, and Mr. A. Sich; also Mr. J. E. Collin and Mr. E. A. Smith (Hon. Members).

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*Wednesday, October 1st, 1913.*—Mr. G. T. Bethune-Baker, F.L.S., F.Z.S., President, in the chair.—Herr Wilhelm Junk, 68, Sachsische-strasse, Berlin, W. 15, was elected a Fellow of the Society.—Mr. H. F. Bartlett exhibited a specimen of *Haplothorax burchellii* found under a stone on the lower part of Flagstaff Hill, St Helena, on March 25th, 1913.—Mr. P. A. Buxton, specimens of larval and imaginal Embiidæ (species as yet undetermined) from various localities in Tunis and Algeria and from the coast to south of the Atlas Mountains.—Mr. E. E. Green, a Drilid (?) beetle, from Ceylon, with remarkable elongate spatulate mandibular and maxillary palpi.—Mr. W. J. Lucas, on behalf of Mr. G. T. Lyle, some silk wound from a Braconid cocoon, together with specimens of the cocoons themselves.—Mr. C. B. Williams, specimens of the cocoons of the three British Coniopterygids.—Dr. F. A. Dixey, several boxes of Lepidoptera in illustration of the geographical relations of Mimicry.—Prof. Poulton read an extract from a letter written by Mr. C. F. M. Swynnerton, showing that the *hippocoon* form at Chirinda in S. E. Rhodesia is, genetically, just as predominant as the *cenea* form is in the Durban district.—Dr. Burr exhibited a specimen of *Diastrammena marmorata*, Haan, a Stenopelmatid Locustid from Japan, which occurs alive in Relf's Nursery at St. Leonard's.—Mr. H. Rowland-Brown, an example of *Araschnia levana*, sent him by Mr. T. Butt Ekins, of Penarth, who said that he had captured it at the end of May this year, on the outskirts of the Forest of Dean.—Commander J. J. Walker, a female *Colias edusa*, F., taken by himself in the Isle of Sheppey, August 21st, 1913, in which the margin of the hind wings was almost entirely clear golden yellow. Also a specimen of a *Ceramidia* near *C. chloroplegia*, Druce, taken by a lady in a fruiterer's shop in North Oxford; no doubt imported with fruit. Also the following Coleoptera:—(1) a short series of the very rare Halticid beetle *Psylliodes cyanoptera*, Ill., taken in June, 1913, at Wood Walton Fen. (2) A specimen of *Coccinella 10-punctata*, L., var. *confluens*, Harr., taken in the Isle of Sheppey, June, 1912, and another very curious aberration of the same beetle with golden yellow spots from Wytham Park, Berks, July

30th, 1913. (3) The very rare male of *Malthodes atomus*, Thoms., also from Wytham Park, June 14th, 1913. (4) A monstrosity of *Haliplus confinis*, Steph., with three perfectly developed tarsi on the right hind leg.—Mr. Dadd, a collection of Catocalids.—Mr. Durrant, on behalf of Mrs. W. C. Boyd, a series of specimens of British Lepidoptera of great historical interest, which she is presenting to the British Museum.—Mr. H. O. Holford, a specimen of *Canonympa pamphilus* of abnormally large size, taken at Newlands Corner, and a female of *Ematurga atomaria*, almost without markings, from Milford.—Mr. D. Pearson, a drawer of butterflies taken this summer in the Tyrol, including specimens of the large Tyrolean form of *Polyommatus amandus*, and a series of *Erebia euryale* var. *ocellaris*.—The following papers were read:—"Illustrations of Specific Differences in the Saws of Female Dolerids," by Rev. F. D. Morice, M.A., F.E.S. "Additions and Corrections to my List of the Rhopalocera of Trinidad (1904)," by W. J. Kaye, F.E.S. "On the Urticating Properties of *Porthesia similis*," by H. Eltringham, M.A., F.E.S.

Wednesday, October 15th, 1913.—Rev. F. D. Morice, M.A., Vice-President, in the chair.—The following gentlemen were elected Fellows of the Society:—Messrs. Edward O. Armitage, Geelong, Victoria, Australia; F. W. Cragg, M.D., Capt. I.M.S., King Institute of Preventive Medicine, Saidapet, Madras; Walter James Dow, The Cottage, Lynwood Avenue, Epsom; Leslie John William Newman, Dept. of Agriculture, Perth, W. Australia.—Mr. F. H. Gravely exhibited lantern-slides showing the connection between asymmetry and geographical distribution in the Indo-Australian Passalids.—Mr. F. Enoch, photographs of the male and female of a new Mymarid.—Mr. Donisthorpe, specimens of the rare myrmecophilous Diptera, *Platyphora lubbocki*, Verrall, *Ænigmatias blattoides*, Meinert, and *Peyerimhoffia brachyptera*, Kieff.—The Hon. N. C. Rothschild, specimens of *Zygana filipendulæ* from the Isle of Lismore, Scotland, and an example resembling them from Folkestone. Also specimens of *Chrysophanus dispar* var. *rutilus* from Hungary and other localities.—Mr. H. Rowland-Brown, examples of *Chrysophanus dispar* var. *rutilus* captured by him in the marshes of the Gironde below Bordeaux, on August 1st and 2nd, 1911, to compare with the much larger form taken in Hungary by Mr. N. C. Rothschild. Also a specimen of *Agriades coridon* var. *syngrapha*, Kef., taken in the Chiltern Hills on August 9th, 1913, being the first ever recorded therefrom; with several examples of this variety taken by him at Dompierre-sur-Mer, and other female forms.—Capt. E. B. Purefoy, a short series of *G. cleopatra* which included two gynandromorphous specimens. Mr. L. W. Newman, four gynandromorphous specimens of *Smerinthus populi*, three with the left side female and right side male, and one *vice versa*. In three of the specimens there was no trace of variation in the wings either in size or markings, the antennæ only denoting gynandromorphism. Also four curious female specimens of *A. coridon*, three having the right pair of wings much smaller than the left and heavily dusted with blue scales, the left side being normal; also one specimen similar but *vice versa*. All

were taken wild in Herts in 1913.—Dr. G. W. Nicholson, a specimen of *Pterostichus aterrimus*, Pk., from Cloverhill, Co. Cavan. The only other Irish record is from Co. Cork.—Mr. E. E. Green, a transfer of a remarkable aberration of *Telchinia viola*, Fab., taken by Mr. G. Halkett, in Ceylon. Also Jassidæ from Ceylon, parasitised by an undetermined species of *Gonatopus*.—The Rev. G. Wheeler, on behalf of Miss Macbride, a number of living specimens of the Longicorn beetle *Acanthocinus ædilis*, L., taken in a timber-yard at Bow.—Dr. Longstaff, on behalf of Mrs. Waterfield, a box of Sudanese Pierine butterflies taken by her, and on which she contributed notes.—Prof. Poulton, a set of four males and one female, and another of two males and one female, of *Metriorrhynchus semiflabellatus*, Thoms. Both sets were captured at Moor Plantation, near Ibadan, S. Nigeria, by Mr. Lamborn. Also the following insects, bred by Mr. W. A. Lamborn from the nests of Hymenoptera-Aculeata at Moor Plantation:—1. A male *Megachile cincta* (Sept. 17th), and the Cantharid beetle *Zonitis eborina*, Fahr. (Sept. 17th). 2. *Odynerus* sp. inc. (Sept. 17th); the species exists unnamed in the collection of the British Museum. 3. A female *Mutilla floralis*, Klug.—“This female Mutillid emerged July 26th, from a mud nest, probably that of *Sceliphron spirifex*, L., found July 14th.” 4. *Chrysis* (*Tetrachrysis*) sp. inc. (July 26th), *Chrysis* (*Tetrachrysis*) *lyncea*, F. (Aug. 3rd), and *Sceliphron spirifex*, L., female (July 31st). All these insects emerged at the recorded dates, from a mud nest of *S. spirifex*.—GEORGE WHEELER, M.A., *Hon. Secretary*.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*September 25th*.—Mr. A. E. Tonge, F.E.S., President, in the chair.—Exhibition of lantern-slides by members as follows:—Mr. C. B. Williams, an adult male Embiid, bred from a larva from Algeria: also a piece of bark showing the silky tunnels made by the Embiid larva.—Mr. Dennis, flower groups in nature, and the fuller's teazle growing and drying for use.—Mr. Main, details of the life-history of the larch-sawfly, and gave an account of its habits at the different stages.—Mr. Lucas, specimens of the local grasshopper, *Gomphocerus rufus*, from Bookham Common, and also a bred female.—Mr. Newman, *Agriades coridon* from Herts, including ab. *semisyngrapha*, and a female specimen with asymmetrical wings, the smaller pair dusted with blue.—Mr. Curwen, *Brenthis euphrosyne* from several localities, those from the higher Alps being mostly large and light in colour, instead of dark and small as usually stated.—Mr. Moore, the aberration of *Rumicia phleas*, captured during the recent Field Meeting at Worms Heath. The upper and under side of the forewings had much enlarged spots = ab. *magnipuncta*.—Mr. West (Greenwich), a series of the Coleopteron, *Daene rufifrons*, taken from the fungus recently exhibited by Mr. Edwards, and a short series of the beautiful *Cassida vittata*.—Several members reported that *Colias edusa* had been seen in numbers at various places, Boxhill, Margate, Folkestone, &c., and that *C. hyale* had been taken.—HY. J. TURNER, *Hon. Report. Sec.*

RECENT LITERATURE.

Text-Book of British Butterflies and Moths. By L. W. NEWMAN and H. LEEDS. Pp. 1-217. St. Albans: Gibbs & Bamforth, Ltd., 1913.

THIS very well arranged and practical handbook to the British Lepidoptera really seems to be the last thing in collecting made easy, and to the man who wishes to fill his cabinet in the most expeditious manner it is the very thing he has been looking for these many years. We have been waiting a long time for something to replace "Merrin."

The bulk of the book (pp. 16-122) consists of the Treatise—hardly a well-chosen title—given in tabular form under each species (English and scientific names), the time of occurrence of each stage of the insect, its food-plant, and many other useful facts, including localities. And it is very satisfactory to note that under this heading the information afforded, though exact and often detailed, is not such that it would be likely immediately to hasten the extinction of some of our rarest insects. The Systematic Arrangement is a laudable attempt at a difficult task—no arrangement can suit everybody's ideas, but might not the author's names have been included? The list of food-plants is quite useful, and the index, the key to a book of this kind, so far as tested, leaves nothing to be desired. One other point—why have the butterflies been kept separate from the moths throughout? Is it for the benefit of the collector, whose interests do not extend beyond the five dozen odd species to be found in these Islands? In any case, it is a serious drawback to quick reference, and might easily have been foreseen.

The authors are to be congratulated upon so successfully carrying through such an arduous task; the collector, without doubt, will not be slow to reap the benefit.

N. D. R.

Annals of Tropical Medicine and Parasitology. Series T. M. vol. vii. No. 2, Liverpool, June 10th, 1913, and No. 3 A, Liverpool, August 11th, 1913.

As usual this periodical is chiefly occupied, as far as entomologists are concerned, with Diptera in connection with disease. By those who give attention to this subject much matter of interest will be found. More especially concerned with entomology is a report by the entomologist, Llewellyn Lloyd, on *Glossina morsitans*, and the description by Prof. R. Newstead, F.R.S., of a new Tsetse-fly, *Glossina severini*, from the Congo Free State.

W. J. LUCAS.

Thirty-sixth Annual Report and Proceedings of the Lancashire and Cheshire Entomological Society. Session 1912. Pp. 1-56. Published by the Society.

"ICHNEUMONS" form the subject of the Vice-President's Address (Mr. Claude Morley), and Mr. H. St. J. K. Donisthorpe contributes a paper "On Some Remarkable Associations between Ants of Different

Species." A Portrait of the late Mr. Samuel James Capper is also included.

Manchester Entomological Society. Tenth Annual Report and Transactions. 1912. Pp. 1-49. Published by the Society.

Among the contents are two papers—"Notes on the Life-History of the Leaf-Insect (*Pulchriphyllium crurifolium*, Serv.) and the Mantis (*Sphodromantis bioculata*, Burm.)," by Mr. H. S. Leigh; and "Notes on the Actias Group of Saturnidæ and Descriptions of Two New Genera," by Mr. J. Henry Watson. There is also a plate, from a photograph by Mr. R. Tait, Junr., on which are shown twelve interesting aberrations of *Abraxas grossulariata*. The descriptive letterpress accompanying the plate is by Mr. B. H. Crabtree.

Proceedings of the South London Entomological and Natural History Society for the Session 1912-13. With ten plates. Pp. i-xvii and 1-154. Published at the Society's Rooms, Hibernia Chambers, London, S.E.

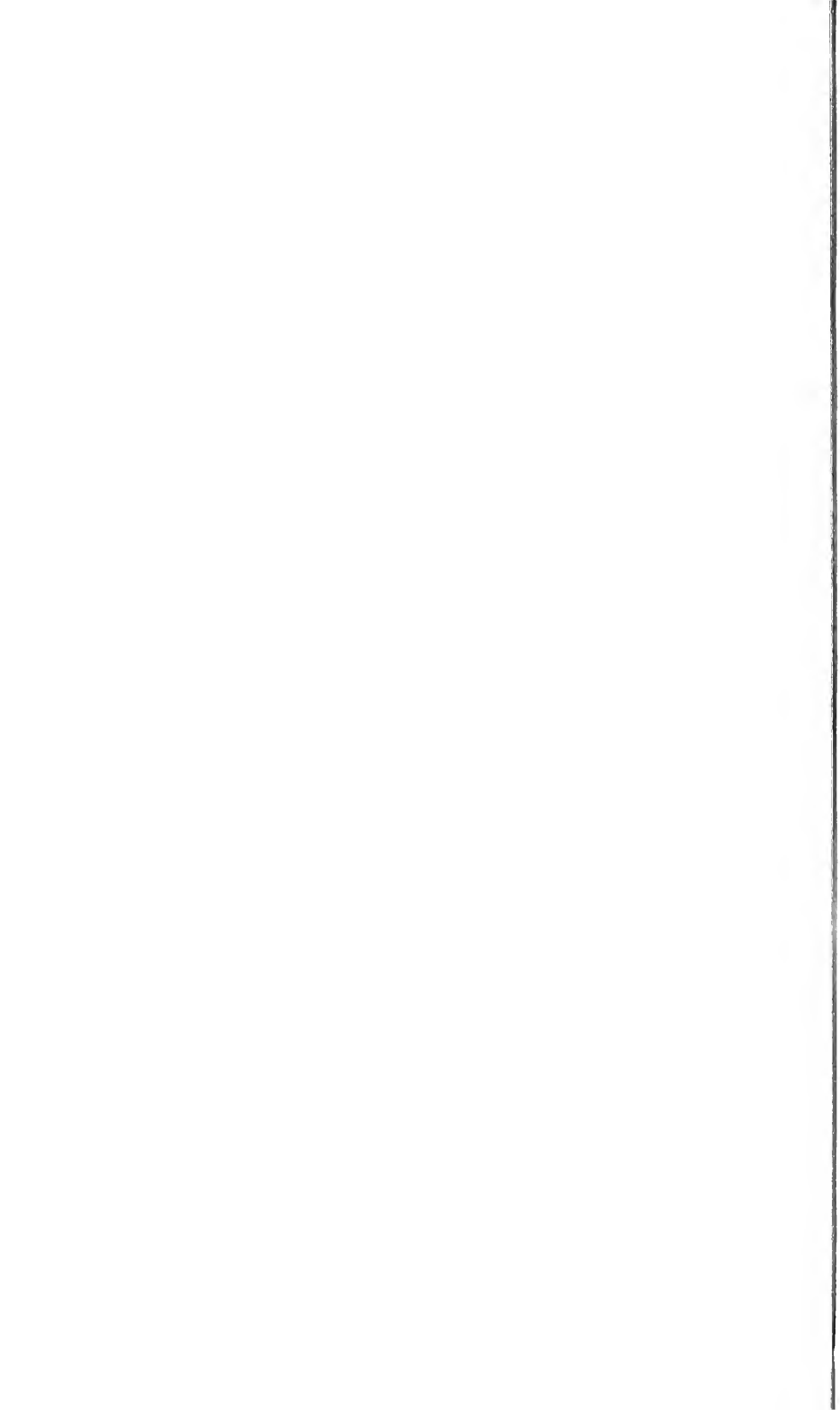
THERE are several papers of very great interest to entomologists in this excellent volume. Among them the following may be mentioned:—"Varietal Names" (pp. 1-6, plates i.-iii.), by Robert Adkin, F.E.S.; "Labelling Entomological Specimens" (pp. 7-12), by R. Adkin; "The Genus *Canonymphe*" (pp. 13-20), by A. E. Gibbs, F.L.S., F.E.S.; "Notes on Earwigs" (pp. 21-27, plates iv., v.), by W. J. Lucas, B.A., F.E.S.; "Mimicry in Coleoptera" (pp. 28-38, plates viii.-x.), by C. J. Gahan, M.A., F.E.S.; and "An Outline of the Generic Types of British Lepidopterous Ova, with some exceptions" (pp. 46-59), by A. E. Tonge, F.E.S. The latter forms part of the "Annual Address."

The three figures on plate vii. depict remarkable beetle larvæ exhibited by Mr. C. J. Gahan; and two specimens of *Pieris napi* var. *bryoniæ* are shown on plate vi.

A Catalogue of the Lepidoptera of Northumberland, Durham, and Newcastle-upon-Tyne. By JOHN E. ROBSON, F.E.S. Vol. ii.—Micro-Lepidoptera. Part ii.—Tineina and Pterophorina. Index to Vol. ii. Edited by JOHN GARDNER, F.E.S. Pp. i-vi and 107-289. London: Williams & Norgate. 1913.

In this instalment—the final one—of the important Catalogue of Northumberland and Durham Lepidoptera compiled by the late Mr. Robson, three hundred and ninety-seven species belonging to the Tineina and fifteen species of Pterophorina are enumerated. Valuable, often copious, notes accompany each entry.

The part now under notice, together with part i. (published in 1905), forms vol. xv. of the 'Natural History Transactions of Northumberland, Durham, and Newcastle-upon-Tyne.' It includes an Introduction by Mr. Gardner, also indexes to genera and species, and a portrait of the author of the Catalogue.





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